Engineering Drawing Questions and Answers – Drawing Tools and their Uses – 1

1. How many battens will be there for a Drawing board?
a) 1 b) 2 c) 3 d) 4
Answer: b
Explanation: Generally drawing board has dimensions of 1000 x 1500, 700 x 1000, 500 x 700, 350 mm x 500 mm, and made of well-seasoned soft wood, so there would be no bending while life increases. And also if size of drawing board increases widely then the board will be fabricated with another 1 or 2 batten.

2. The part that doesn't belong to T-square is _____
a) Working edge b) Blade c) Stock d) Ebony
Answer: d
Explanation: Working edge and Stock are parts of T- square those which make 90 degrees with each other, the blade is the long bar that exists in T-Square. Ebony is part of Drawing board in which T-square is fitted to draw lines.

3. The angle which we can't make using a single Set-square is _____
a) 45° b) 60° c) 30° d) 75°
Answer: d
Explanation: 45° can be drawn using 45° Set-square, and 30°, 60° can be drawn using 30° – 60° Set-square, but to draw 75° degrees we need both Set-squares. That is only if we keep 30° of set-square adjacent with 45° set-square we can get 75°. And also multiple angles can be achieved using protractor.

4. The angle which we can't make using both the Set-squares is _____
a) 15° b) 105° c) 165° d) 125°
Answer: d
Explanation: 15° can be made by keeping 45° and 30° adjacent to each other on the line perpendicular to the line for which $15^o$is made. Likewise for 105° and 165° also if we just change the alignment with the required line it possible. But to make 125° there is no such combination available for Set-squares.

5. Small bow compass can draw circles less than _____ mm radius.
a) 25mm b) 30mm c) 35mm d) 40mm
Answer: a

Explanation: A normal Small bow compass is capable of drawing circles less than the 25mm radius. This is because of the arrangement of a screw in between the legs of the compass. But any other normal compass can't give us perfect circles whose radius is less than 25mm.

6. Which is not the use of divider?
a) To divide curved or straight lines into the desired number of equal parts
b) To draw circles
c) To transfer dimensions from one part of the drawing to another part
d) To set-off given distances from the scale to the drawing
Answer: b
Explanation: Divider can be used for those purposes as mentioned in options. But we cannot use divider as a compass and even if we want the compass to be used as divider we can change the pencil part with needle attachment.

7. The cardboard scales are available in a set of _____ scales.
a) six b) ten c) eight d) twelve
Answer: c
Explanation: The cardboard scales are available in a set of eight scales. They are designated from M1 to M8 which has scale of 1:1, 1:2.5, 1:10, 1:20, 1:50, 1:200, 1:300, 1:400, and 1:1000. These are standard scales used.

8. _____ is used to draw curves which are not circular.
a) Compass b) Protractor c) French curves d) Pro circle
Answer: c
Explanation: French curves are used for drawing curves which can't be drawn with a compass. A faint freehand curve is first drawn through the known points. Longest possible curves exactly coinciding with the freehand curve are then found out from the French curve. Finally, neat continues curve is drawn with the aid of French curve.

9. The areas of the two subsequent sizes of drawing sheet are in the ratio ____
a) 1:5 b) 1:4 c) 1:2 d) 1:10
Answer: c
Explanation: A successive format size (from A0 to A5) is obtained by halving along the length or doubling along the width. So the areas of the two subsequent sizes are in the ratio 1:2. Likewise in reverse order (from A5 to A0) the ratio will be 2:1.

10. The sizes from A0 to A5 increases.
a) True b) False

Answer: b

Explanation: The sizes from A0 to A5 decreases, A5 (148 mm x 210 mm), A4 (210 mm x 297 mm), A3 (297 mm x 420 mm), etc. A successive format size is obtained by doubling along the width or halving along the length.

11. The increase in hardness is shown by the value of the figure put in front of the letter H, 2H, 3H, and 4H etc.

a) True b) False

Answer: a

Explanation: Letters HB denote the medium grade where the increase in hardness is shown by the value of the figure put in front of the letter H, viz. 2H, 3H, and 4H etc. Similarly, the grade becomes softer according to the letter B, 2B, 3B and 4B etc.

12. What is the next size of 210 mm x 297 mm in drawing papers?

a) 148 mm x 210 mm b) 297 mm x 420 mm

c) 420 mm x 594 mm d) 105 mm x 148 mm

Answer: b

Explanation: 210 mm x 297 mm is A4 size, next one is A3 (297 mm x 420 mm), which came doubling along the width. And the next size is obtained by doubling the width i.e. A2 (420 mm x 594mm) and so on.

13. The Grade becomes _____ according to the figure placed in front of the letter B, 2B, 3B, 4B etc.

a) harder b) lighter c) darker d) softer

Answer: d

Explanation: The increase in hardness is shown by the value of the figure put in front of the letter H, 2H, 3H, and 4H etc. Similarly, the grade becomes softer according to the figure placed in front of the letter B, 2B, 3B, and 4B etc.

Drawing Tools and their Uses – 2

1. The accuracy of the drawing depends on the quality of the instruments used.

a) True b) False

Answer: a

Explanation: Drawing instruments play a vital role in the quality of the drawing. Factors such as accuracy, precision, correctness, etc depend on the quality of the said

instruments. There are many drawing instruments which help in increasing the accuracy of the drawing.

2. Which of the following instrument is made of thin strips of wood arranged in a line to form a rectangle and on which, the drawing is made?

a) Mini – drafter b) Drawing Board

c) Protractor d) Scale

Answer: b

Explanation: The drawing board is made up of thin sheets of seasoned soft wood, arranged in a line so as to form a rectangle. Then it is fitted with two battens on the respective parallel sides of the board. The battens are attached with the help of screws.

3. Which of the following tools is used to draw horizontal lines?

a) Mini – drafter b) Protractor

c) T – square d) French curve

Answer: c

Explanation: T – squares are made up of hard wood, plastics, etc. It consists of two parts; stock and blade. The stock slides on the drawing board and the horizontal lines are drawn from the working edge on the side of the blade. The angle between the stock and the blade is 90°.

4. Which of the following instrument can be used to draw accurate perpendicular lines, parallel lines and angular lines?

a) Mini – drafter b) T – square

c) Protractor d) Set square

Answer: a

Explanation: Mini – drafters are used to draw perpendicular lines, parallel lines and angular lines. They consist of blades, protractor head, double bar link mechanism, screw and clamp. The blades have markings corresponding to the engineering scale.

5. According to the Indian Standard Institute (ISI), which among the following designation has the size 1000 x 700 (in mm)?

a) B0 b) B1 c) B2 d) B3

Answer: b

Explanation: The designation B1 is 1000 x 700 mm in size whereas B0, B2 and B3 designations are 1500 x 1000 mm, 700 x 500 mm and 500 x 300mm respectively. These designations denote the dimensions of the drawing boards. Standard dimensions are used to simplify the production process.

6. Which is the most common tool used for drawing circles?

a) French curve b) Mini – drafter

c) Divider d) Compass

Answer: d

Explanation: Compass is used to draw circles. Its design is similar to the divider, except in compass there is a provision for the attachment of pencil or lead in one of the legs of the compass. The divider is used to measure and repeat the dimensions when they are repeated.

7. For drawing circles with large radius, which of the following tool is used?

a) Bow compass b) Lengthening bar compass

c) Divider d) Protractors

Answer: b

Explanation: In lengthening bar compass, there is a provision for increasing the radius of the circle greater than the total open length of the compass. This helps in drawing very large circles with the help of medium sized compasses.

8. Which of the following drawing tools is used by architects for making blueprints?

a) Drawing Pencils b) Dusters

c) Ink Pen d) Erasers

Answer: c

Explanation: Ink Pen is used to draw the blueprints by architects and draftsmen. They are used to draw lines onto the tracing paper. They are used for making the final drafts of the drawing made in pencil. Drawing pencils have generally leads which drawn on paper can be erased. This does not happen with the ink pen.

9. Which of the following drawing tool is not used to set the drawing sheet onto the drawing board?

a) Drawing clips b) Drawing pins

c) Divider d) Adhesive Tape

Answer: c

Explanation: Divider is a drawing tool used to replicate the dimensions when the dimensions are repeated. Drawing clips, drawing pins and adhesive tapes are used to attach the drawing sheet onto the drawing board. These attachments are temporary attachments and can be removed after the drawing is completed.

10. According to the Indian Standard institution (ISI) what is the size of the designation A3 in mm?

a) 420 x 297 b) 841 x 594

c) 1189 x 841 d) 297 x 210

Answer: a

Explanation: The size of the designation A3 in mm is 420 x 297. The designations A0, A1, A2, A4 and A5 have sizes 1189 x 841 mm, 841 x 594 mm, 594 x 420 mm, 297 x 210 mm and 210 x 148 mm respectively. Standardizing helps in uniformity of the products all over the nation and will avoid local variations.

11. Which of the following drawing tool is used to transfer dimensions when there is a repetition of the dimensions?

a) Compass b) Protractor

c) Divider d) Mini – Drafter

Answer: c

Explanation: Divider is used to transfer dimensions when there is a repetition of the dimensions. It is the faster method than using a scale and then marking the dimension again. Protractors are only used to mark angles and compass is used to draw circles.

12. Which of the following grades of leads is the hardest?

a) 6B b) 5H c) 4B d) 6H

Answer: d

Explanation: 6H is the hardest grade of lead. The softest grade is 6B. HB is the medium soft grade. Generally for educational purposes, 2HB pencils are used to make drawings. B is soft and H is medium hard. As the prefix number increases, the softness increases in B and the hardness increases in case of H.

13. For marking angles, which of the following drawing tool is used?

a) Protractor b) Divider

c) Compass d) French curve

Answer: a

Explanation: Protractors are used to mark angles from 0° to 180°. There are markings on the semicircular area of the protractor. The least count of protractor for educational purpose is 1°. The accuracy of marking angles is highest in protractor.

14. Using 30° – 60° – 90° and 45° – 45° – 90° set squares, which of the following angle is not possibke to draw?

a) 45° b) 30° c) 10° d) 90°

Answer: c

Explanation: Using proper combination of both the set squares, one can draw multiple angles with 30° angle minimum. If T-square and mini-drafter also used, the minimum accurate angle that we can draw is 15°. Set squares are generally used to draw vertical and inclined lines.

15. Which is the instrument used to draw parallel lines fast?

a) Set square b) Ruler scale

c) Protractor d) Roll-n-draw

Answer: d

Explanation: Using roll-n-draw scales, we can draw parallel lines very accurately and fast. They are used to draw parallel lines in horizontal direction, vertical direction and also in inclined planes. General dimension of the roll-n-draw scale is 30 cm and 15 cm. The scale is rolled on the paper to achieve parallel lines.

Sheet layout, Types of Machine Drawing and Free-Hand Sketching

1. The preferred size of the drawing sheets is recommended by the _____

a) B.I.S. b) ASME

c) ASTM d) NIST

Answer: a

Explanation: Bureau of Indian Standards (B.I.S.), American Society of Mechanical Engineering (ASME), American Society for Testing and Materials (ASTM), U.S. National Institute of Standards and Technology (NIST).

2. The untrimmed size for _____ sheet is 240 mm x 330 mm.

a) A1 b) A3 c) A4 d) A5

Answer: c

Explanation: The untrimmed size of any sheet will be slightly larger than trimmed size. The untrimmed size for an A4 sheet is 240 mm x 330 mm where trimmed size is 210 mm x 297mm. The space between the trimmed sheet and the frame is called border.

3. SP: 46 (2003) recommends the borders of _____ mm width for the sheet sizes A0 and A1, and _____ mm for the sizes A2, A3, A4 and A5.

a) 10, 20 b) 15, 20 c) 20, 10 d) 15, 10

Answer: c

Explanation: SP: 46 (2003) recommends the borders of 20 mm width for the sheet sizes A0 and A1, and 10 mm for the sizes A2, A3, A4 and A5. The BIS-SP 46 is the standard used in the educational institution for engineering drawing.

4. The false statement regarding orientation mark.
a) The orientation mark coincides with one of the centering marks
b) Represents the direction to which sheet is placed
c) Orientation mark can be used for the orientation of drawing sheet on the drawing board
d) Facilitate positioning of the drawing for reproduction purpose

Answer: b

Explanation: The sheet may be placed in any direction but within the sheet, the drawing should be specified particularly for reproduction purpose, the main purpose is to facilitate positioning of the drawing and parts in it.

5. The size of the title block is _____ mm x _____ mm.
a) 25 x 10 b) 100 x 25
c) 65 x 185 d) 185 x 65

Answer: d

Explanation: The size of the title block is 185mm x 65 mm which is recommended by B.I.S. (Bureau of Indian Standards), where 25mm x 10mm is for scale in drawing sheet. Within the title box there will be so many sections divided like Name of the firm, Drawing No, Title, etc.

6. The number of folding methods for folding of various sizes of drawing sheets is _____
a) 1 b) 2 c) 3 d) 4

Answer: b

Explanation: The final size of the folded print in method 1 will be 297 x 190, while that in method 2 will be 297 x 210. In either case, the title block is visible at the top of the folded print. When prints are to be stored and preserved in cabinets they are folded by method 2.

7. Which of the following is reducing scale?
a) 10:1 b) 10:2 c) 0.5:1 d) 2:1

Answer: c

Explanation: 0.5:1 is reducing scale which we can also be written as 1:2. In the remaining options the antecedent is more than the consequent. So we can say if antecedent is a decimal and consequent is whole number then the ratio is said to be reducing scale.

8. 1:10000 is enlarging scale.

a) True b) False

Answer: b

Explanation: 1:10000 is reducing scale since antecedent is less than consequent. The ratio represents the object should be drawn 1/10000th of the original one. Usually this much ratios will be used only when the machine parts are too big.

9. _____ is not an essential thing for free-hand sketching.

a) A soft-grade pencil b) French curves

c) A soft rubber-eraser d) A paper in form of a sketch-book or a pad

Answer: b

Explanation: French curves are used for drawing curves which cannot be drawn with a compass. Since we are just making a rough sketch of our drawing beforehand, for the actual drawing there is no need for French curves. The remaining are primary requirements to sketch any drawing.

10. Which statement is false?

a) Drawing for instruction manual: This is assembly drawing without dimensions. This is also used for explaining working principle of each part

b) Exploded assembly drawing: This type of assembly drawing is used for explaining working principle of any machine

c) Drawing for catalogue: Special assembly drawings are prepared for catalogues, with overall and principal dimensions

d) Patent drawing: It is generally assembly drawing either in pictorial form or principal view of orthographic projection of machine

Answer: b

Explanation: The correct statements are schematic assembly drawing: This type of assembly drawing is used for explaining working principle of any machine. Exploded assembly drawing: It represents the details of a machine in a pictorial form as it is assembled. It helps the mechanics for dismantling machine for repairing purpose.

11. Arrange the statements. Given statements refers to free-hand sketching of straight lines.

i) Then begin to draw the line with short and light strokes.

ii) Hold the pencil at about 30 mm distance from the lead point.

iii) Finish finally with a dark and firm line.

iv) Swing it from left to right and backwards, between the two points.

a) i), ii), iii) and iv) b) ii), iii), iv) and i)

c) iv), iii), i) and ii) d) ii), iv), i) and iii)

Answer: d

Explanation: Holding the pencil should be primary thing, getting clear view on drawing is next, after we have to just draw with a light sketch so that we can understand how the sketch will be, and finishing with a dark sketch.

12. Arrange the statements. Given statements refers to free-hand sketching of a circle.

i) Add four radial lines between them.

ii) Make the center and through it, draw horizontal and vertical center lines.

iii) The paper may be revolved after about each quarter-circle for easy wrist motion while drawing.

iv) Mark points on these lines at radius distance from the center.

a) ii), i), iv) and iii) b) ii), iii), iv) and i)

c) iv), iii), i) and ii) d) ii), iv), i) and iii)

Answer: a

Explanation: For drawing, circle center should be the primary thing. Make the circle and through it draw horizontal and vertical center lines. Later we add four radial lines between them and then the paper maybe revolved for easy wrist motion to enable drawing.

Different Types of Lines – 1

1. Medium thickness, line-group of 2mm are not used for _____

a) out lines b) dotted lines c) cutting plane –lines d) dimension lines

Answer: d

Explanation: Out lines, dotted lines and cutting plane-lines are drawn using 2mm thickness lines. Whereas centre lines, section lines, dimension lines, extension lines, construction lines, leader lines, short break lines and long-break lines are drawn using 1mm thickness lines.

2. Initial work and construction lines are drawn using __ pencil.

a) 3H b) 4H c) H d) 2H

Answer: c

Explanation: Initial work and construction lines are drawn using H pencil. 2H pencil is used for outlines, dotted lines, dimension lines and arrowheads. 3H, 4H are used for centre lines and section lines.

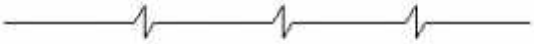
3. Centre lines, section lines are drawn using __ pencil.

a) H b) 2H c) 3H or 4H d) HB

Answer: c

Explanation: Centre lines, section lines are drawn using 3H or 4H pencil. Outlines, dotted lines, section-plane lines, dimension lines and arrow heads are drawn using 2H. These different pencils give different shades which give different importance to lines in drawing.

4. The line given below is used for_____



a) Long-break line b) Cutting planes

c) Centroidal lines d) Out lines of adjacent parts

Answer: a

Explanation: Lines used to represent cutting planes is chain thin (narrow) with thick (wide) at the ends and at changing of position, lines used to represent centroidal lines and outlines of adjacent parts are chain thin double-dashed or long-dashed double-dotted (narrow).

5. The line given below is used for_____

a) Hidden outlines b) Cutting planes

c) Hidden edges d) Dimension lines

Answer: b

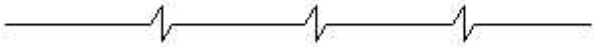
Explanation: Hidden outlines, hidden edges are drawn using dashed thin (narrow) lines. Dimension lines are drawn using continuous thin (narrow) lines (straight or curved). The given type of line in question is used to represent cutting planes.

6. Dashed thick (wide) line is represented by _____

Answer: c

Explanation: The other lines are continuous thin (narrow) (straight or curved) which areused for grid, dimension. Dashed thin (narrow) is used for hidden outlines. A Chain thin long-dashed dotted (narrow) line is used for centre line, lines of symmetry etc.

7. Match the following.

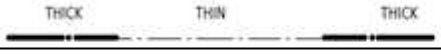
1.		i. Dimension, extension
2.		ii. Long-break line
3.		iii. Line showed at surface treatment
4.		iv.Cutting planes

a) 1, i; 2, ii; 3, iii; 4, iv
b) 1, ii; 2, iii; 3, i; 4, iv
c) 1, ii; 2, iv; 3, iii; 4, i
d) 1, iv; 2, iii; 3, ii; 4, i

Answer: b

Explanation: Thick-thin-thick are used for cutting planes, dashed thick (wide) is used for surface treatment, zigzag lines are used for long-break lines and continuous thin line is used for dimensions, extensions and projection lines.

8. Match the following.

1.		i. Dimension, extension
2.		ii. Indication of surfaces for special requirement
3.		iii. Line showed at surface treatment
4.		iv.Cutting planes

a) 1, i; 2, ii; 3, iii; 4, iv
b) 1, ii; 2, iii; 3, iv; 4, i
c) 1, ii; 2, iv; 3, iii; 4, i
d) 1, iv; 2, iii; 3, ii; 4, i

Answer: b

Explanation: Thick-thin-thick are used for cutting planes, dashed thick (wide) is used for surface treatment, chain thick or long dashed dotted (wide) is used for indication of lines or surfaces to which a special requirement applies and continuous thin line is used for dimensions, extensions and projection lines.

9. Drawing pencils are graded according to increase in relative _____

a) diameter b) sharpness

c) length d) hardness

Answer: d

Explanation: Drawing pencils are graded according to increase in relative hardness. They

are marketed with the labeled as H, 2H, 3H, 4H, 5H, 6H etc. These grades are used for getting accurate, clean and neat drawings.

10. Match the following.

1.	Dimension lines	i.Continuous thick lines
2.	Extension or Projection lines	ii.Continuous thin lines
3.	Margin lines	iii.Continuous thick lines
4.	Outlines	iv.Continuous thin lines

a) 1, i; 2, ii; 3, iii; 4, iv
b) 1, ii; 2, iii; 3, iv; 4, i
c) 1, ii; 2, iv; 3, iii; 4, i
d) 1, iv; 2, iii; 3, ii; 4, i

Answer: c

Explanation: Dimension lines are continuous thin lines, are terminated at the outer ends by pointed arrowheads. Extension lines continuous thin lines extend by about 3mm beyond the dimension lines. Margin lines are continuous thick or wide lines along which the prints are trimmed. Outlines are continuous thick or wide lines.

11. Short-break lines are drawn freehand while long-break lines are ruled lines.
a) True
b) False

Answer: a

Explanation: Short-break lines are continuous, thin and wavy. They are drawn with freehand and are used to show a short-break, or irregular boundaries. Long-break lines are thin ruled lines with short zigzags within them.

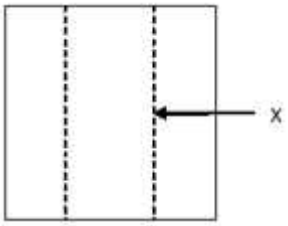
Different Types of Lines – 2

1. In engineering drawing, which type of line indicates that there is a change of plane?
a) Continuous thin wavy
b) Long chain thin
c) Continuous thick
d) Medium thick short dashes
Answer: c
Explanation: In engineering drawing, a change of plane is indicated by drawing continuous thick lines. Continuous thin lines are used for indicating dimension line, hatching line, revolved section, etc. Long chain lines are used to indicate center line, cutting lines.

2. Which of the following lines are used to show that the object is cut and then viewed?
a) Hidden lines
b) Leader lines
c) Centre lines
d) Hatching Lines
Answer: d
Explanation: Hatching lines are used to show that the orthographic view is drawn after a section of the object is cut. They indicate that the object is cut and it shows the remaining solid body. Hidden lines are used to indicate holes or slots.

3. What do hidden lines in orthographic projections denote?
a) Holes or slots
b) Change of Plane
c) Position of cut
d) Centre of a circle or cylinder
Answer: a
Explanation: Hidden lines denote those parts which cannot be seen when viewing the object. They are used when there are holes or slots in the object, if they cannot be viewed directly. Change of plane is indicated by outlines. Position of cut is denoted by section line.

4. From the fbelow figure, what is the name of the line X?

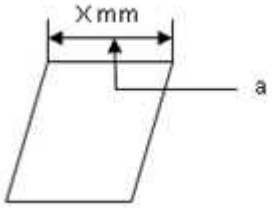


a) Outline
b) Section line
c) Hidden line
d) Hatching

Answer: c

Explanation: Hidden lines are dashed lines with dashes equaling 2mm and the gap 1mm. These lines depict that there is a hole or slot i.e. no solid part is present there. Section line are long chain thin lines with thick ends.

5. What is the type of line used for line a?



a) Continuous thick
b) Continuous thin straight
c) Medium thick short dashes
d) Continuous thin wavy

Answer: b

Explanation: Continuous thin straight lines are used to denote the dimensions of the object. Thin lines are used so as to distinguish between outline and the dimension line. Continuous thin wavy lines are used to indicate short breaks or irregular boundary line.

6. The axis of the cylinder or sphere is denoted by which of the following line?
a) Section line
b) Centre line
c) Hidden line
d) Leader line

Answer: b

Explanation: Centre line shows the axis of the cylinder or sphere. These lines generally pass through the centre of the circle. For a cylinder, they generally are parallel to the height of the cylinder. For circles, two centre lines are drawn perpendicular to each other passing through the centre of the circle.

7. What is the standard length and width of the arrowhead of dimension lines?
a) 2mm and 2mm
b) 3mm and 1mm
c) 4mm and 2mm
d) 3mm and 2mm
Answer: b
Explanation: Arrowheads of dimension lines have a length of 3mm and 1mm wide. When drawing the arrowheads the ratio, length: width is to be maintained at 3:1. The arrowheads can be drawn with length 6mm and breadth 2mm, since the ratio is the same.

8. What is the length of the short dashes of the centre lines?
a) 5mm
b) 2mm
c) 1mm
d) 3mm
Answer: b
Explanation: Centre line consists of long dash of 8-10mm, a gap of 1mm, short dash of 2mm and then a gap of 1mm. This pattern continues throughout the centre line. In case of section line, the ends of the section line are thickened. This is how section line and centre line are different.

9. Among the following, which of the representation is wrong?
a) 
b)
c)
d) 
Answer: b
Explanation: For proper dimensioning, it is important for the lines to meet. One line cannot be in air with respect to the other intersecting line; they should meet at some point. If the lines do not meet, dimensions will not have accuracy.

10. Which type of line is used to join the dimension line and the curve that needs to be dimensioned?
a) Leader line
b) Outline
c) Dimension line
d) Section line
Answer: a
Explanation: Leader lines lead the dimension line to the curve that needs to be dimensioned. It is a bridge connecting two lines. Outlines are the main or most prominent lines of the object when viewed for drawing. Dimension lines are used to denote the particular dimensions.

11. What is the difference between the section line and the centre line?
a) The length of the long dashes
b) The length of short dashes
c) The width of the gap
d) The two ends of the lines
Answer: d
Explanation: The ends of a section line are thickened so as to distinguish it from the centre line. The rest of the section line has the same thickness and dimensions as that of the centre line. The thickening of the ends in the section line is also used to denote the direction of viewing.

System of Dimensioning – 1

1. Which are the two systems of placing dimensions? (Options given below)
i. Aligned system, ii. Break system, iii. Unidirectional system, iv. Directional system
a) i, ii
b) i, iii
c) ii, iv
d) i, iv
Answer: b
Explanation: The two systems of placing dimensions are aligned system and unidirectional system. In the aligned system the dimension is placed perpendicular to the dimension line.

In unidirectional system all dimensions are placed such that they can be read from the bottom of the drawing sheet.

2. Aligned system is used for drawing of air crafts, automobiles.
a) True
b) False
Answer: b
Explanation: Since the drawing of aircrafts, automobiles etc. are very large it is inconvenient to read dimensions from the right-hand side. So we use unidirectional system of dimensioning but not aligned system of dimensioning.

3. In unidirectional system the dimensions are _____
a) Placed above the dimension lines
b) Placed below the dimension lines
c) Placed by breaking the dimension line in the middle
d) Placed left side of the dimension line
Answer: c
Explanation: In unidirectional system all dimensions are placed such that they can be read from the bottom of the drawing sheet. The dimension lines are broken near the middle for inserting the dimensions. This is used in mainly large drawings.

4. In aligned system the dimensions are _____
a) Placed parallel to the dimension line
b) Placed perpendicular to the dimension line
c) Placed left side of the dimension line
d) Placed right side of the dimension line
Answer: b
Explanation: In the aligned system the dimension is placed perpendicular to the dimension line. The dimensions should be placed near the middle and above, but clear of the dimension lines.

5. From unidirectional system, it is _____
a) Convenient to read dimensions from the bottom edge
b) Convenient to read dimensions from the right-hand edge
c) Convenient to read dimensions from the right-hand edge
d) Convenient to read dimensions from the top edge
Answer: a
Explanation: Unidirectional system of dimensioning is used for large drawings. So the

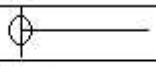
dimensions are placed by breaking the dimension line near the middle. Also all dimensions are so placed that they can be read from the bottom edge.

6. Match the following

1.		i.	Closed and filled
2.		ii.	Closed
3.		iii.	Open (90°)
4.		iv.	Oblique stroke

a) 1, i; 2, ii; 3, iii; 4, iv
b) 1, ii; 2, iii; 3, i; 4, iv
c) 1, iv; 2, iii; 3, i; 4, ii
d) 1, iv; 2, i; 3, ii; 4, iii
Answer: c
Explanation: An arrowhead is placed at each end of a dimension line. The pointed end touches the outline or an extension line. The length of the arrowhead should be about three times its maximum width.

7. Match the following

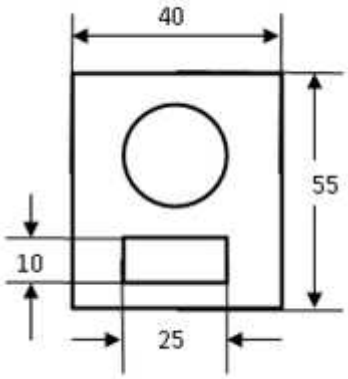
1.		i.	Small open circle
2.		ii.	Open (20°)
3.		iii.	Open (90°)
4.		iv.	Oblique stroke

a) 1, i; 2, ii; 3, iii; 4, iv
b) 1, ii; 2, iii; 3, i; 4, iv
c) 1, iv; 2, iii; 3, i; 4, ii
d) 1, iv; 2, i; 3, ii; 4, iii
Answer: c
Explanation: An arrowhead is placed at each end of a dimension line. The size of an arrowhead should be proportional to the thickness of the outlines. It is drawn freehand with two strokes made in the direction of its pointed end. The space between them is neatly filled up.

8. In which system of dimensioning the figures can read from bottom as well as right hand side of the drawing?
a) Aligned system
b) Unidirectional system
c) Nonaligned multidirectional system
d) Parallel system
Answer: a
Explanation: In aligned system of dimensioning, the dimension figures are written in such a way that they can read from the bottom and right hand side of the drawing. It increases the effort in reading the dimensions.

System of Dimensioning – 2

1. Which of the following dimension is according to the ‘aligned system’ of dimensioning?



a) 40
b) 55
c) 25
d) 10
Answer: a
Explanation: In aligned system of dimensioning, the dimensions are written on the dimension line. Their alignment is along the length of the dimension line. The dimensions are always written either on top or below the dimension line but never cutting it.

2. In dimensioning, the lines enclosing the dimension line are known as ____
a) Leader line
b) Dimension line

c) Extension line
d) Outline
Answer: c
Explanation: The extension line encloses the dimension line. It starts and ends with the line to be dimensioned. The extension line is extended beyond the dimension line by 4mm. It helps in defining proper boundaries for the dimension line.

3. When dimensioning the circle, the dimension line begins from the centre of the circle.
a) True
b) False
Answer: a
Explanation: When dimensioning the circle, the dimension line begins from the centre of the circle. With the help of the leader line, the dimensions are written on it. The notations φ and R are used to indicate whether the dimension denotes diameter or the radius respectively.

4. While dimensioning a circle, the leader line and the dimension line are drawn at which angle with respect to each other?
a) 45°
b) 30°
c) 0° or 180°
d) 90°
Answer: c
Explanation: When dimensioning a circle, the leader line and the dimension line are drawn 0° or 180° with respect to each other. This helps in clear dimensioning of the circle. It also reduces the difficulty in reading the dimensions when there are concentric circles involved.

5. While dimensioning holes, slots, etc. how would their number be specified?
a) Number written on the dimension line
b) Number is written of the leader line
c) Number is written on the corner of the page
d) Number is written on the side of the hole or slot.
Answer: a
Explanation: The number of holes, slots, etc. is written on the dimension line along with the dimensions. For example, if there are four holes of same dimensions; then only one of the holes will have their dimensions specified and along with dimensions, the number is also written; 4Holes, φx mm.

6. What is the height if the dimension figures written on the dimension line?
a) 7mm to 9mm
b) 2mm to 3mm
c) 6mm to 8mm
d) 3mm to 5mm
Answer: d
Explanation: It is customary to write the figures with a height of 3mm to 5mm. This helps in the readability of the dimension figures. It also makes reading the dimensions easy. The thickness of the letters is so adjusted that it can read without effort.

7. While dimensioning, what should always be written before a point accompanied by a figure if the value of the figure is less than unity?
a) 1
b) 0
c) 2
d) 6
Answer: b
Explanation: For figures having value less than one, dimensions should be written as 0.5 or 0.3 as per the value. There needs to be a zero in front of the point if it is less than 1. Sometimes zero is omitted but this practice should not be encouraged.

8. In unidirectional system, the figures are written along the dimension line.
a) True
b) False
Answer: b
Explanation: In unidirectional system of dimensioning, the dimension figures are written in between the dimension line. All dimensions are aligned according to the observer i.e. all are written in horizontal direction and not along the length of the dimension line.

9. In which system of dimensioning the figures can read from bottom only?
a) Aligned system
b) Unidirectional system
c) Nonaligned multidirectional system
d) Parallel system
Answer: b
Explanation: In unidirectional system of dimensioning, the dimension figures are so written that they can be read only when viewed from the bottom and not from any other direction. Reading the dimensions is easier than in aligned system.

Types of Dimensioning – 1

1. The ratio of height to length of an arrow in dimensioning is ___
a) 1:2
b) 1:3
c) 1:4
d) 1:1.5
Answer: b
Explanation: The standard ratio of height to length of an arrow in dimensioning should be kept only 1:3. Even if there are so many types of arrows like oblique stroke, closed, open small open circle etc. Generally closed and filled arrowhead is widely used and with 1:3 ratio.

2. Dimensioning doesn't represent _____
a) height
b) length
c) depth
d) material
Answer: d
Explanation: Dimensioning relates to the geometry of machine part/plot but not the material, transparency, physical, mechanical, chemical properties of machine part/plot. Other than the dimensions are placed near the title block of drawing sheet if necessary.

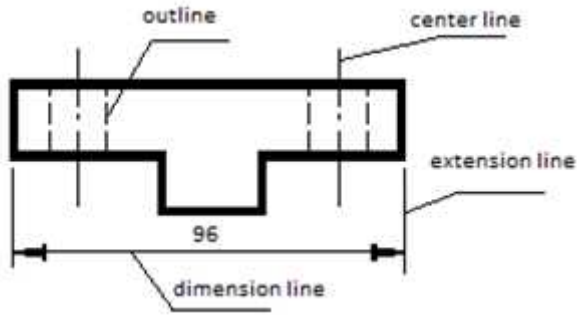
3. Which is the wrong statement regarding dimensions?
a) Every dimension must be given, but none should be given more than once.
b) Every dimension should be written to the left side of the drawing.
c) Dimensions should be placed outside the views.
d) A centre line should not be used as dimension line.
Answer: b
Explanation: There is no such rule that the dimensions should be placed only on left side of drawing because, it may not possible to represent every dimension only on left side. So, it is given flexibility that dimensions can be given any side of drawing but none should be given twice or more.

4. Dimension lines should be drawn at least _____mm away from the outlines and from each other.
a) 5
b) 6

c) 7
d) 8
Answer: d
Explanation: The standards are made as such that dimension lines should be drawn at least 8 mm away from the outlines and from each other. This gives clear, neat appearance in mentioning dimensions in drawing.

5. Two types of dimensions needed on a drawing are: i) size or functional dimensions and ii) location or datum dimensions.
a) True
b) False
Answer: a
Explanation: Yes, the given statement is true. The former indicate sizes i.e. length, breadth, height, depth, etc. The second one shows locations or exact positions of various constructional details within the object.

6. The wrongly represented line in the below figure is _____



a) dimension line
b) extension line
c) outline
d) centre line
Answer: c
Explanation: The line which is represented as outline is hidden line, the dark line which is to represent main component is outline of component, the remaining are correct. The 96 given there is the dimension figure.

7. An outline or a centre line should be used as a dimension line.
a) True
b) False
Answer: b

Explanation: An outline or a centre line should never be used as a dimension line. A centre line may be extended to serve as an extension line. Since, the outline may be misunderstood if it is used as dimension line.

8. Which is the wrong statement from the below options?
a) As far as possible all dimensions should be given in millimeters, omitting the abbreviation mm.
b) The height of the dimension figures should be from 3mm to 5mm.
c) A zero must always precede the decimal point when the dimension is less than unity
d) The dimensions should only be given in mm

Answer: d

Explanation: There is no need to give the dimensions only in mm. Some of the drawings may be very large in size it is not convenient to give dimensions in millimeters and another unit is used but only one dimension should be used among whole drawing.

9. Location and datum dimensions indicates _____
a) length
b) diameter
c) height
d) position

Answer: b

Explanation: The location or datum dimension which are generally shown by letters F and L respectively, and shows the location or exact position of various constructional details within the object. The letter F represents functional dimensions.

10. Size or functional dimensions does not indicate _____
a) thickness
b) radius
c) depth
d) position

Answer: d

Explanation: Size or functional dimensions only represents dimensions, figures of length, breadth, height, depth, and diameter. But not show the locations or positions these are indicated by location or datum dimensions.

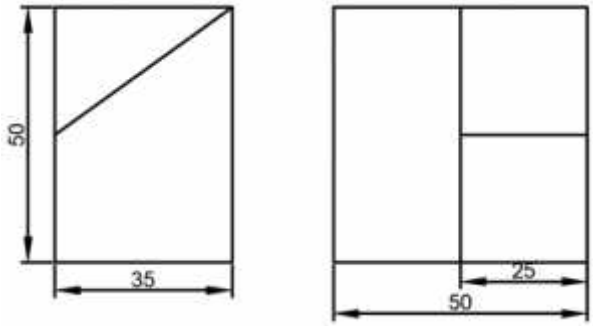
Types of Dimensioning – 2

1. In chain dimension, the dimensions are arranged parallel to each other.
a) True
b) False
Answer: b
Explanation: In chain dimension, the dimensions are arranged in a straight line. The type of dimensioning in which the dimensions are arranged parallel to each other is called as Parallel Dimension. The combination of both the type is called as combined dimension.

2. In combined dimension, the dimensions are arranged in a straight line only.
a) True
b) False
Answer: b
Explanation: In combined type of dimension, the dimensions are arranged in a straight line as well as parallel to each other. It depends on the convenience of dimensioning and the important dimensions. When more than two dimensions overlap, combined dimensioning is done.

3. In which of the following type of dimensioning, the dimensions are arranged only in a straight line?
a) Parallel dimension
b) Chain Dimension
c) Combined dimension
d) Aligned dimension
Answer: b
Explanation: In chain dimension, the dimensions are arranged only in a straight line. In this type of dimensioning, the dimensions appear less crowded and make it easier to read. There is almost less confusion while interpreting the dimensions.

4. Which type of dimensioning is shown in the figure?

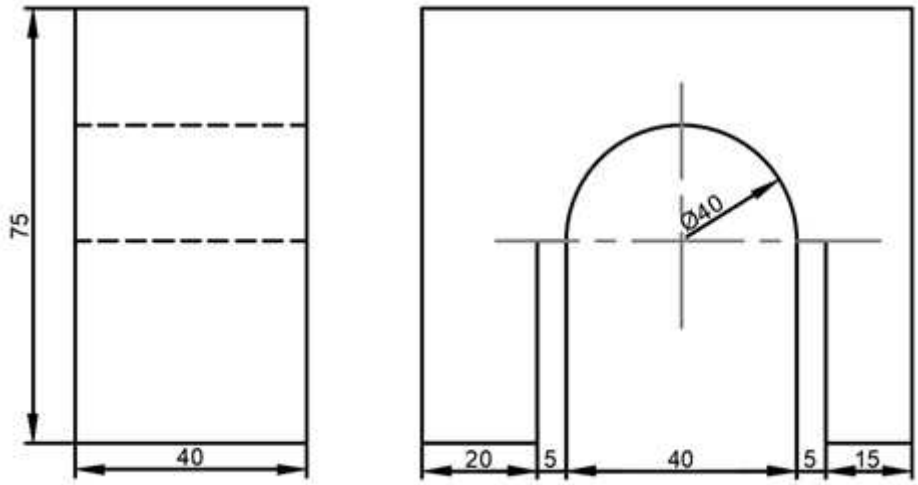


a) Parallel dimension
b) Unidirectional dimension
c) Combined dimension
d) Chain Dimension

Answer: a

Explanation: The dimensions are arranged in a parallel manner. Hence the answer is parallel dimension. This type of dimensioning is also called as aligned dimension, as the dimension figures are aligned along the length of the dimension line.

5. Which type of dimensioning is shown below?

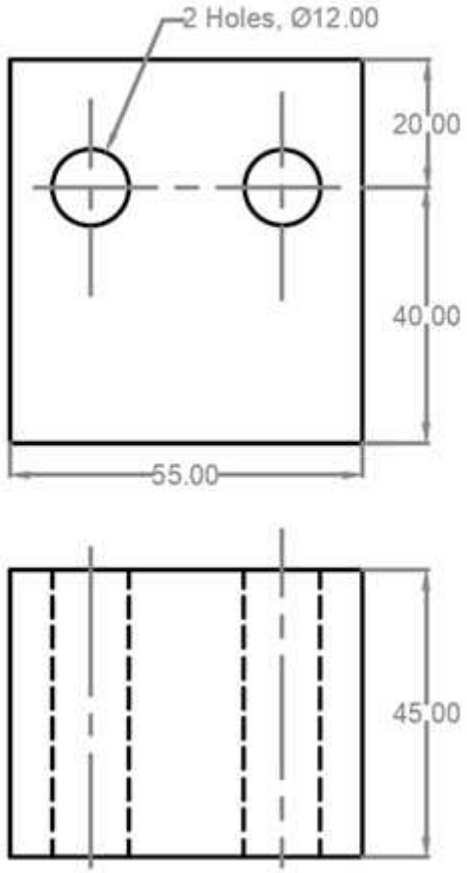


a) Chain dimension
b) Parallel dimension
c) Unidirectional dimension
d) Combined dimension

Answer: a

Explanation: The type of dimensioning followed is chain dimension. The dimensions are arranged in a straight line. In this example, the aligned dimensioning system is being used i.e. the dimension figures are aligned along the length of the dimension line.

6. Which type of dimensioning is done below?

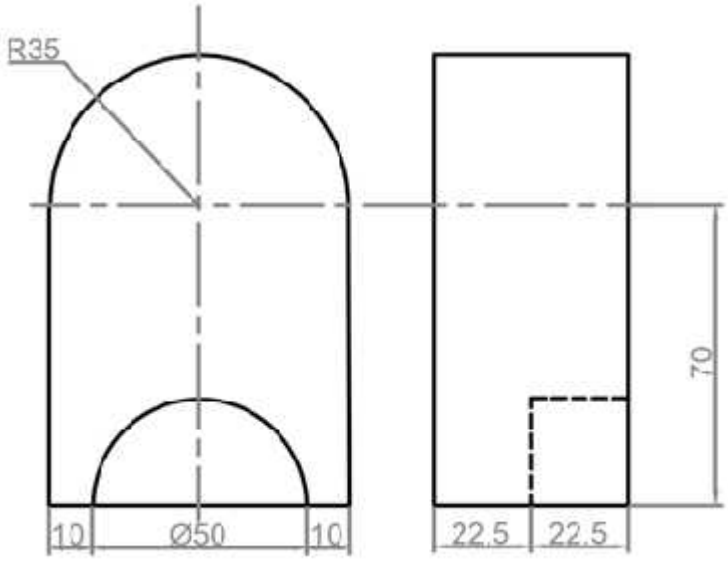


a) Unidirectional and chain dimension
b) Aligned and parallel dimension
c) Aligned and chain dimension
d) Unidirectional and parallel dimension

Answer: a

Explanation: The dimension figures are written in such a way that they can be read from bottom only. The chain dimensioning is used as the dimensions are arranged in a straight line. In parallel dimension, the dimension lines are arranged parallel to each other.

7. Identify the type of dimensioning used in the figure below.

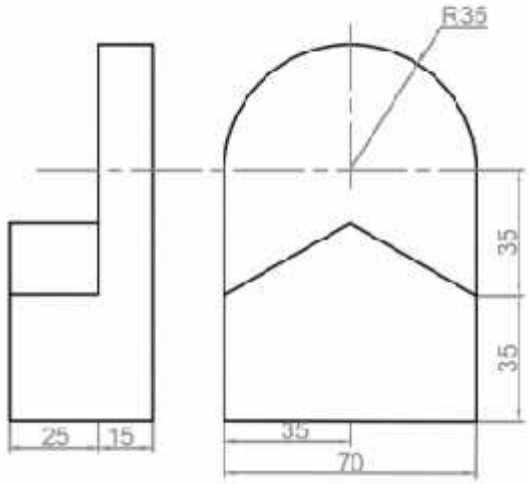


a) Parallel and aligned dimension
b) Parallel and unidirectional dimension
c) Chain and aligned dimension
d) Chain and unidirectional dimension

Answer: c

Explanation: The type of dimensioning done is chain and aligned dimension. The dimensions are arranged in a straight line and the dimension figures are aligned along the length of the dimension line. The dimension figures can be read from the right side as well as bottom.

8. Identify the type of dimensioning used in the example below.

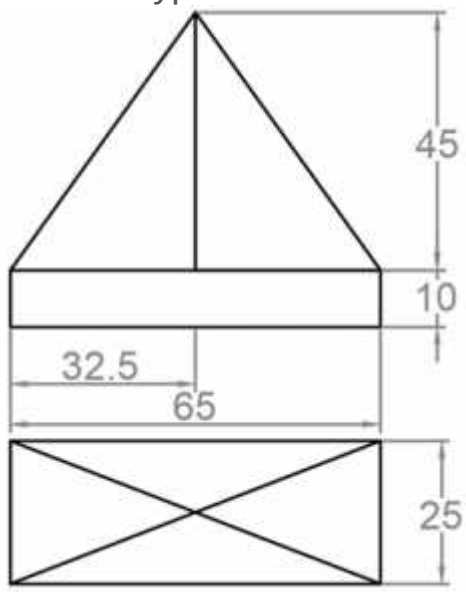


a) Parallel and aligned dimension
b) Chain and aligned dimension
c) Chain and unidirectional dimension
d) Combined and aligned dimension

Answer: d

Explanation: The type of dimensioning done is combined dimensioning and the system of dimensioning used is aligned. The dimensions are arranged in both ways i.e. parallel as well as in a straight line. The dimension figures are aligned along the length of the dimension line.

9. Which type of dimensioning is done in the example below?

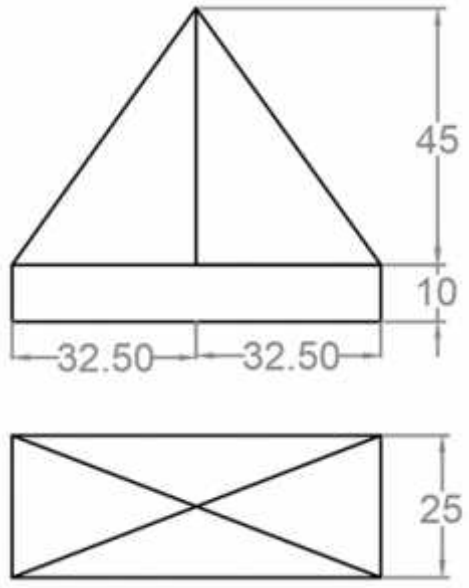


a) Parallel dimension
b) Chain dimension
c) Combined dimension
d) Aligned dimension

Answer: c

Explanation: The dimensions are arranged parallel to each other in horizontal dimensioning and in straight line for vertical dimensioning. There is a need for calculation for finding out some dimensions. The dimension figures can be read only from the bottom.

10. Identify the type and system of dimensioning in the example given below.



a) Unidirectional and parallel dimension
b) Unidirectional and chain dimension
c) Unidirectional and combined dimension
d) Aligned and combined dimension

Answer: c

Explanation: The example has unidirectional and chain type of dimensioning. The dimension figures are arranged horizontally and can only be read from the bottom. The dimensions are arranged in a straight line and not in parallel direction.

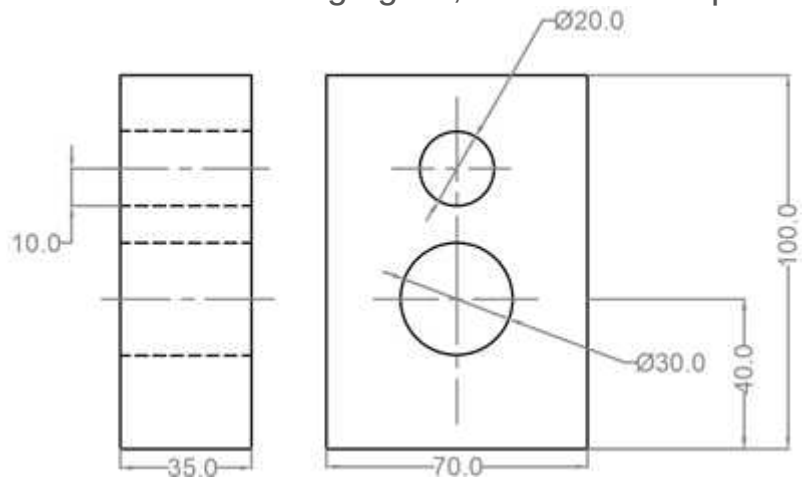
Basic Principles in Dimensioning -1

1. The advised position of placement of the dimensions should be _____
a) Inside the view
b) Outside the view
c) On the boundaries of the view
d) Cutting the view

Answer: b

Explanation: It is advised to place the dimensions outside the view. This will bring clear picture of the view and will help in the understanding of the dimensions. Placing the dimensions outside the view gives a cleaner look.

2. From the following figure, which is the repetitive dimension?

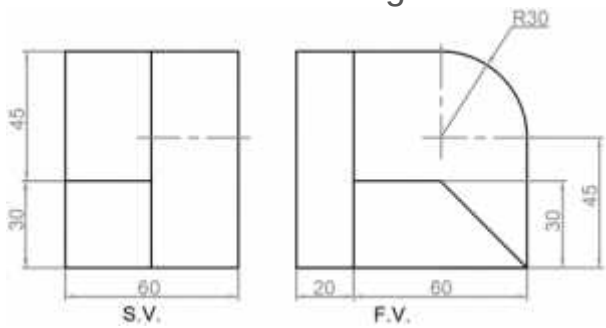


a) 30
b) 70
c) 10
d) 20

Answer: c

Explanation: From the front view it is clear that the circle has diameter 20 mm. Hence its radius will be 10mm. The dimension 10mm in the side view is just a repetition of this information. Repetitive dimensions are redundant and they need to be avoided.

3. Which of the following dimensions is arranged haphazardly?



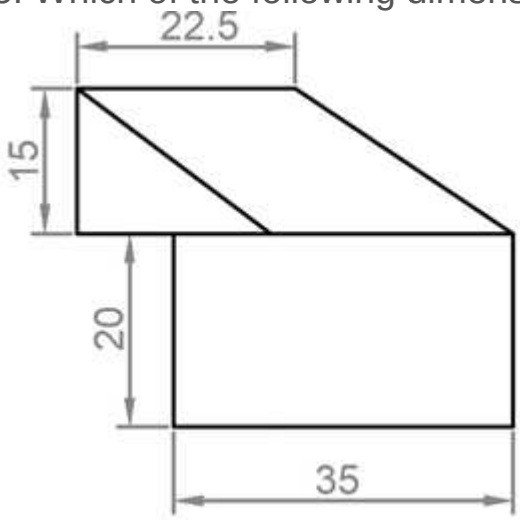
a) 45 in S.V.
b) 45 in F.V.
c) 30 in S.V.
d) 30 in F.V.

Answer: d

Explanation: The dimension 30mm is repeated and is placed in a haphazard manner. There is no need for the dimension in F.V. as it is clearly understood from the S.V. Such dimensions should be avoided at all costs.

4. If there is a need for the center line, then it can be used as a _____
a) Dimension line
b) Leader line
c) Extension line
d) Section line
Answer: c
Explanation: The center line can be used an extension line. With the help of the center line as extension line, we can dimension the distance between the centers of the circles from the outline view of the object. Thus helps in drawing the circle accurately.

5. Which of the following dimension is incorrect?



a) 22.5
b) 15
c) 20
d) 35
Answer: c
Explanation: The dimension 20mm is given without using the extension line. The outline of the view is used to dimension the line. This is not usually favoured. Always use extension line and place the dimension line in between the extension lines.

6. Dimension lines should not intersect each other as far as possible.
a) True
b) False
Answer: a
Explanation: Dimension should never intersect each other as far possible. Intersecting

dimension lines can cause confusion and needs more effort to understand them. To increase the readability of the dimension they should not intersect with each other.

7. Different units of measurement can be used in dimensioning a view.
a) True
b) False
Answer: b
Explanation: All dimensions should be expressed in one unit. Using different units for dimensions will create confusion for the observer and there is a chance of misinterpretation. Therefore, using different units should be avoided and a tag ‘All dimensions are in mm’ should be added above the title page.

8. While dimensioning a cylinder in the view where the true shape of the cylinder is not visible, which symbol is used to denote that it is a cylinder?
a) •
b) φ
c) Θ
d) ○
Answer: b
Explanation: Since the true shape of the cylinder is circle from one view, we used the symbol φ followed by the dimension figure while dimensioning it in the view where it is seen as a rectangle. The cross-section of the rectangle is square then the symbol • followed by the dimension figure is used.

9. As far as possible, dimension should be given to which of the following lines?
a) Outline
b) Hidden line
c) Center line
d) Leader line
Answer: a
Explanation: Dimensions are given to the outlines of the view. It is advised not to dimension hidden lines as their true shape is not known when they hidden. It is important to dimension those lines whose true shape is properly visible.

10. How is a spot face hole with 24mm diameter, 5mm deep and spot face diameter 10mm dimensioned?
a) Φ24 and φ10
b) 5 SPOT FACE, φ24 X φ10

c) φ24 SPOT FACE, φ10
d) φ10 SPOT FACE, φ24 x 5 DEEP
Answer: d
Explanation: Holes made by spot facing are dimensioned in this manner ‘φ10 SPOT FACE, φ24 x 5 DEEP’. This means the there is a spot face of 10mm diameter after the 24mm diameter and 5 mm thickness. Using this makes the reading of the dimension easy.

Basic Principles in Dimensioning – 2

1. How is tapped hole of diameter 10mm with 20mm dimensioned?
a) M10
b) M10, 20
c) M10, DEEP 20
d) M10 20 mm deep
Answer: c
Explanation: A tapped hole of 10mm diameter and 20mm deep is dimensioned as M10, DEEP 20. The ‘M’ stands for metric threads. These are standard threads whose pitch is predefined according to the diameter. The ‘M’ indicates that the hole is tapped.

2. How is a blind drilled hole of 15mm diameter and 15mm deep dimensioned?
a) M15, DEEP 15
b) φ15, DEEP 15
c) φ15
d) φ15 x 15
Answer: b
Explanation: Since the hole is not through, it is mandatory to mention the depth of the hole while dimensioning. Hence a blind drilled hole of 15mm diameter and 15mm deep is dimensioned as φ15, DEEP 15. Since the hole is not threaded ‘M’ should not be used for dimensioning.

3. The dimensions of circular part or arc should be given where the true shape is visible.
a) True
b) False
Answer: a
Explanation: Circular parts and arcs should be dimensioned where their true shapes are

visible. Proper notations should be used to dimension circles and arcs. This will help in clarifying the dimension and reduces the confusion if there are any.

4. A chamfer of 3mm thick and angle 45° inclination is dimensioned as _____
a) 45° x 3
b) 3 x 45°
c) 45°
d) 3mm
Answer: b
Explanation: A chamfer of 3mm thickness and angle 45° is dimensioned as 3 x 45°. From this dimension, we can get the information of the angle at which the chamfer is cut and the distance from one of the sides. This helps in reading of the dimensions easy.

5. The leader should be used to dimension the circle.
a) True
b) False
Answer: a
Explanation: The leader lines should be used to dimension the circle. This helps in identifying the true shape as well the dimension related to the circle. It is advised not to dimension cylinders in the views where it is seen as any shape other than circle but should be dimensioned where its cross-section is clearly visible.

6. What does dimensioning of a circle depend upon?
a) Shape
b) Length
c) Unit
d) Size
Answer: d
Explanation: The dimensioning of the circle depends upon the size or diameter of the circle. If the diameter of the circle is considerably large, the dimension can be given inside the circle itself. It should be noted that the dimension of the circle should be given in the view where its true shape is visible.

7. The dimensions which are smaller are to be placed _____
a) Nearer to the view
b) Further from the outline of the view
c) Inside the view
d) On the view

Answer: a

Explanation: The dimensions which are smaller should be placed nearer to the view while the larger view should be place further away. Dimensions large or small should not be placed on the view. Extension lines should be used and the outlines of ht view for dimensioning.

8. While dimensioning, where should the large dimensions be placed?

a) On the outlines of the view

b) Near the view

c) Further away from the view

d) Inside the view

Answer: c

Explanation: The larger dimensions should be placed further away from the outlines of the view. They should be placed beyond the smaller dimensions. This helps in a neat arrangement of the dimensions and can be understood easily.

9. Extension lines should start from which part of the drawing?

a) Away from the outlines

b) From inside the views

c) No need for extension lines

d) Outlines of the view

Answer: d

Explanation: Extension lines should start immediately from the outlines of the views. There should be no gap between the outlines and the extension lines. Dimensions should not be given on the outlines themselves and therefore extension lines should be used.

10. Dimensions can be placed anywhere irrespective of the features visible.

a) True

b) False

Answer: b

Explanation: Dimensions have to be placed where the true shape or features are clearly indicated. For example, if there is cylindrical hole in the object, the size of the cylinder i.e. the diameter of the base circle should be dimensioned in the view where it is seen as circle and not in the view where the cylinder is seen as rectangle.

Terminology of Dimensioning – 1

1. The wrong statement about leader line is _____

a) A leader line is a thin continuous line connecting a note or a dimension figure.

b) One end of the leader terminates either in an arrowhead or a dot.

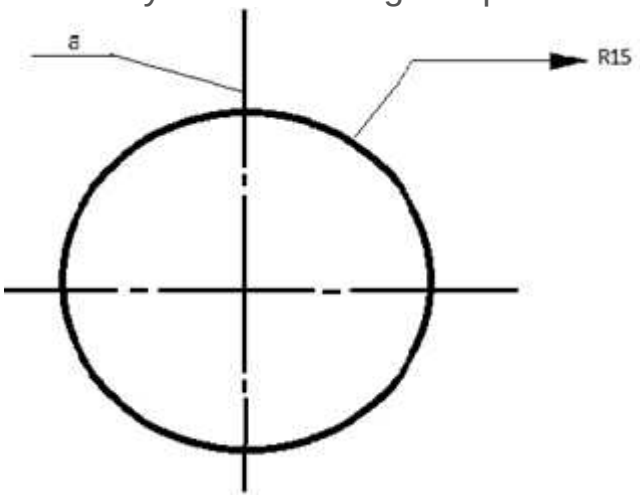
c) The leader is drawn vertical or horizontal or curved.

d) Use of common leaders for more than one feature should never be made.

Answer: c

Explanation: The leader is never drawn vertical or horizontal or curved. It is drawn at a convenient angle of not less than 30o to the line to which it touches. When pointing to a circle or an arc it is drawn radially.

2. Identify the ‘a’ in the given picture



a) dimension line

b) hidden line

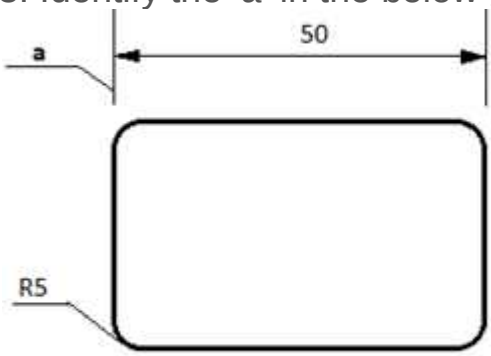
c) centre line

d) outline

Answer: c

Explanation: Centre line usually represents the centre of circle, the axis of cylindrical objects, lines of symmetry, trajectories, pitch circle of gears and pitch circle of holes, represented by chain thin long-dashed dotted (narrow).

3. Identify the ‘a’ in the below given picture.



a) dimension line
b) outline
c) leader
d) extension line

Answer: d

Explanation: An extension line also a thin continuous line drawn in extension of an outline. It extends by about 3 mm beyond the dimension line. Dimension line is a thin continuous line. It is terminated by arrowheads touching the outlines, extension lines or centre lines.

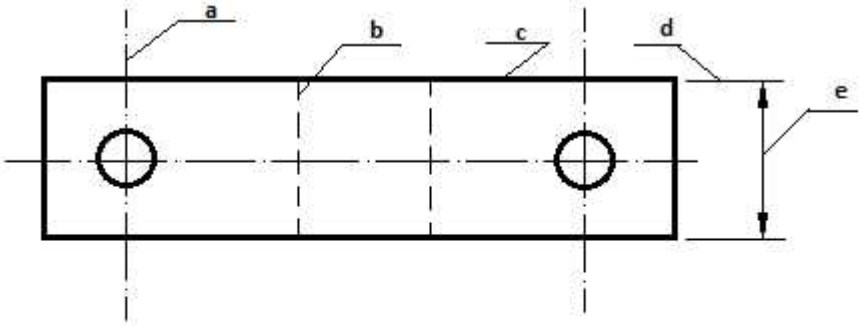
4. While representing the diameter in dimensioning it is represented as _____

a) D
b) Ø
c) Dia
d) d

Answer: b

Explanation: Diameter is represented the unique way as shown in options which directly represents the circle and line at its center that is center line where diameter is measured. But radius is represented as capital R.

5. From below given figure, match the following.



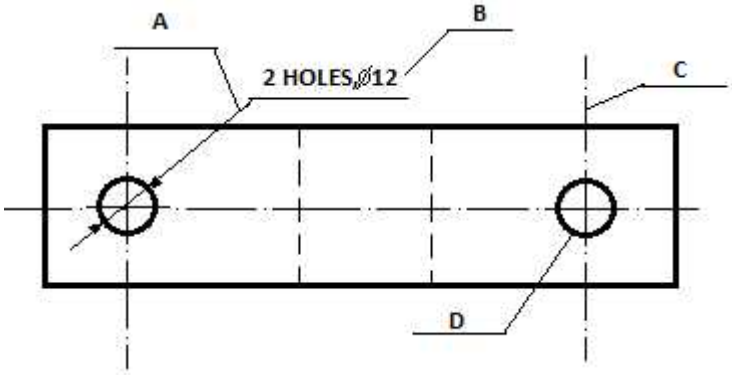
a.	i.	Dimension line
b.	ii.	Extension line
d.	iii.	Hidden outline
e.	iv.	Centre line

a) a, i; b, ii; d, iii; e, iv
b) a, iv; b, iii; d, ii; e, i
c) a, i; b, iv; d, iii; e, ii
d) a, iii; b, ii; d, i; e, iv

Answer: b

Explanation: Chain thin long-dashed dotted (narrow) is used for centre line. Dashed thin (narrow) is used for hidden outlines and hidden edges. Continuous thin (narrow) (straight or curved) is used for extension line as well as dimension line, but dimension line has arrow heads at ends.

6. Identify the note in the below given figure.



a) A
b) B
c) C
d) D

Answer: b

Explanation: A note gives information regarding specific operation relating to a feature. It is placed outside a view but adjacent to the feature concerned. It is so written that it may be read when the drawing is viewed from the bottom edge.

7. It is recommended that a gap of about 2 mm should be kept between the extension line and an outline.
a) True
b) False
Answer: b
Explanation: It is recommended that a gap of about 1 mm should be kept between the extension line and an outline or object boundary by the B.I.S. It extends by about 3 mm beyond the dimension line.

8. A dot may also be used to replace an arrowhead.
a) True
b) False
Answer: a
Explanation: Arrowheads should ordinarily be drawn within the dimensioned feature. But when there is fewer space arrowheads can also be kept outside and a dot may also be used to replace arrowhead and also if there is no space for dimension figure to be kept on dimension line the figure may be written above the extended portion of dimension line.

Terminology of Dimensioning – 2

1. Which of the lines is a thin continuous line with the ends terminating in arrowheads and is enclosed by extension lines, outlines or centre lines?
a) Dimension line
b) Leader line
c) Extension line
d) Section line
Answer: a
Explanation: The dimension line is a thin continuous line with the ends terminating in arrowheads and is enclosed by extension lines, outlines or centre lines. The dimension figures is written on the top of the dimension line or aligned at the centre of the dimension line according to the system of dimensioning.

2. What is the name of the thin continuous line which encloses the dimension lines are generally drawn 1mm away from the outlines?
a) Dimension line
b) Section line
c) Leader line
d) Extension line
Answer: d
Explanation: Extension line is a thin continuous line which encloses the dimension line and they are generally drawn 1mm away from the outlines. They need to drawn near to the outlines and far away from the outlines.

3. In engineering drawing, which type of arrowhead is used?
a) Open (90°)
b) Small open circle
c) Closed and filled
d) Oblique stroke
Answer: c
Explanation: Usually in engineering drawing, the arrowheads used are closed and neatly filled. They are made by hand in proportion to the thickness of the outline. The length of the arrowhead is three times the width of the arrowhead.

4. What is used to specify the operation done on a particular feature?
a) Dimension
b) Note
c) Arrowhead
d) Leader line
Answer: b
Explanation: A note is used to indicate information about the operation done on a particular feature. It is written near to the feature and usually it is shown outside the view. With this type of information of the drawing manufacturing of the part becomes easy.

5. Which of the following is a thin continuous line with one side terminating in arrowhead and the other with a period?
a) Note
b) Extension
c) Leader
d) Dimension
Answer: c

Explanation: A leader is thin continuous line with one end terminating in arrowhead and the other with a period. While dimensioning arcs or circles, leaders are aligned to the radius of the respective arcs or circles.

6. What is the inclination of the leader in a drawing?
a) Vertical
b) Horizontal
c) Less than 30˚
d) Greater than 30˚
Answer: d
Explanation: The leaders are drawn at an inclination of more than 30˚. They should not be placed vertical, horizontal and less than 30˚ to the respective feature. The arrowhead should touch the feature they are describing or dimensioning.

7. A leader line can be drawn curved.
a) True
b) False
Answer: b
Explanation: A leader line can never be drawn curved. They should be drawn straight and inclined at an angle not less than 30˚. They should not be placed vertical or horizontal in the views. One side of the leader line should terminate in arrowhead and the other in period.

8. Which of the following dimension needs to be calculated?
a) Length of the rectangle
b) Breadth of the rectangle
c) Diameter of circle
d) Position of circle
Answer: c
Explanation: In the given example, the diameter of the circle is not dimensioned. Diameter of a circle is a very prominent feature and should not be missed while dimensioning. The dimensions are so given that they do not require any further calculations. The above example is the incorrect way of dimensioning.

9. While dimensioning a feature with a square cross-section, what should be added before the dimension figure?
a) SQUARE
b) SQ

c) Sq.
d) Nothing
Answer: b
Explanation: While dimensioning a feature with a square cross-section, ‘SQ’ should be added before the dimension figure to indicate its shape. For dimensioning the base circle of a cylinder, the symbol ‘φ’ is added before the dimension figure.

10. While dimensioning a sphere, what should be added in front of the dimension figure?
a) Sp.
b) SP.
c) SPHERE
d) φ
Answer: c
Explanation: Since in all views, a sphere is seen as circle. While dimensioning a sphere it is important to add ‘SPHERE’ in front of the dimension figure giving information about the diameter of the sphere. Fore example, a sphere with 25mm diameter will be dimensioned as ‘SPHERE 25’.

11. Operations performed on a particular feature are indicated by using extension lines.
a) True
b) False
Answer: b
Explanation: A note is used to indicate the operations done on a feature if there any. The note accompanied by a leader line which terminates in arrowhead on one side and a period on other side. For example, the threads on feature may have a note indicating whether it is a single start or double start.

12. Tapers and slope indicated in the view are part of dimensioning.
a) True
b) False
Answer: a
Explanation: Tapers and slopes are part of dimensioning. They are calculated through their respective formulas and are indicated as 1: x, near the feature which has the slope or taper on them. While drawing these features, having this information sure comes handy.

Representative Factor – 1

1. Representative fraction is the _____
a) ratio of the length in drawing to the actual length
b) ratio of the actual length to the length in drawing
c) reciprocal of actual length
d) square of the length in drawing
Answer: a
Explanation: Representative fraction is the ratio of the length of the object represented on drawing to the actual length of the object represented.

$$R.F. = \frac{\text{Length of the drawing}}{\text{Actual length of object}}$$

2. The scale of a drawing is given as 1:20. What is the representative fraction?
a) 20
b) 1/20
c) 0.5
d) 0.02
Answer: b
Explanation: The scale of drawing is given as 1:20 that is a reducing scale, this means dimensions are made to 1/20th of full size. So the representative factor is that dimension in drawing to actual dimension. R.F. = (1/20)/1 = 1/20.

3. The scale of a drawing is given as 15:1. What is the representative fraction?
a) 15
b) 0.15
c) 1.5
d) 1/15
Answer: a
Explanation: The scale of drawing is given as 15:1 that is a enlarging scale, this means dimensions are increased to 15 times of actual ones. So the representative factor is that dimension in drawing to actual dimension. R.F. = 15/1 = 15.

4. The length of the drawing is 50 mm, the scale is given as 1:5. Find the actual length.
a) 50 cm
b) 10 cm
c) 25 cm

d) 10 mm

Answer: c

Explanation: The scale given is 1:5 (reducing scale) that is the drawing is made with 1/5th of actual dimensions. So we have to multiply the drawing length with 5. 50 mm x 5 =250 mm and 1 cm =10 mm. The actual length in cm is 25.

5. The actual length is 1m. The length of drawing is 5cm. Find the representative factor.

a) 1/5

b) 20

c) 1/20

d) 5

Answer: c

Explanation: Representative factor is the ratio of the length represented in drawing to the actual length. Here given actual length is 1 m =100cm and length of drawing is 5 cm. R.F. =5 cm/100 cm = 0.05 (or) = 1/20.

6. The representative factor is 4. The actual length is 20 mm. Find the length of drawing.

a) 5 cm

b) 5 mm

c) 0.2 mm

d) 8 cm

Answer: d

Explanation: The representative factor given is 4 (more than one), shows the scale is enlarging. Representative factor = ratio of length in drawing to actual length. R.F. = (length in drawing)/20 mm = 4.

Length in drawing = 20 mm x 4 = 80 mm = 8 cm.

7. A machine part is drawn two times with different scales. The ratio of 1st drawing's R.F. to 2nd drawing R.F. with respect to actual object is found to be 2. The length of second drawing is 10 mm. Find the 1st drawing length.

a) 5 mm

b) 200 mm

c) 5 cm

d) 2 cm

Answer: a

Explanation: 2= 1st drawing R.F/2nd drawing R.F. =(length of 1st drawing/ actual

length)/(length of 2nd drawing/ actual length) = length of first drawing/ length of second drawing= length of first drawing/ 10 mm. 2 x 10 mm = 20 mm. So therefore the length of first drawing is 20 mm = 2 cm.

8. The length of the drawing is 20 cm, the scale is given as 2:1. Find the actual length.
a) 50 cm
b) 10 cm
c) 25 cm
d) 10 mm
Answer: b
Explanation: The scale given is 2:1 (enlarging scale) that is the drawing is made 2 times of actual dimensions. So we have to divide the drawing length with 2. 20 mm / 2 =100 mm and 1 cm =10 mm. The actual length in cm is 10 cm.

9. The actual length is 1cm. The length of drawing is 30 cm. Find the representative factor.
a) 1/30
b) 30
c) 0.03
d) 15
Answer: b
Explanation: Representative factor is the ratio of the length represented in drawing to the actual length. Here given actual length is 1 cm and length of drawing is 30 cm. R.F. =30 cm/1 cm = 30.

10. The representative factor is 0.02. The actual length is 50 cm. Find the length of drawing.
a) 10 cm
b) 5 cm
c) 0.25 cm
d) 10 mm
Answer: d
Explanation: The representative factor given is 0.02 (less than one), shows the reducing scale. Representative factor = ratio of length in drawing to actual length. R.F. = (length in drawing)/50 cm = 0.02. Length in drawing = 0.02 x 50 cm = 1 cm = 10 mm.

11. The ratio of length of actual object to length of drawing is given as 5. Find the scale and R.F. (Representative factor).
a) 1:5, 1/5
b) 5:1, 1/5
c) 1:5, 5
d) 5:1, 5
Answer: a
Explanation: Given that the ratio of actual length to length of drawing which is reciprocal of R.F. So the R.F. for given values is 1/5. From the given information it can be understood that the actual object is 5 times larger than the drawing, so the scale is reducing scale i.e. 1:5.

12. The representative factor is 2, the drawing length is 100 mm. Find the actual length.
a) 20 cm
b) 50 mm
c) 20 mm
d) 50 cm
Answer: b
Explanation: The scale is enlarging scale. The ratio of length of drawing to actual length gives the representative factor. 100 mm / actual length = 2, actual length = 100 mm/2 = actual length = 50 mm (or) 5 cm.

13. The representative factor is 0.5, the drawing length is 10 cm. Find the actual length.
a) 20 cm
b) 50 mm
c) 20 mm
d) 50 cm
Answer: a
Explanation: The scale is reducing scale. The ratio of length of drawing to actual length gives the representative factor. 10 cm / actual length = 0.5, actual length = 10 cm/0.5 = actual length = 20 cm (or) 200 mm.

Representative Factor – 2

1. Representative factor is defined as the ratio of the length of the drawing to the actual length of the object.
a) True
b) False
Answer: a
Explanation: The representative factor is defined as the ratio of the length of the drawing to the actual length of the object. The value of representative factor can give information on whether the scale is enlarging or reducing.

2. What is the representative factor of a line, whose length is 24cm on the drawing sheet, representing an actual length of 6m?
a) 1:50
b) 1:25
c) 1:24
d) 1:60
Answer: b
Explanation: Representative factor is calculated as the ratio of the length of the drawing to the actual length of the object. Both the quantities should be taken in same unit. In this example, R.F. equals to 24 ÷ (600) i.e. 1:25.

3. A 20mm line, drawn on the drawing sheet represents an actual length of 5m. What is the representative factor?
a) 1:2.5
b) 1:25
c) 25:1
d) 1:250
Answer: d
Explanation: The formula for calculating the representative factor is the length of the drawing divided by the actual length of the object. Hence for this example, R.F = 20 ÷ 5000 i.e. 1:250. The units of the quantities in the formula must be the same.

4. A line of 10cm is drawn on a drawing sheet. It represents an actual length of 25mm. What is the representative factor?
a) 1:4
b) 1:40
c) 4:1
d) 40:1
Answer: c

Explanation: Representative factor is calculated as the ratio of the length of the drawing to the actual length of the drawing it represents. From this formula we get, R.F. = 100 ÷ 25. Hence the representative factor is 4:1.

5. Which of the following representative factor will have an enlarging scale?
a) 1:24
b) 1:5
c) 1:3
d) 1:0.5
Answer: d
Explanation: The representative factor 1:0.5 can be written as 2:1. Since the actual length of the drawing is less than the representative length, the scale is enlarging. If the actual length of the object is greater than the representative value, R.F. will be less than unity.

6. Which of the following representative factors depict that the actual length of the object is greater than the length of the drawing?
a) 2:5
b) 4:1
c) 3:2
d) 5:3
Answer: a
Explanation: Considering that a 2cm line drawn on the drawing sheet represents an actual length of 5cm. Hence in the case of representative factor 2:5 i.e. 1:2.5, the actual length is greater than the length of the drawing.

7. What is the representative factor if the length of the drawing is 15mm and the actual length of the object is 3m?
a) 1:2
b) 1:0.2
c) 1:200
d) 1:20
Answer: c
Explanation: The representative factor is the ratio of length of the drawing to the actual length of an object. Hence for the line of length 15mm and the actual length 3m, R.F. = 15 ÷ 3000 = 1:200. The units of both the quantities should be same.

8. Which of the following is not a valid representative factor?
a) 1:2

b) 1:3
c) 2:5
d) 0:4
Answer: d
Explanation: The representative factor cannot be zero. As the length of the drawing cannot be zero, having a value zero means that there is no drawing made. Representative factors are used to scale down or up the drawing from the actual object.

9. A line of length 4mm is represented by a line of 4cm. What is the representative factor?
a) 1:1
b) 10:1
c) 1:10
d) 1:100
Answer: b
Explanation: The actual length of the object is 4mm and the length of the drawing is 4cm. From the formula for calculating the representative factor we get, R.F. = 4 ÷ 0.4 = 10. Hence the representative factor is 10:1.

10. What is the representative factor if sides of square measuring 4cm in the drawing sheet while the actual length of the side of the square is 3m?
a) 1:0.75
b) 4:3
c) 1:75
d) 3:4
Answer: c
Explanation: The length of the drawing is 4cm and the actual length of the drawing is 3m. By using the formula for calculating the representative factor we get the value of R.F. as 1:75. R.F. = 4 ÷ 300. The units of both the quantities should be the same.

Types of Scales – 1

1. What is the type of scale in which the representative fraction is 1:1?
a) Enlarged scale
b) Reduced scale
c) Full size scale
d) Graphical scale

Answer: c

Explanation: A full size scale is a type of scale in which the length of the drawing and the actual length of the object is of the ratio 1:1. Hence by definition, its representative fraction is 1:1. In full size scale the drawing is drawn with the actual measurements.

2. Which of the following representative fraction depicts an enlarging scale?

a) 1:0.2

b) 1:2

c) 1:3

d) 1:1

Answer: a

Explanation: Enlarging scale means that the drawing is drawn with the bigger dimensions in comparison to the actual dimensions of the object. A representative fraction of 1:0.2 means 5:1, i.e. the drawing is five times bigger than the actual object. Hence the scale is enlarging scale.

3. Which of the following scales is a reducing scale?

a) 3:2

b) 1:3

c) 1:1

d) 1:0.4

Answer: b

Explanation: The representative fraction 1:3 indicates that the dimension of the drawing is one-third of the actual object. Since the drawing is smaller than the actual object, this type of scale is called reducing scale.

4. Which of the following is not an enlarging scale?

a) 2:1

b) 4:3

c) 3:5

d) 6:1

Answer: c

Explanation: Enlarging scale means that the drawing is larger than the actual object. Hence the representative fraction will be greater than unity. For reducing scale the representative fraction is less than unity.

5. Which of the following scales is neither an enlarging nor a reducing scale?

a) 3:2

b) 1:4
c) 1:0.5
d) 1:1
Answer: d
Explanation: A scale which is neither enlarging nor reducing is called as full size scale. The representative fraction of a full size scale is 1:1. In full size scale, the drawing is made just as the actual dimensions of the object.

6. A scale which is numerically represented on the drawing sheet is called as _____
a) Graphical scale
b) Engineer’s scale
c) Reducing scale
d) Full size scale
Answer: b
Explanation: An engineer’s scale is the representation of the scale used in drawing on the drawing sheet numerically. For example, if the length of the drawing is 5 cm and the actual length is 10m, then it is numerically represented as 5cm = 10m.

7. Which of the following scale is used in survey maps?
a) Engineer’s scale
b) Diagonal scale
c) Graphical scale
d) Vernier scale
Answer: c
Explanation: Graphical scales are used in survey maps. The graphical scale is drawn on the drawing. When the drawing ages, the engineer’s scale shrinks and may not give accurate results. Hence graphical scale is used as the drawing shrinks, the scale will also shrink.

8. What is the formula for calculating the length of the scale?
a) Minimum length to be measured x R.F.
b) Minimum length to be measured ÷ R.F.
c) Maximum length to be measured ÷ R.F.
d) Maximum length to be measured x R.F.
Answer: d
Explanation: The length of the scale is calculated by using the following formula,
Length of the scale = R.F. x Maximum length to be measured.

9. Units of the measurements must be shown in the scale drawn.
a) True
b) False
Answer: a
Explanation: Units of the scale must be clearly indicated on the drawing. This helps in clearing any misunderstanding concerning the different units used in the scale. The representative fraction should be mentioned in the drawing as well.

10. The minimum length to be shown must be known for drawing unusual scale.
a) True
b) False
Answer: b
Explanation: The maximum length of the scale must be known to draw unusual scales on the drawing sheet. The representative fraction of the scale is also essential information. The units of the scale must be mentioned on the drawing.

Types of Scales – 2

1. What are the two parts of Vernier scale?
a) Primary scale and secondary scale
b) Plain scale and comparative scale
c) Vernier scale and secondary scale
d) Primary scale and Vernier scale
Answer: d
Explanation: The Vernier scale consists of two parts. They are the primary scale and the Vernier scale. Vernier scale is used to read very small dimensions with great accuracy. The Vernier part of the scale is derived from the primary scale.

2. Which of the following scale is a plain scale with fully divided minor divisions?
a) Diagonal scale
b) Vernier scale
c) Primary scale
d) Comparative scale
Answer: c
Explanation: The primary scale is a plain scale with fully divided minor divisions. For reading very small dimensions, minor divisions cannot be further divided. Hence we use Vernier scale to read those dimensions.

3. The graduations of which scale is derived from the primary scale?
a) Comparative scale
b) Vernier scale
c) Plain scale
d) Diagonal scale
Answer: b
Explanation: The graduations on the primary scale helps in making the graduations on the Vernier scale. For reading very small dimensions we need to further divide the minor divisions on the primary scale, which will to problems in reading dimensions properly. Hence Vernier scale is used.

4. Which of the following is used in checking the instruments to measure angles with great accuracy?
a) Circular Vernier scale
b) Plain scale
c) Diagonal scale
d) Comparative scale
Answer: a
Explanation: The circular Vernier scale is used to check the instruments to measure angles with high accuracy. They are used in measuring instruments like micrometer in mechanical engineering. They work on the same principle as the linear Vernier scale.

5. Which of the following scales represent two different units having same representative fration?
a) Plain scale
b) Diagonal scale
c) Comparative scale
d) Vernier scale
Answer: c
Explanation: Comparative scales are those in which two different units are measured by using different graduations but have same representative fraction. A drawing can be read in two units with the help of this scale.

6. What is the length of the scale, the representative fraction is 1:50000 and the scale must measure up to 25 km?
a) 5×10^{-4} cm
b) 50 cm
c) 5 cm

d) 0.5 cm

Answer: b

Explanation: The formula for calculating the length of the scale is given by, Length of the scale = R.F. x maximum length to be measured; Hence length of the scale = 1 ÷ 50000 x 25 x 1000 x 100 = 50 cm. It is very important to note the units while calculating.

7. In a particular drawing, 40 inches is represented by a 10 cm long line. A comparative scale is constructed that measures up to 180 inches and 2 m respectively. What are the lengths of scale for both the inches as well as the meter scales? (1 inch = 0.0254 meter)

a) 7 cm and 8.3 cm

b) 35 cm and 18.35

c) 2.2 cm and 22.9 cm

d) 45 cm and 19.7 cm

Answer: d

Explanation: The length of the scale = R.F. x maximum length to be measured. Hence for the inches scale, R.F. = 10 ÷ 40 and the maximum length to be measured is 180 inches. Hence length of inch scale = 10 ÷ 40 x 180 = 45 cm. Similarly length of meter scale = 10 ÷ 40 ÷ 0.0254 ÷ 100 x 2 x 100 = 19.7 cm.

8. Which of the following is used to set or measure angles when a protractor is not available?

a) Plain scale

b) Diagonal scale

c) Scale of chords

d) Comparative scale

Answer: c

Explanation: The scale of chords is used to measure or set angles when there is no protractor. In this method, a line PQ is drawn and then from Q a perpendicular QR is drawn. An arc is drawn with centre Q and is made to intersect perpendicular QR. Then the arc is divided into 9 equal parts with each part denoting 10° from Q.

9. In a map, 30 miles is represented by 20 cm. What is the length of the kilometer scale if the maximum length to be measured is 10 km? (1 mile = 1.609 km)

a) 4.14 cm

b) 10.73 cm

c) 9.32 cm

d) 24.14 cm

Answer: a

Explanation: The formula for calculating the length of the scale is given by; Length of the scale = R.F. x maximum length to be measured. Hence from the formula, length of the scale = 20 ÷ (30 x 1.609 x 1000 x 100) x 10 x 1000 x 100 = 4.14 cm.

10. What is the representative fraction of the kilometer scale if 20 miles is represented as 5 cm and maximum length to be measured is 5 km? (1 mile = 1.609 km)

a) 1:4

b) 1:643600

c) 1:1.287

d) 0.7768:1

Answer: b

Explanation: The representative fraction is calculated by the formula, R.F. = length of the drawing ÷ actual length of the object. Here the length of the drawing is 5 cm and the actual length is 20 miles. In R.F. both quantities should be in same unit. R.F. = 5 ÷ (20 x 1.609 x1000 x 100) = 1:643600.

Types of Scales – 3

1. Why it is more beneficial to represent the scale graphically other than by just numerical?

a) To represent clearly

b) More accurate

c) To measure directly from scale

d) To prevent

Answer: d

Explanation: The scale is drawn on the drawing itself. As the drawing becomes old, the drawing sheet may shrink and may not give accurate results then. But if we use graphical scale, along with drawing the scale also shrinks.

2. What is not essential information to construct a scale from the following?

a) The R.F. of the scale

b) The units to represent

c) Length of scale

d) Maximum length

Answer: c

Explanation: The length of the scale can be found using ’length of the scale = Representative fraction x Maximum length’. To draw drawing R.F (representative fraction), Units to represent (example: meters and centimeter or another if needed) and maximum length required is essential.

3. Scales having same representative fraction but graduated to read different units are called _____

a) Scale of chords
b) Circular vernier scale
c) Comparative scale
d) Diagonal scale

Answer: c

Explanation: A drawing drawn with a scale reading inch units can be read in metric units by means of a metric comparative scale, constructed with same representative fraction. The comparative scales may be plain scales or diagonal scales and may be constructed separately or one above the other.

4. The scale used in micrometer is _____

a) Plain scale
b) Comparative scale
c) Diagonal scale
d) Circular vernier scale

Answer: d

Explanation: The circular vernier uses the principle of vernier. The circular vernier is used in surveying instruments to measure angle to the required accuracy. In the case of mechanical engineering, it is used in measuring instruments like micrometer.

5. The scale used to find angles is _____

a) Diagonal scale
b) Comparative scale
c) Circular vernier scale
d) Scale of chords

Answer: d

Explanation: The scale of chords is used to set out or measure angles when a protractor is not available. It is based on lengths of chords of different angles measured on the same arc.

6. Which scale you prefer if there is need to measure most accurately.
a) Plain scale
b) Vernier scale
c) Ordinary scale
d) Comparative scale
Answer: b
Explanation: The plain scale gives only up to single decimal. Comparative scales are just used to represent two different units. The vernier scale gives up to 2 decimal values.

7. Which scale represents only two units or a unit and its sub-division?
a) Diagonal scale
b) Plane scale
c) Scale of chords
d) Vernier scale
Answer: b
Explanation: A plain scale is constructed by dividing a line into suitable number of equal parts or units, the first of which is sub-divided into smaller parts. Plain scales represent either two units or a unit and its sub-division.

8. Which scale is employed when we need to measure in three units?
a) Plane scale
b) Scale of chords
c) Vernier Scale
d) Diagonal scale
Answer: d
Explanation: A diagonal scale is used when very small distances are to be accurately measured or when measurements are required in three units. Small divisions of short lines are obtained by the principle of diagonal scales.

9. We need a scale which has to show dm, cm and mm. Which scale do you prefer?
a) Diagonal scale
b) Plain scale
c) Vernier scale
d) Comparative scale
Answer: a
Explanation: Diagonal scale is meant for drawing scales which represents 3 units. A

diagonal scale is used when very minute distances to be measured. Small divisions of short lines are obtained by the principle of diagonal scale.

10. Which scale is used in surveying instrument?
a) Comparative scale
b) Circular Vernier scale
c) Vernier scale
d) Scale of chords
Answer: b
Explanation: The circular vernier uses the principle of vernier. The circular vernier is used in surveying instruments to measure angle to the required accuracy. In the case of mechanical engineering, it is used in measuring instruments like micrometer.

Plane Scales – 1

1. The maximum length is 50 m and length of scale is 10 cm. Find the Representative factor.
a) 1/50
b) 50
c) 500
d) 1/500
Answer: d
Explanation: Length of the scale = Representative fraction x Maximum length, 10 cm = Representative fraction x 5000 cm, Representative factor = 1/500.

2. Given Representative factor as 4/50 and maximum length is 100 cm. Find the length of scale.
a) 8 cm
b) 10 cm
c) 9.7 cm
d) 12 cm
Answer: b
Explanation: Length of the scale = Representative fraction x Maximum length, Length of scale = 4/50 x 100 cm, Length of scale= 8 cm.

3. Given, below are the steps related to construct a scale of 1:50 to show meters and decimeters and maximum length is 5 meters. Arrange the steps

i. Then divide the 1st part into 10 equal divisions
ii. Determining the length of scale 1/50 x 500 cm = 10 cm
iii. Determining R.F. here it is 1/50
iv. Draw a line 10 cm long and divide it to 5 equal parts
a) i, ii, iii, iv
b) iii, ii, iv, i
c) ii, iv, i, iii
d) iv, i, ii, iii
Answer: b
Explanation: The general procedure involves finding R.F. at the 1st and next max length of scale and then dividing whole line into given number of units at last dividing the 1st part to number of sub-divisions that occur in unit.

4. How many divisions a line has to be made if it is given to prepare plain scale up to 7 yards?
a) 8
b) 7
c) 6
d) It depends on R.F
Answer: b
Explanation: Whatever the representative factor may given, we just require number of units to divide the line in scale. Representative factor is only needed to find the length of the scale. Length of the scale = Representative fraction x Maximum length.

5. What is the length of the scale, representative fraction given is 3/40 and maximum length to be represented in scale is 100 cm?
a) 8.5 cm
b) 10 cm
c) 7.5 cm
d) 13.33
Answer: c
Explanation: Length of the scale = Representative fraction x Maximum length. Length of the scale = 3/40 x 100 cm = 7.5 cm. That is to draw a scale for 100 cm with 3/40 R.F. We need to draw 7.5 cm length line and divide to 10 decimeters.

6. In preparing a plain scale of feet and yards, the first division is to be divided into how many sub-divisions?
a) 5

b) 3
c) 4
d) 10
Answer: b
Explanation: Given that the plain scale is to be made with feet and yards. Generally 1st part is divided into sub-divisions here is feet. We know 1 yard is equal to 3 feet, so 1st division should be divided into 3 sub-divisions.

7. In preparing a plain scale of feet and inches, how many sub-divisions do the first division is to be divided?
a) 10
b) 6
c) 12
d) 5
Answer: c
Explanation: Given that the plain scale is to be made with feet and inches. Generally 1st part is divided into sub-divisions here is inches. We know 1 feet is equal to 12 inches, so 1st division should be divided into 12 sub-divisions.

8. In preparing a plain scale of miles and furlongs, how many divisions do the first part is to be made?
a) 10
b) 12
c) 8
d) 6
Answer: c
Explanation: Given that the plain scale is to be made with miles and furlongs. Generally 1st part is divided into sub-divisions here is furlong. 1 mile is equal to 8 feet, so 1st division should be divided into 8 sub-divisions.

9. A plain scale is made to show 9 miles and sub division is furlong. To measure 3 miles and 6 furlongs how many divisions is to take on the right side of origin and how many division it is to take on the left side of origin?
a) 3, 6
b) 2, 4
c) 6, 3
d) 4, 2
Answer: a

Explanation: Origin is at 1st division ending. 1st division is made to sub-divisions. From origin it is divided to divisions on right side. Here it is asked to measure how many divisions do 3 miles takes. It is 3 and 6 furlongs take on left of origin. It is 6.

10. A plain scale is made to show 7 yards and sub division is feet. To measure 2 feet, how many divisions it is to take on the left side of origin?
a) 1
b) 2
c) 3
d) 4
Answer: b
Explanation: Origin is at 1st division ending. 1st division is made to sub-divisions. From origin it is divided to divisions on right side and towards left 1st division is divided into sub-divisions. Here it is asked to measure how many divisions do 2 feet takes. It is 2 from origin to left.

11. A plain scale is made to show 4 feet and sub division is inch. To measure 2 feet and 10 inches how many divisions is to take on the right side of origin?
a) 1
b) 2
c) 10
d) 9
Answer: b
Explanation: Origin is at 1st division ending. 1st division is made to sub-divisions. From origin it is divided to divisions on right side and towards left 1st division is divided into sub-divisions. Here it is asked to measure how many divisions do 2 feet takes. It is 2 from origin to right.

12. A plain scale is made to show 8 meters and sub division is decimeters. To measure7 meters and 3 decimeters how many divisions is to take on the right side of origin and how many it is to take on the left side of origin?
a) 7, 3
b) 3, 7
c) 6, 4
d) 4, 6
Answer: a
Explanation: Origin is at 1st division ending. 1st division is made to sub-divisions. From origin it is divided to divisions on right side and towards left 1st division is divided into sub-

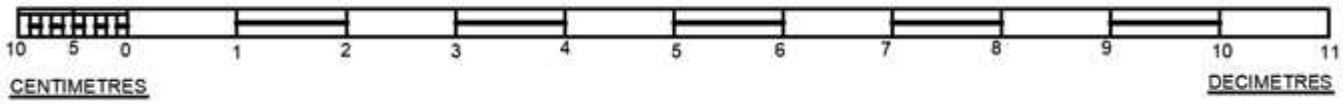
divisions. Here it is asked to measure how many divisions do 7 meters takes. It is 7 from origin to right. And 3 from origin to left.

13. A plain scale is made which shows 6 meters of maximum length and sub division is decimeter with a R.F. of 1 /60. How much length does the scale shows 4 m and 5 decimeters?
a) 4 m 5 dm
b) 4.5 m
c) 0.75 dm
d) 0.75 m
Answer: b
Explanation: length of the scale = Representative fraction x Maximum length, length of scale =1/60 x 4.5 m = 0.075 m = 0.75 dm = 7.5 cm = 75 mm. (or) 1/60 x 4 m =0.0666 m + 1/60 x 5 dm = 0.083 dm, 0.666 dm + 0.08333 dm =0.7499 dm =7.5 cm = 75 mm.

Plane Scales – 2

1. A scale of 1:25 is to be constructed to show centimeters and it should be long enough to measure 10 meters. What is the length of the scale?
a) 4 cm
b) 0.4 cm
c) 40 cm
d) 400cm
Answer: c
Explanation: The length of the scale is calculated as the product of the representative fraction and the maximum length to be measured. Hence, length of the scale = 1 ÷ 25 x 10 x 100 = 40 cm. While calculating it is very important to note the units of the dimensions.

2. From the following figure what is the maximum length that can be measured?

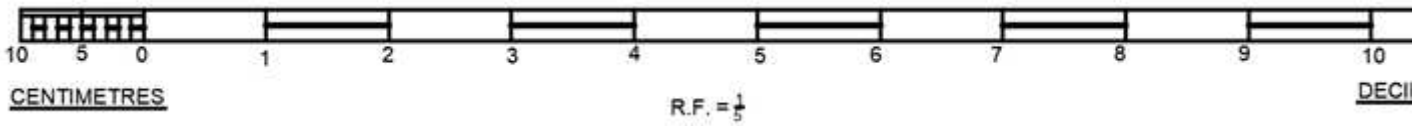


a) 11 dm
b) 10 dm
c) 13 dm
d) 12 dm

Answer: d

Explanation: From the scale given in the figure it is clear that the maximum length that can be measured is 12 decimeters. It is clearly seen that we can measure 11 decimeters and then by adding 10 centimeters which is equal to one decimeter. Hence the maximum length is 12 dm.

3. What is the length of the scale? (R.F. = 1/5)

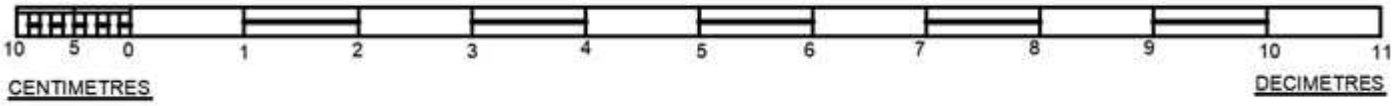


a) 2.4 cm
b) 24 cm
c) 240cm
d) 0.24cm

Answer: b

Explanation: The length of the scale is calculated by the formula, length of the scale = R.F. x maximum length to be measured. Hence, length of centimeter scale = 1 ÷ 5 x 12 x 10 = 24 cm. Here, the representative factor is 1/5.

4. Using the given scale, we can measure 13.7 dm.

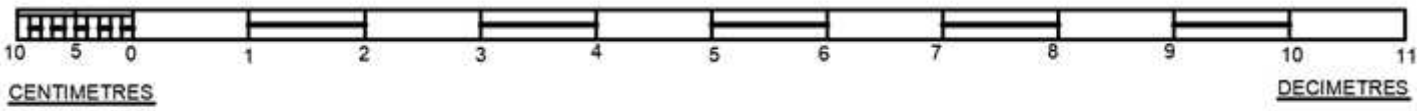


a) True
b) False

Answer: b

Explanation: The maximum length that can be measured is 12 dm. Any measurement beyond that using the given scale is not possible. As we can clearly see we can measure 11 dm and the rest 1 dm can be measured using 10 cm.

5. What is the least count of the given scale?

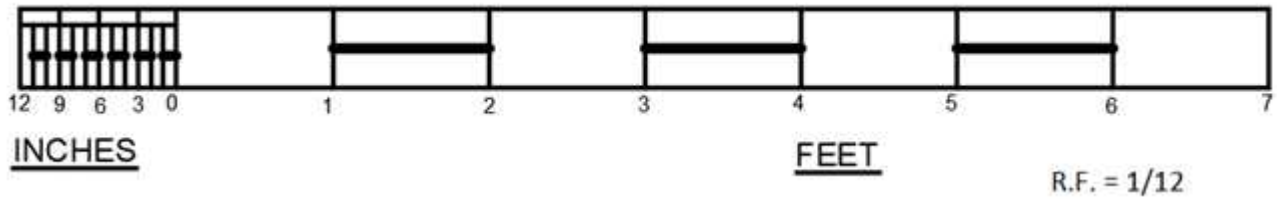


a) 1 cm
b) 0.1 cm
c) 1dm
d) 10 cm

Answer: a

Explanation: The smallest value that can be measured is 1 cm or 0.1 dm. The maximum value that can be measured using the above scale is 12 dm. 10 cm equals to 1 dm. It is clear that 11 dm can be measured but in addition to it, we can measure 10 cm.

6. What is the maximum length that can be measured using the given scale?

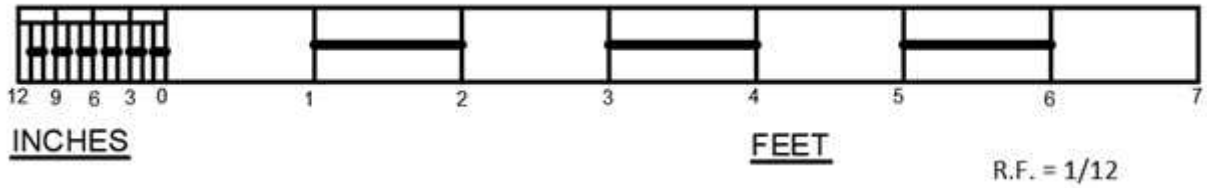


a) 7 inches
b) 7 feet
c) 8 feet
d) 12 inches

Answer: c

Explanation: It is clearly visible that the maximum length that can be measured using the given scale is 7 feet. The rest twelve inches can be measured. Since 12 inches = 1 foot, we can measure 1 foot in addition to the 7 feet. Hence we can measure 8 feet maximum using the above scale.

7. What is the scale in the following figure?

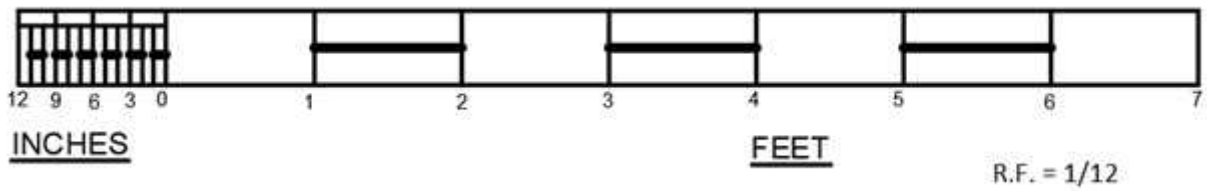


a) 1:2
b) 1:12
c) 1:4
d) 1:7

Answer: b

Explanation: In the figure it is clearly shown that the representative factor is 1/12. Hence the scale is 1:12. The representative fraction is measured as the length of the drawing divided by the actual length of the object.

8. What is the length of the scale?

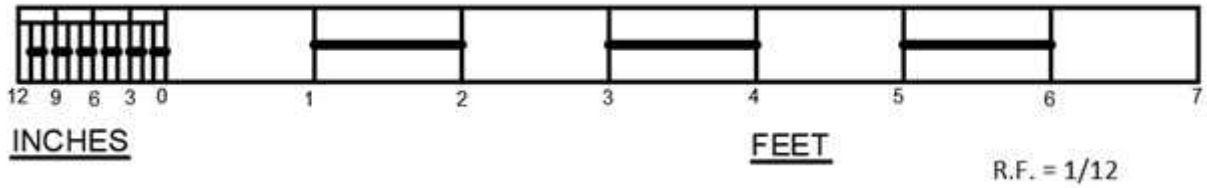


a) 7 feet
b) 7 inches
c) 8 feet
d) 8 inches

Answer: d

Explanation: The length of the scale is calculated as, length of the scale = representative fraction x maximum length to be measured. Hence length of the scale = 1 ÷ 12 x 8 x 12 = 8 inches. While calculating, the units are to be noted.

9. What is the least count of the given scale?

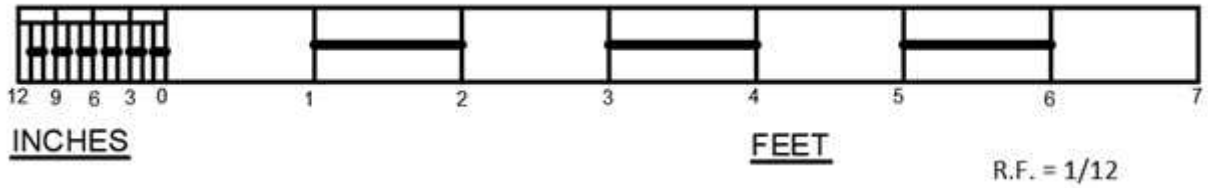


a) 3“
b) 1“
c) 12”
d) 7”

Answer: b

Explanation: The least count is the minimum amount of length that can be measured. Here in the given scale, the least count is 1 inch or one twelfth of a foot = 1/12th foot. The maximum length that can be measured is 8 feet.

10. From the given scale we can measure 3 feet 10”.



a) True
b) False

Answer: a

Explanation: From the given scale we easily measure 3 feet. In addition to that we can measure 10 inches using the inches scale. In this type of plain scale we can measure using both feet and inches as 12 inches = 1 foot.

Diagonal Scales – 1

1. The diagonal scales are used when measurements are required in _____ units.
a) 1
b) 2
c) 3
d) 4

Answer: c

Explanation: Using plain scale we can accommodate 2 units (example: yard, feet). But with diagonal scale we can accommodate 3 units (example: yard, feet and inch). It is possible by the principle of diagonal division.

2. If a diagonal scale is to be made with meter, decimeter and centimeter then, how many divisions it has to be made vertically?
a) 3
b) 5
c) 10
d) 9

Answer: c

Explanation: Vertical divisions are related to how many centimeters take a decimeter. It is 10. Or anywhere in diagonal scales vertical division are dependent of 2nd and 3rd unit which we use in drawing diagonal scale.

3. If a diagonal scale is to be made with yard, feet and inch then, how many divisions it has to be made vertically?
a) 3
b) 12
c) 10
d) 6
Answer: b
Explanation: Vertical divisions are related to how many inches take a foot. It is 12. Or anywhere in diagonal scales vertical division are dependent of 2nd and 3rd unit which we use in drawing diagonal scale.

4. Arrange the steps involve in drawing the diagonal scale.
i) Dividing vertically and joining the points from subdivisions to successive next subdivisions on the last vertical line.
ii) Finding length of scale
iii) Finding R.F.
iv) Dividing horizontally and subdividing the 1st part.
a) i, ii, iii, iv
b) iii, ii, iv, i
c) iv, iii, i, ii
d) ii, i, iv, iii
Answer: b
Explanation: General procedure in preparing graphical scales includes finding representative fraction at first and then finding length of scale. Next dividing horizontally, sub-dividing the 1st division which is common in plain and diagonal scale. In diagonal scales the fourth step as said above places prominent role.

5. A plot of 35,000 sq m is drawn on map as plot of 14 cm and 5 cm. Find the R.F.
a) 1/35000
b) 1/50000
c) 1/34930
d) 1/2236
Answer: d
Explanation: Area of plot in drawing is 14 x 5 = 70 sq cm (equivalent to 35000 sq m). So 1 sq cm =35000/70 = 500 sq m. 1 cm = square root of 500 m = 22.3 m (equivalent to 1 cm). Representative fraction = 1/ (22.36 m) =1/ (2236 cm).

6. Diagonal scale follows the principle of similar triangles.
a) True
b) False
Answer: a
Explanation: Diagonal scale follows the principle of similar triangles where a short length is divided into number of divisions in which sides are proportional which produces interpolated values in between the 1st least number in unit to 0.

7. We can draw diagonal scale for meter, feet, inch.
a) True
b) False
Answer: b
Explanation: There exists a particular order in selecting 1st, 2nd and 3rd unit while drawing diagonal scale that is 1st should have higher quantity of all three, 3rd should have least quantity of all three and 2nd should be middle in them. And there exits at least appreciable multiples among themselves.

8. Which of the following scales is used to accurately measure minute divisions?
a) Plain scale
b) Diagonal scale
c) Scale of chords
d) Comparative scale
Answer: b
Explanation: Minute divisions are accurately measured by using diagonal scales. Diagonal scales are also when three different units of measurements are needed to be measured. With the help of these scales we can get a relation between three different units.

Diagonal Scales – 2

This set of Tough Engineering Drawing Questions and Answers focuses on “Diagonal Scales – 2”.

1. Which of the following scales is used when there are three units that need to be measured?
a) Plain scale
b) Comparative scale
c) Diagonal scale

d) Vernier scale

Answer: c

Explanation: Diagonal scale is used when three different units of measurements are needed to be measured. With the help of this scale we can get the reading in three different units. This scale also helps in accurate measurement of minute divisions.

2. Which of the following scales is used to accurately measure minute divisions?

a) Plain scale

b) Diagonal scale

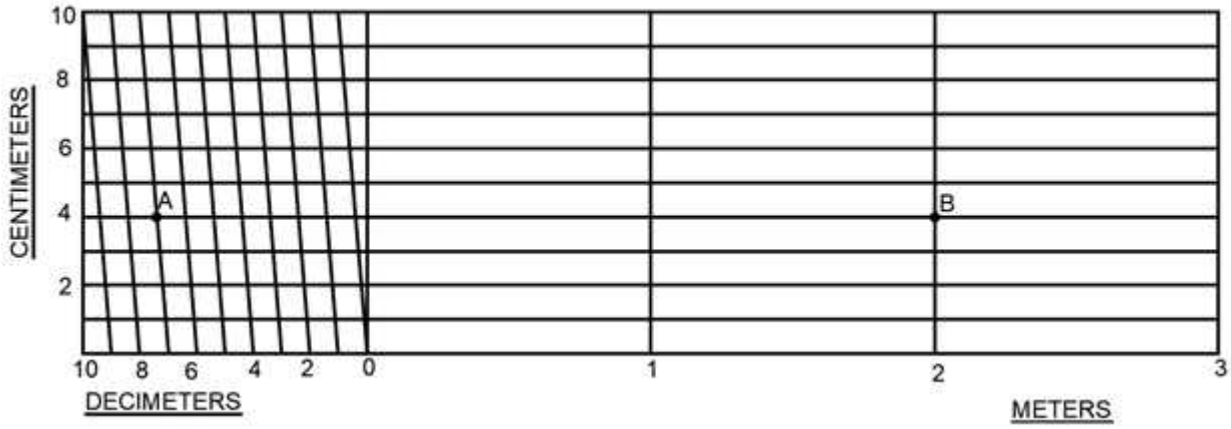
c) Scale of chords

d) Comparative scale

Answer: b

Explanation: Minute divisions are accurately measured by using diagonal scales. Diagonal scales are also when three different units of measurements are needed to be measured. With the help of these scales we can get a relation between three different units.

3. What is the length of AB in the following scale?



a) 2.74 m

b) 3.74 m

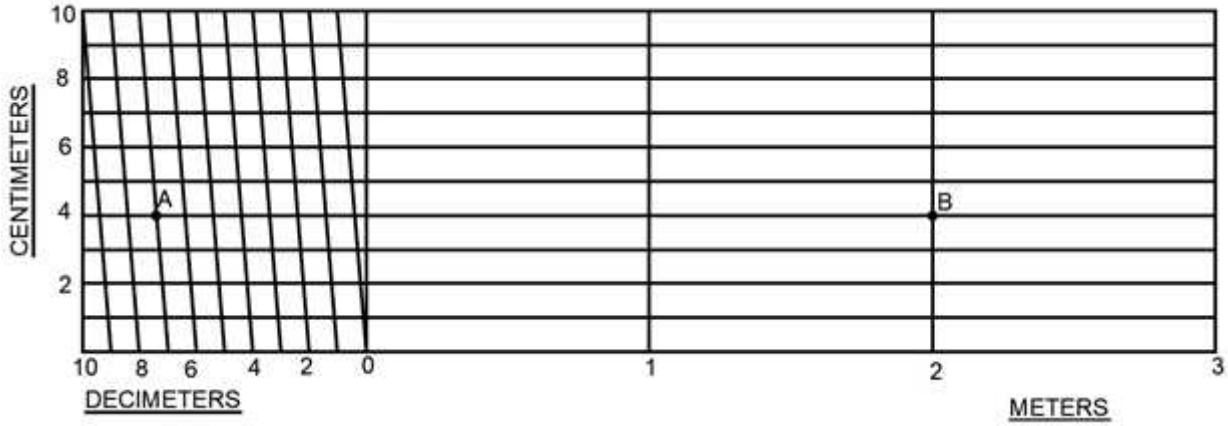
c) 2.47 m

d) 3.47 m

Answer: a

Explanation: Reading of the diagonal involves reading in three ways. The first measurement is taken in the meters scale, the second is from the decimeters scale and the third is from the centimeters scale. Hence in meters scale, the value is 2 m from 0; in decimeters scale, the value is 7 dm and in the centimeters scale, the value is 4 cm. Hence length of AB = 2.74 m.

4. What is the maximum length of the given scale?

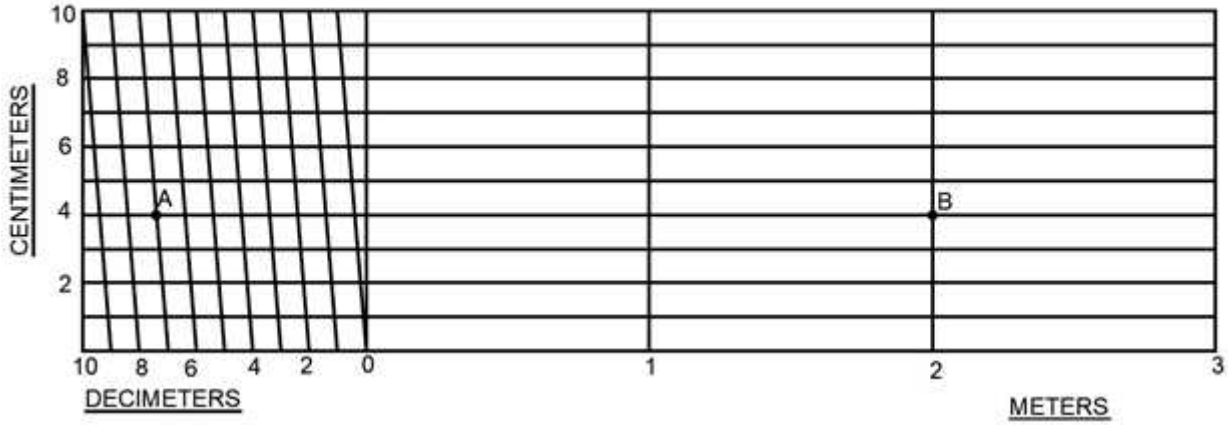


a) 3 dm
b) 4 dm
c) 3 m
d) 4 m

Answer: d

Explanation: The maximum length that can be measured using the given scale is 4 meters. It is clear that wee can measure 3 m from the meters scale. The rest 1 meter is measured as 10 decimeter. Hence 3 + 1 = 4 meters is the maximum length.

5. If the given scale is 1: 60, what is the length of the scale?



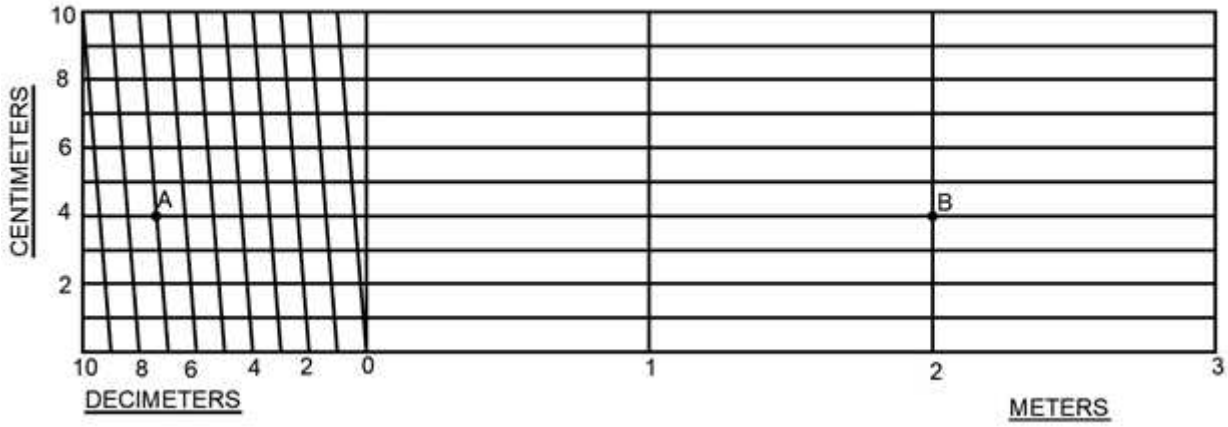
a) 6.67dm
b) 0.67 cm
c) 6.67 cm
d) 66.67 cm

Answer: c

Explanation: The length of the scale is determined by the formula, length of the scale =

representative fraction x maximum length to be measured, that is, length of the scale = 1 ÷ 60 x 4 x 100 = 6.67 cm. Hence the length of the scale is 6.67 cm.

6. From the given scale, we can measure 4.56 m.

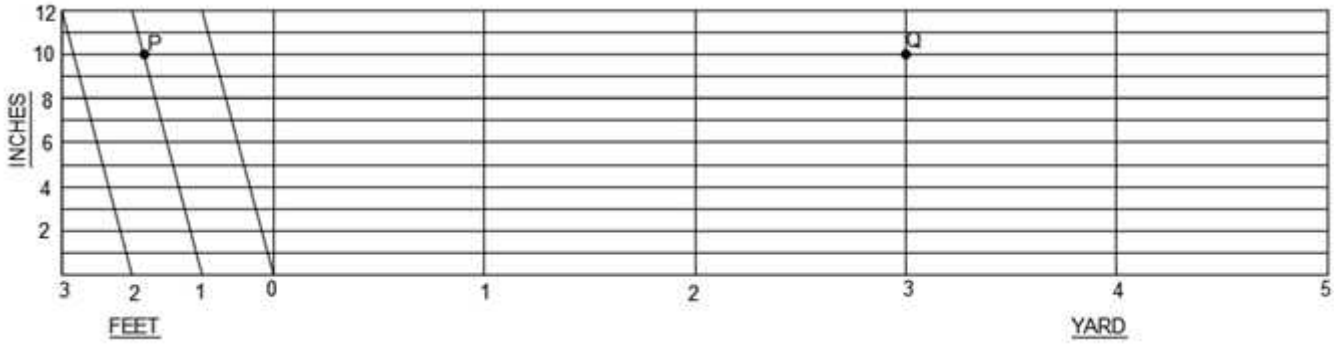


a) True
b) False

Answer: b

Explanation: The maximum length that can be measured is 4 meters. Hence any value beyond 4.00 meters cannot be measured using the above scale. Measuring a value in diagonal scale, the line needs to coincide with one of the line in the scale and not go beyond it.

7. From the given scale below, what is the length of PQ?



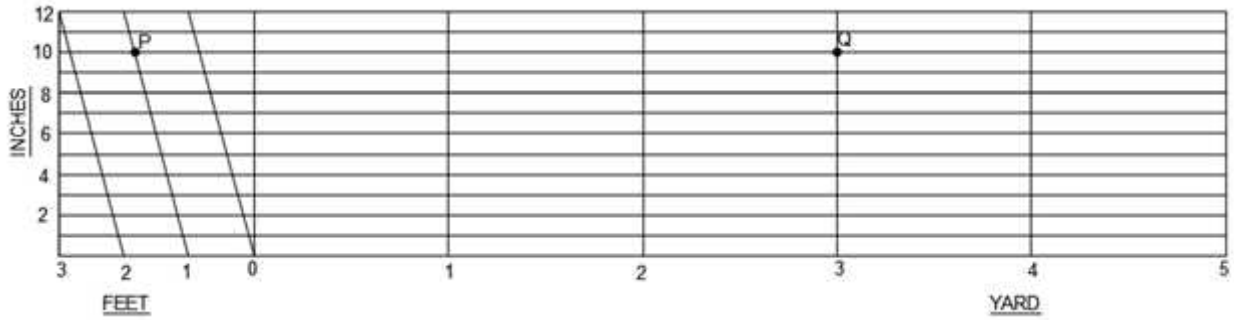
a) 3 yd 2 ft 0”
b) 3 yd 1 ft 10”
c) 3 yd 0 ft 10”
d) 4 yd 2 ft 0”

Answer: b

Explanation: The distance from the 0 on the horizontal to the point Q is 3 yards. In the feet

scale, the point P lies on 1 feet and in the inches scale, the point P lies on 10 inches. Hence, the length of PQ is 3 yards 1 foot 10 inches.

8. What is the maximum length that can be measured using the given scale?

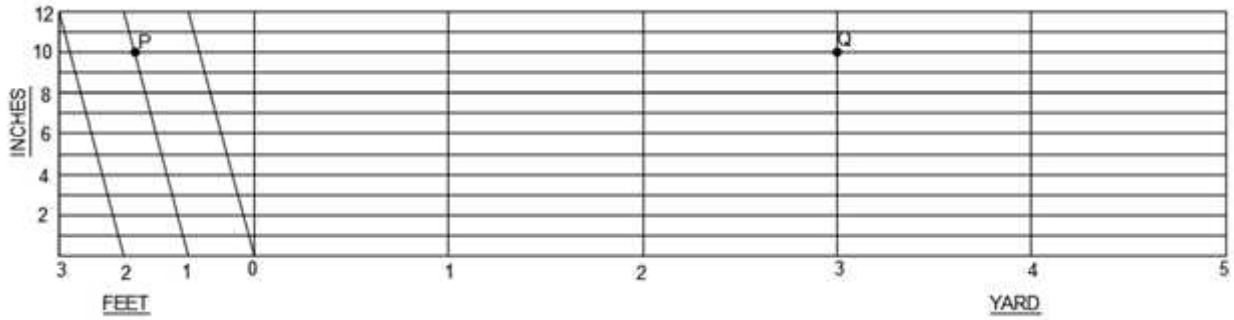


a) 6 yards
b) 5 yards
c) 6 feet
d) 15 feet

Answer: a

Explanation: It is clear that we can measure up to 5 yards directly. But in addition to the five yards, we have 3 feet in the feet scale which equals to one yard. Hence the maximum length that can be measured is 6 yards.

9. What is the length of the scale, if the scale is 1:30?

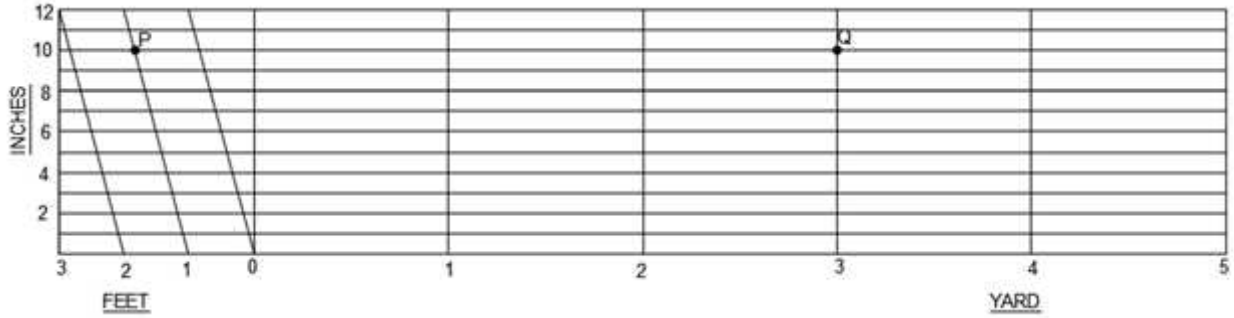


a) 0.6 yard
b) 7.2 feet
c) 0.2 feet
d) 7.2 inches

Answer: d

Explanation: The length of the scale is measured as; length of the scale = representative fraction x maximum length to be measured. Hence, length of the scale = 1 ÷ 30 x 6 x 3 x 12 = 7.2 inches. Representative fraction for the scale 1:30 is 1/30.

10. From the given scale, we can measure 5 yards 3 feet and 0 inches.



a) True
b) False

Answer: a

Explanation: We can measure 5 yards and 3 feet using the given scale, as 5 yards are clearly indicated on the yards scale and 3 feet is also indicated on the feet scale. 3 feet equals 1 yard. Hence, 5 yard 3 feet is nothing but 6 yards and that is the maximum length that can be measured by the scale.

Construction of Parallel & Perpendicular Lines – 1

1. Given are the steps to draw a perpendicular to a line at a point within the line, when the point is near the centre of line.
Arrange the steps. Let AB be the line and P be the point in it
i. P as centre, take convenient radius R1 and draw arcs on the two sides of P on the line at C, D.
ii. Join E and P
iii. The line EP is perpendicular to AB
iv. Then from C, D as centre, take R2 radius (greater than R1), draw arcs which cut at E.
a) i, iv, ii, iii
b) iii, ii, iv, i
c) iv, iii, i, ii
d) ii, i, iv, iii

Answer: a

Explanation: Here uses the concept of locus. Every 2 points have a particular line that is every point on line is equidistant from both the points. The above procedure shows how the line is build up using arcs of similar radius.

2. Given are the steps to draw a perpendicular to a line at a point within the line, when the point is near an end of the line.
Arrange the steps. Let AB be the line and P be the point in it.
i. Join the D and P.
ii. With any point O draw an arc (more than semicircle) with radius of OP, cuts AB at C.
iii. Join the C and O and extend till it cuts the large arc at D.
iv. DP gives the perpendicular to AB.
a) i, iv, ii, iii
b) iii, ii, iv, i
c) iv, iii, i, ii
d) ii, iii, i, iv
Answer: d
Explanation: There exists common procedure for obtaining perpendiculars for lines. But changes are due changes in conditions weather the point lies on the line, off the line, near the centre or near the ends etc.

3. Given are the steps to draw a perpendicular to a line at a point within the line, when the point is near the centre of line.
Arrange the steps. Let AB be the line and P be the point in it
i. Join F and P which is perpendicular to AB.
ii. Now C as centre take same radius and cut the arc at D and again D as centre with same radius cut the arc further at E.
iii. With centre as P take any radius and draw an arc (more than semicircle) cuts AB at C.
iv. Now D, E as centre take radius (more than half of DE) draw arcs which cut at F.
a) i, iv, ii, iii
b) iii, ii, iv, i
c) iv, iii, i, ii
d) ii, i, iv, iii
Answer: b
Explanation: Generally in drawing perpendiculars to lines involves in drawing a line which gives equidistance from either side of the line to the base, which is called the locus of points. But here since the point P is nearer to end, there exists some peculiar steps in drawing arcs.

4. Given are the steps to draw a perpendicular to a line from a point outside the line, when the point is near the centre of line.
Arrange the steps. Let AB be the line and P be the point outside the line
i. The line EP is perpendicular to AB
ii. From P take convenient radius and draw arcs which cut AB at two places, say C, D.
iii. Join E and P.
iv. Now from centers C, D draw arc with radius (more than half of CD), which cut each other at E.
a) i, iv, ii, iii
b) iii, ii, iv, i
c) iv, iii, i, ii
d) ii, iv, iii, i
Answer: d
Explanation: At first two points are taken from the line to which perpendicular is to draw with respect to P. Then from two points equidistant arcs are drawn to meet at some point which is always on the perpendicular. So by joining that point and P gives perpendicular.

5. Given are the steps to draw a perpendicular to a line from a point outside the line, when the point is near an end of the line.
Arrange the steps. Let AB be the line and P be the point outside the line
i. The line ED is perpendicular to AB
ii. Now take C as centre and CP as radius cut the previous arc at two points say D, E.
iii. Join E and D.
iv. Take A as center and radius AP draw an arc (semicircle), which cuts AB or extended AB at C.
a) i, iv, ii, iii
b) iii, ii, iv, i
c) iv, ii, i, iii
d) ii, iv, iii, i
Answer: c
Explanation: The steps here show how to draw a perpendicular to a line from a point when the point is nearer to end of line. Easily by drawing arcs which are equidistance from either sides of line and coinciding with point P perpendicular has drawn.

6. Given are the steps to draw a perpendicular to a line from a point outside the line, when the point is nearer the centre of line.
Arrange the steps. Let AB be the line and P be the point outside the line
i. Take P as centre and take some convenient radius draw arcs which cut AB at C, D.
ii. Join E, F and extend it, which is perpendicular to AB.
iii. From C, D with radius R1 (more than half of CD), draw arcs which cut each other at E.
iv. Again from C, D with radius R2 (more than R1), draw arcs which cut each other at F.
a) i, iii, iv, ii
b) iii, ii, iv, i
c) iv, iii, i, ii
d) ii, iv, iii, i

Answer: a

Explanation: For every two points there exists a line which has points from which both the points are equidistant otherwise called perpendicular to line joining the two points. Here at 1st step we created two on the line we needed perpendicular, then with equal arcs from either sides we created the perpendicular.

7. Given are the steps to draw a parallel line to given line AB at given point P.
Arrange the steps.
i. Take P as centre draw a semicircle which cuts AB at C with convenient radius.
ii. From C with radius of PD draw an arc with cuts the semicircle at E.
iii. Join E and P which gives parallel line to AB.
iv. From C with same radius cut the AB at D.
a) i, iv, ii, iii
b) iii, ii, iv, i
c) iv, iii, i, ii
d) ii, iv, iii, i

Answer: a

Explanation: There exists some typical steps in obtaining parallel lines for required lines at given points which involves drawing of arcs, necessarily, here to form a parallelogram since the opposite sides in parallelogram are parallel.

8. Given are the steps to draw a parallel line to given line AB at a distance R.
Arrange the steps.

i. EF is the required parallel line.
ii. From C, D with radius R, draw arcs on the same side of AB.
iii. Take two points say C, D on AB as far as possible.
iv. Draw a line EF which touches both the arc (tangents) at E, F.
a) i, iv, ii, iii
b) iii, ii, iv, i
c) iv, iii, i, ii
d) ii, iv, iii, i
Answer: b
Explanation: Since there is no reference point P to draw parallel line, but given the distance, we can just take arcs with distance given from the base line and draw tangent which touches the both arcs.

9. Perpendiculars can't be drawn using _____
a) T- Square
b) Set-squares
c) Pro- circle
d) Protractor
Answer: c
Explanation: T-square is meant for drawing straight line and also perpendiculars. And also using set-squares we can draw perpendiculars. Protractor is used to measure angles and also we can use to draw perpendiculars. But pro-circle consists of circles of different diameters.

10. The length through perpendicular gives the shortest length from a point to the line.
a) True
b) False
Answer: a
Explanation: The statement given here is right. If we need the shortest distance from a point to the line, then drawing perpendicular along the point to line is best method. Since the perpendicular is the line which has points equidistant from points either side of given line.

Construction of Parallel & Perpendicular Lines – 2

1. Using how many methods can you draw perpendicular lines through a point within the lines?
a) 1
b) 2
c) 3
d) 4
Answer: c
Explanation: We can draw perpendicular lines using three methods. In one method, if the point is nearer to the centre of the line to which the perpendicular is to be made then we can use the bisector method where we cut two arcs on the line and from those intersections we cut another to the point.

2. How many ways can we draw parallel lines to an existing line?
a) 1
b) 2
c) 3
d) 4
Answer: b
Explanation: There are two ways by which we can draw parallel lines to an existing line. The first method is when we have to draw parallel lines to a line through a given point. The other method is to draw parallel lines to a line through a given distance.

3. While drawing perpendicular line through a point which is nearer to the middle of a given line, _____ is cut at two points on the line.
a) A circle
b) A square
c) A rectangle
d) An arc
Answer: d
Explanation: While drawing perpendicular line through a point which is nearer to the middle of a given line, an arc is cut at two points on the line. From these two intersection points, we draw other arcs with same radius and they are made to cut each other.

4. While drawing a perpendicular to a given line through a point nearer to the end of the line, which of the following properties of the circle is used?
a) The diameter of a circle always subtends an angle of 90˚ on the circumference.
b) The angle at the circumference is half the angle at the centre of the circle.

c) The summation of the opposite angles of a quadrilateral is always 180°.
d) In an arc the angle subtended by any two points on the circumference is always same.

Answer: a

Explanation: While drawing a perpendicular to a given line through a point nearer to the end of the line, the geometric property of the circle that the diameter of a circle always subtends an angle of 90° on the circumference of the circle is used to draw the perpendicular line.

5. For drawing a perpendicular through a point outside a given line, which of the following method is used after drawing an arc from that point to the line intersecting at two points?
a) Angle bisector
b) Subtending an angle
c) Perpendicular bisector
d) Drawing a quadrilateral

Answer: c

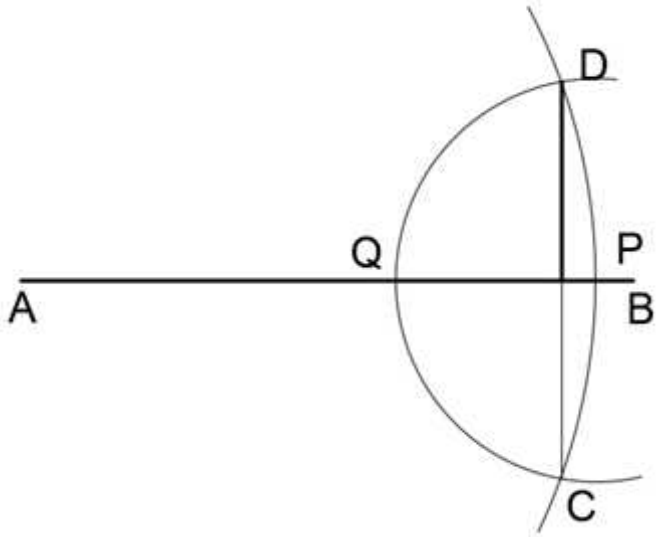
Explanation: For drawing a perpendicular through a point outside a given line, an arc is drawn from that point to the line intersecting at two points. Then a perpendicular bisector is drawn between those points and thus making a perpendicular through the point outside the line.

6. While drawing a perpendicular to a line from a point within the line but nearer to the end of the line, all the arcs drawn in the process are of _____
a) Different radii
b) Different radii but one
c) Same radii but one
d) Same radii

Answer: d

Explanation: While drawing a perpendicular to a line from a point within a line but nearer to the end of the line, all the arcs drawn in the process are of same radii. There four arcs drawn in the process and all of them have the same radius.

7. In the given figure which of the following construction line is drawn first?



a) Line AP
b) Arc DPC
c) Arc DQC
d) Line DC

Answer: b

Explanation: For drawing perpendicular to a given line through a point that is outside the line and is nearer to the end of the line we first cut an arc with radius equal to AD, keeping centre at A. then we draw another arc with radius DP keeping centre at P. Then join both intersection points we get the perpendicular.

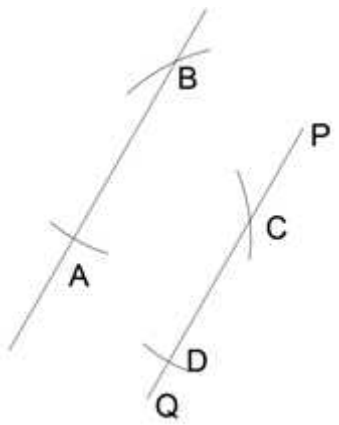
8. For drawing parallel lines to a given line through a given point we make use of _____

a) Arcs
b) Triangles
c) Lines
d) Quadrilaterals

Answer: a

Explanation: For drawing parallel lines to a given line through a given point we make use of arcs. By cutting the given line using an arc with centre as the given point and of convenient radius, then using the same radius cutting an arc with centre with the new intersection point and so on we make the parallel line.

9. Which of the following arcs is made first to draw a parallel line to the given line PQ?



a) A
b) B
c) C
d) D

Answer: c

Explanation: The first arc drawn is C with centre A and any convenient radius. Then from C with the same radius another arc is drawn to the line PQ which cuts at D. And again from C another arc is drawn with radius equal to AD and it cuts at B and then A and B are joined giving the required parallel line.

10. While drawing a parallel line to the given line through a given distance, what all we need to draw?
a) Quadrilaterals
b) Arcs and tangent
c) Tangents
d) Circles

Answer: b

Explanation: While drawing a parallel line to a given line through a given distance, we need to draw arcs and a tangent. The arcs are drawn on the same side of the given line and with radius as the given distance. Then a tangent is drawn joining both the arcs.

Drawing Regular Polygons & Simple Curves – 1

1. A Ogee curve is a _____
a) semi ellipse
b) continuous double curve with convex and concave
c) freehand curve which connects two parallel lines

d) semi hyperbola

Answer: b

Explanation: An ogee curve or a reverse curve is a combination of two same curves in which the second curve has a reverse shape to that of the first curve. Any curve or line or mould consists of a continuous double curve with the upper part convex and lower part concave, like ‘’S’’.

2. Given are the steps to construct an equilateral triangle, when the length of side is given. Using, T-square, set-squares only. Arrange the steps.

i. The both 2 lines meet at C. ABC is required triangle

ii. With a T-square, draw a line AB with given length

iii. With 30o-60o set-squares, draw a line making 60o with AB at A

iv. With 30o-60o set-squares, draw a line making 60o with AB at B

a) i, iv, ii, iii

b) iii, ii, iv, i

c) iv, iii, i, ii

d) ii, iii, iv, i

Answer: d

Explanation: Here gives the simple procedure since T-square and 30°-60° set-squares. And also required triangle is equilateral triangle. The interior angles are 60°, 60°, 60^o(180° /3 = 60°). Set- squares are used for purpose of 60°.

3. Given are the steps to construct an equilateral triangle, with help of compass, when the length of side is given. Arrange the steps.

i. Draw a line AB with given length

ii. Draw lines joining C with A and B

iii. ABC is required equilateral triangle

iv. With centers A and B and radius equal to AB, draw arcs cutting each other at C

a) i, iv, ii, iii

b) iii, ii, iv, i

c) iv, iii, i, ii

d) ii, iii, iv, i

Answer: a

Explanation: Here gives the simple procedure to construct equilateral triangle. Since we used compass we can construct any type of triangle but with set-squares it is not possible to construct any type of triangles such as isosceles, scalene etc.

4 Given are the steps to construct an equilateral triangle, when the altitude of triangle is given. Using, T-square, set-squares only. Arrange the steps.
i. Join R, Q; T, Q. Q, R, T is the required triangle
ii. With a T-square, draw a line AB of any length
iii. From a point P on AB draw a perpendicular PQ of given altitude length
iv. With 30o-60o set-squares, draw a line making 30o with PQ at Q on both sides cutting at R, T
a) i, iv, ii, iii
b) iii, ii, iv, i
c) iv, iii, i, ii
d) ii, iii, iv, i
Answer: d
Explanation: Here gives the simple procedure since T-square and 30°-60° set-squares. The interior angles are 60°, 60°, 60° (180° /3 = 60°). Altitude divides the sides of equilateral triangle equally. Set- squares are used for purpose of 30o.

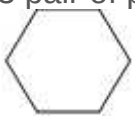
5. Given are the steps to construct an equilateral triangle, with help of compass, when the length of altitude is given. Arrange the steps.
i. Draw a line AB of any length. At any point P on AB, draw a perpendicular PQ equal to altitude length given
ii. Draw bisectors of CE and CF to intersect AB at R and T respectively.QRT is required triangle
iii. With center Q and any radius, draw an arc intersecting PQ at C
iv. With center C and the same radius, draw arcs cutting the 1st arc at E and F
a) i, iii, iv, ii
b) iii, ii, iv, i
c) iv, iii, i, ii
d) ii, iii, iv, i
Answer: a
Explanation: This is the particular procedure used for only constructing equilateral triangle using arcs, when altitude is given, since we used similar radius arcs to get 30° on both sides of a line. Here we also bisected arc using the same procedure from bisecting lines.

6. How many pairs of parallel lines are there in regular Hexagon?
a) 2
b) 3
c) 6

d) 1

Answer: b

Explanation: Hexagon is a closed figure which has six sides, six corners. Given is regular hexagon which means it has equal interior angles and equal side lengths. So, there will be 3 pair of parallel lines in a regular hexagon.



7. Given are the steps to construct a square, when the length of side is given. Using, T-square, set-squares only. Arrange the steps.

i. Repeat previous step and join A, B, C and D to form a square

ii. With a T-square, draw a line AB with given length.

iii. At A and B, draw verticals AE and BF

iv. With 45o set-squares, draw a line making 45o with AB at A cuts BF at C

a) i, iv, ii, iii

b) iii, ii, iv, i

c) iv, iii, i, ii

d) ii, iii, iv, i

Answer: d

Explanation: Square is closed figure with equal sides and equal interior angles which is 90o. In the above steps, it is given the procedure to draw square using set-squares. 45o set-square is used since 90/2 = 45.

8. How many pairs of parallel lines are there in regular pentagon?

a) 0

b) 1

c) 2

d) 5

Answer: a

Explanation: Pentagon is a closed figure which has five sides, five corners. Given is regular pentagon which means it has equal interior angles and equal side lengths. Since five is odd number so, there exists angles 36o, 72o, 108o, 144o, 180o with sides to horizontal.

9. Given are the steps to construct a square using compass, when the length of side is given. Arrange the steps.

i. Join A, B, C and D to form a square

ii. At A with radius AB draw an arc, cut the AE at D

iii. Draw a line AB with given length. At A draw a perpendicular AE to AB using arcs
iv. With centers B and D and the same radius, draw arcs intersecting at C
a) i, iv, ii, iii
b) iii, ii, iv, i
c) iv, iii, i, ii
d) ii, iii, iv, i
Answer: b
Explanation: Here we just used simple techniques like drawing perpendiculars using arcs and then used the compass to locate the fourth point. Using compass it is easier to draw different types of closed figures than using set-squares.

10. Given are the steps to construct regular polygon of any number of sides. Arrange the steps.
i. Draw the perpendicular bisector of AB to cut the line AP in 4 and the arc AP in 6
ii. The midpoint of 4 and 6 gives 5 and extension of that line along the equidistant points 7, 8, etc gives the centers for different polygons with that number of sides and the radius is AN (N is from 4, 5, 6, 7, so on to N)
iii. Join A and P. With center B and radius AB, draw the quadrant AP
iv. Draw a line AB of given length. At B, draw a line BP perpendicular and equal to AB
a) i, iv, ii, iii
b) iii, ii, iv, i
c) iv, iii, i, ii
d) ii, iii, iv, i
Answer: c
Explanation: Given here is the method for drawing regular polygons of different number of sides of any length. This includes finding a line where all the centers for regular polygons lies and then with radius taking any end of 1st drawn line to center and then completing circle at last, cutting the circle with the same length of initial line. Thus we acquire polygons.

Drawing Regular Polygons & Simple Curves – 2

1. What is the shape with ‘n’ no. of sides, in which all the sides are equal, called?
a) Rectangle
b) Circle
c) Triangle
d) Regular polygon
Answer: d
Explanation: A regular polygon is a shape with 4 or more sides and all the sides are of equal length. A regular polygon with five, six, seven, etc. sides are called as regular pentagon, regular hexagon, regular heptagon, etc. respectively.

2. For drawing a regular hexagon, the fastest method is to draw the hexagon using circle and then cutting arcs equal to the diameter which is equal to the side of the regular hexagon.
a) True
b) False
Answer: a
Explanation: For drawing a regular hexagon, the fastest method is to draw a circle with diameter equal to the length of the side of the regular hexagon and then dividing the circle into six parts by cutting arcs equal to the diameter of the circle on its circumference. Then the intersection points are joined to form the hexagon.

3. _____ is a curve with two same curves in which one curve is a reverse of the other curve.
a) Ellipse
b) Parabola
c) Ogee
d) Hyperbola
Answer: c
Explanation: An ogee curve is a curve with two curves in which one curve is a reverse of the other curve. Both curves are of same radii. They both are tangent to parallel lines or in other words the tangents to both the curves are parallel to each other.

4. For drawing a polygon with side of given length, first we draw a _____ with centre at one of the ends of the length and the radius as length.
a) Circle
b) Arc
c) Semicircle
d) Quarter circle

Answer: c

Explanation: For drawing a polygon with side of given length, first we draw a semicircle with centre at one of the ends of the length and the radius as the length. The next step is to divide the semicircle into the number of sides of the polygon.

5. The second step in drawing a polygon is to divide the semicircle into the number of ____ the polygon has.

a) Vertices

b) Edges

c) Diagonals

d) Sides

Answer: d

Explanation: The second step in drawing a polygon is to divide the semicircle into the number of sides the polygon has. In the first we draw a semicircle with centre at one of the ends of the length and the radius is taken as the length of the side of the polygon.

6. The third step involved in drawing a polygon is to join the _____ one being the second division on the semicircle and the other being the first centre.

a) Points

b) Lines

c) Planes

d) Surfaces

Answer: a

Explanation: The third step involved in drawing a polygon is to join the points one being the second division on the semicircle and the other being the first centre through which the c=semicircle was made in the first step.

7. While constructing a regular hexagon using a T-square and 30˚-60˚ set square, we draw circles.

a) True

b) False

Answer: b

Explanation: In drawing a regular hexagon using a T-square and a 30˚-60˚ set square, we draw parallel lines and not circles. As it is impossible to draw circles using T-square and 30˚-60˚ set squares. We draw these parallel lines using angles.

8. To draw an arc of given radius touching two straight lines at right angles with each other, we first draw _____ with centre at the intersection point of the two

lines on both the lines.
a) An arc
b) A circle
c) A square
d) A triangle
Answer: a
Explanation: To draw an arc of given radius touching two straight lines at right angles with each other, we first draw an arc with centre at the intersection point of the two lines on both the lines. Then we draw another from the new intersection of the arc and the lines.

9. In the second step in drawing the arc of given radius touching two straight lines at right angles with each other, we draw another arc from the centre at the new intersection of the arc and the lines and keeping the radius same.
a) True
b) False
Answer: a
Explanation: In the second step in drawing the arc of given radius touching two straight lines at right angles with each other, we draw another arc from the centre at the new intersection of the arc and the lines and keeping the radius same. The intersection of these two new arcs is the centre of the required arc.

10. The tangent to both the curves in an ogee curve is perpendicular to each other.
a) True
b) False
Answer: b
Explanation: The tangent to both the curves in an ogee curve is parallel and not perpendicular to each other. An ogee curve is a curve with two curves with one of the curve being a reverse curve to the other. Hence it is also called as reverse curve.

Drawing Tangents and Normals for Different Conditions of Circle – 1

1. Given are the steps to draw a tangent to any given circle at any point P on it. Arrange the steps.
i. Draw the given circle with center O and mark the point P anywhere on the circle.

ii. With centers O and Q draw arcs with equal radius to cut each other at R.
iii. Join R and P which is the required tangent.
iv. Draw a line joining O and P. Extend the line to Q such that OP = PQ.
a) i, iv, ii, iii
b) iv, i, iii, ii
c) iii, i, iv, ii
d) ii, iv, i, iii
Answer: a
Explanation: Tangent is a line which touches a curve at only one point. Every tangent is perpendicular to its normal. Here we first found the normal which passes through center and point. Then drawing perpendicular to it gives the tangent.

2. Given are the steps to draw a tangent to given circle from any point outside the circle. Arrange the steps.
i. With OP as diameter, draw arcs on circle at R and R1.
ii. Draw the given circle with center O.
iii. Join P and R which is one tangent and PR1 is another tangent.
iv. Mark the point P outside the circle.
a) ii, iv, iii, i
b) iv, i, iii, ii
c) iii, i, iv, ii
d) ii, iv, i, iii
Answer: d
Explanation: Usually when a point is outside the circle there exists two tangents. For which we first join the center with point P and then taking distance from center to P as diameter circle is drawn from midpoint of center and P to cut circle at two points where tangents touch the circle.

3. Given are the steps to draw a tangent to given arc even if center is unknown and the point P lies on it. Arrange the steps. Let AB be the arc.
i. Draw EF, the bisector of the arc CD. It will pass through P.
ii. RS is the required tangent.
iii. With P as center and any radius draw arcs cutting arc AB at C and D.
iv. Draw a perpendicular RS to EF through P.
a) ii, iv, iii, i
b) iv, i, iii, ii
c) iii, i, iv, ii

d) ii, iv, i, iii

Answer: c

Explanation: Even if the center of arc is unknown, just by taking any some part of arc and bisecting that with a line at required point p gives us normal to tangent at P. So then from normal drawing perpendicular gives our required tangent.

4. Given are the steps to draw a tangent to given circle and parallel to given line. Arrange the steps.

i. Draw a perpendicular to given line and extend to cut the circle at two points P and Q.

ii. At P or Q draw perpendicular to normal then we get the tangents.

iii. PQ is the normal for required tangent.

iv. Draw a circle with center O and line AB as required.

a) ii, iv, iii, i

b) iv, i, iii, ii

c) iii, i, iv, ii

d) ii, iv, i, iii

Answer: b

Explanation: Normal of curve will be perpendicular to every parallel tangent at that point. We just drawn the longest chord (diameter) and then perpendicular it gives the required tangents. Since circle is closed figure there exist two tangents parallel to each other.

5. How many external tangents are there for two circles?

a) 1

b) 2

c) 3

d) 4

Answer: b

Explanation: External tangents are those which touch both the circles but they will not intersect in between the circles. The tangents touch at outmost points of circles that are ends of diameter if the circles have same diameter.

6. How many internal tangents are there for two circles?

a) 4

b) 3

c) 2

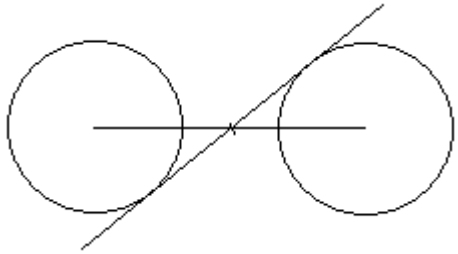
d) 1

Answer: c

Explanation: Internal tangents are those which touch both the circle and also intersect each other on the line joining the centers of circles. And the internal tangents intersect each other at midpoint of line joining the center of circles only if circles have same diameter.

7. For any point on the any curve there exist two normals.
a) True
b) False
Answer: b
Explanation: Here we take point on the curve. There exist multiple tangents for some curve which are continuous, trigonometric curves, hyperbola etc. But for curves like circles, parabola, ellipse, cycloid etc. have only one tangent and normal.

8. Arrange the steps. These give procedure to draw internal tangent to two given circles of equal radii.
i. Draw a line AB which is the required tangent.
ii. Draw the given circles with centers O and P.
iii. With center R and radius RA, draw an arc to intersect the other circle on the other circle on the other side of OP at B.
iv. Bisect OP in R. Draw a semi circle with OR as diameter to cut the circle at A.
a) ii, iv, iii, i
b) iv, i, iii, ii
c) iii, i, iv, ii
d) ii, iv, i, iii
Answer: a
Explanation: Since the circles have same radius. The only two internal tangents will intersect at midpoint of line joining the centers. So we first found the center and then point of intersection of tangent and circle then from that point to next point it is drawn a arc midpoint as center and join the points gave us tangent.

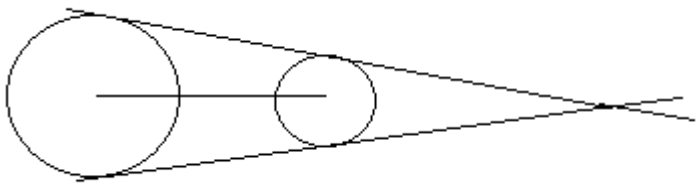


9. There are 2 circles say A, B. A has 20 units radius and B has 10 units radius and distance from centers of A and B is 40 units. Where will be the intersection point of external tangents?

a) to the left of two circles
b) to the right of the two circles
c) middle of the two circles
d) they intersect at midpoint of line joining the centers

Answer: b

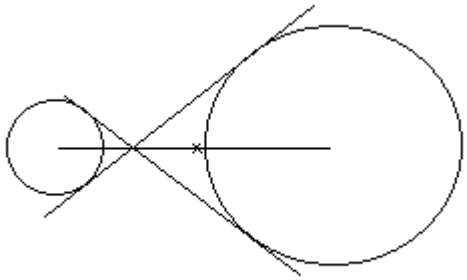
Explanation: A has 20 units radius and B has 10 units radius. So, the tangents go along the circles and meet at after the second circle that is B that is right side of both circles. And we asked for external tangents so they meet away from the circles but not in between them.



10. There are 2 circles say A, B. A is smaller than B and they are not intersecting at any point. Where will be the intersection point of internal tangents for these circles?
a) to the left of two circles
b) to the right of the two circles
c) middle of the two circles
d) they intersect at midpoint of line joining the centers

Answer: b

Explanation: A is smaller than B so the intersection point of internal tangents will not be on the midpoint of line joining the centers. And we asked for internal tangents so they will not meet away from the circles. They meet in between them.

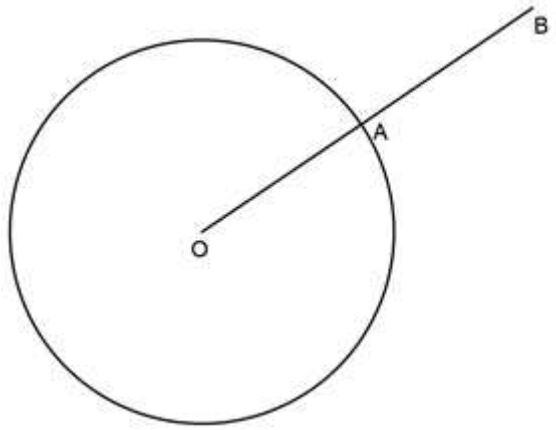


Drawing Tangents and Normals for Different Conditions of Circle – 2

1. A tangent to a circle is a line which touches the circle at one and only one point.
a) True
b) False
Answer: a
Explanation: A tangent to a circle is a line which touches the circle at one and only one point. The line joining the centre of the circle and that one point whose length is equal to the radius is perpendicular to the tangent.

2. The line perpendicular to a tangent and is passing through the point of contact is called as _____
a) Perpendicular bisector
b) Angle bisector
c) Normal
d) Tangent
Answer: c
Explanation: The line perpendicular to a tangent and is passing through the point of contact is called as the normal. The line joining the centre and the point of contact is perpendicular to the tangent and hence can be called as normal to the tangent.

3. In the following figure, the tangent at point A can be drawn by _____

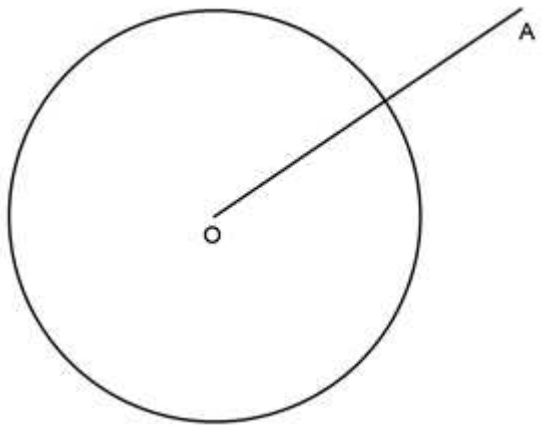


a) Angle bisector
b) Perpendicular bisector
c) Rectangle
d) Arc
Answer: b
Explanation: In the given figure, the tangent to the circle with centre O at point A can be drawn by using the property of perpendicular bisector. Since from the figure it is clear that

the length of OA is equal to the length of AB and the perpendicular bisector of OB is the tangent at A.

4. How many tangents can be drawn from a point outside a given circle?
a) 4
b) 3
c) 2
d) 1
Answer: c
Explanation: Two tangents can be drawn from a point outside a given circle. The method to draw tangent to the circle first involves joining the point and the centre and then drawing a semicircle with that length as diameter. Then join the intersection points on the circle and the point outside you get the tangent.

5. In the following figure, how will make a tangent from the point outside the circle?



a) By drawing a semicircle with diameter as OA
b) By drawing a perpendicular bisector
c) By drawing an angle bisector
d) By drawing circle with the same radius from A
Answer: a
Explanation: In the given figure, we can draw a tangent from the point outside i.e. point A to the circle by drawing a semicircle with diameter as OA. The intersection point of this semicircle with the circle is joined with the point A to form the tangent.

6. How many tangents to a given circle, can we draw parallel to a given line?
a) 1
b) 2

c) 3
d) 4
Answer: b
Explanation: We can draw two tangents to a given circle which will be parallel to a given line. The given line can be outside or inside the circle but we can draw two parallel lines tangent to the circle. Both the lines will touch the circle at one and only one point respectively.

7. In how many ways can there be a common tangent between two circles?
a) 3
b) 4
c) 1
d) 2
Answer: d
Explanation: There are two ways in which the circles can have a common tangent. One is internal tangents in which the common tangent is touching the internal part of the circle with respect to the other circle and the other way is external tangent.

8. How many internally common tangents can two circles have?
a) 3
b) 1
c) 2
d) 4
Answer: c
Explanation: Two circles can have two internally touching common tangents. Both the tangents intersect at a point which is equidistant from the centers of both the circles. In other words they intersect at a point which bisects the line joining the centers of the circles.

9. To draw a tangent to an arc of unknown radius and centre though any point on the arc we use _____
a) Angle bisectors
b) Semicircles
c) Arc
d) Perpendicular bisector
Answer: d
Explanation: To draw a tangent to an arc of an unknown radius and a centre through any point on the arc we the principle of perpendicular bisectors. First we cut the arc at two

sides of the point by an arc of any radius and we use perpendicular bisector to draw the normal and from there we draw the tangent.

10. How is a normal to a tangent drawn?
a) Angle bisector
b) Perpendicular bisector
c) Rectangle
d) Semicircle
Answer: b
Explanation: We draw a normal to a tangent by using perpendicular bisector. Cut the tangent at two points on both sides of the point of contact and then keeping center at the new intersection points cut another arc on the up and down of the point of contact. Join these points and you get a normal.

Construction of Ellipse – 1

1. Which of the following is incorrect about Ellipse?
a) Eccentricity is less than 1
b) Mathematical equation is $X^2 /a^2 + Y^2/b^2 = 1$
c) If a plane is parallel to axis of cone cuts the cone then the section gives ellipse
d) The sum of the distances from two focuses and any point on ellipse is constant
Answer: c
Explanation: If a plane is parallel to axis of cone cuts the cone then the cross-section gives hyperbola. If the plane is parallel to base it gives circle. If the plane is inclined with angle more than external angle of cone it gives parabola. If the plane is inclined and cut every generators then it forms a ellipse.

2. Which of the following constructions doesn’t use elliptical curves?
a) Cooling towers
b) Dams
c) Bridges
d) Man-holes
Answer: a
Explanation: Cooling towers, water channels use Hyperbolic curves as their design. Arches, Bridges, sound reflectors, light reflectors etc use parabolic curves. Arches, bridges, dams, monuments, man-holes, glands and stuffing boxes etc use elliptical curves.

3. The line which passes through the focus and perpendicular to major axis is _____

a) Minor axis
b) Latus rectum
c) Directrix
d) Tangent

Answer: b

Explanation: The line bisecting the major axis at right angles and terminated by curve is called the minor axis. The line which passes through the focus and perpendicular to major axis is latus rectum. Tangent is the line which touches the curve at only one point.

4. Which of the following is the eccentricity for ellipse?

a) 1
b) 3/2
c) 2/3
d) 5/2

Answer: c

Explanation: The eccentricity for ellipse is always less than 1. The eccentricity is always 1 for any parabola. The eccentricity is always 0 for a circle. The eccentricity for a hyperbola is always greater than 1.

5. Axes are called conjugate axes when they are parallel to the tangents drawn at their extremes.

a) True
b) False

Answer: a

Explanation: In ellipse there exist two axes (major and minor) which are perpendicular to each other, whose extremes have tangents parallel them. There exist two conjugate axes for ellipse and 1 for parabola and hyperbola.

6. Steps are given to draw an ellipse by loop of the thread method. Arrange the steps.

i. Check whether the length of the thread is enough to touch the end of minor axis.
ii. Draw two axes AB and CD intersecting at O. Locate the foci F1 and F2.
iii. Move the pencil around the foci, maintaining an even tension in the thread throughout and obtain the ellipse.
iv. Insert a pin at each focus-point and tie a piece of thread in the form of a loop

around the pins.
a) i, ii, iii, iv
b) ii, iv, i, iii
c) iii, iv, i, ii
d) iv, i, ii, iii
Answer: b
Explanation: This is the easiest method of drawing ellipse if we know the distance between the foci and minor axis, major axis. It is possible since ellipse can be traced by a point, moving in the same plane as and in such a way that the sum of its distances from two foci is always the same.

7. Steps are given to draw an ellipse by trammel method. Arrange the steps.
i. Place the trammel so that R is on the minor axis CD and Q on the major axis AB. Then P will be on ellipse.
ii. Draw two axes AB and CD intersecting each other at O.
iii. By moving the trammel to new positions, always keeping R on CD and Q on AB, obtain other points and join those to get ellipse.
iv. Along the edge of a strip of paper which may be used as a trammel, mark PQ equal to half the minor axis and PR equal to half of major axis.
a) i, ii, iii, iv
b) ii, iv, i, iii
c) iii, iv, i, ii
d) iv, i, ii, iii
Answer: b
Explanation: This method uses the trammels PQ and PR which ends Q and R should be placed on major axis and minor axis respectively. It is possible since ellipse can be traced by a point, moving in the same plane as and in such a way that the sum of its distances from two foci is always the same.

8. Steps are given to draw a normal and a tangent to the ellipse at a point Q on it. Arrange the steps.
i. Draw a line ST through Q and perpendicular to NM.
ii. ST is the required tangent.
iii. Join Q with the foci F1 and F2.
iv. Draw a line NM bisecting the angle between the lines drawn before which is normal.
a) i, ii, iii, iv

b) ii, iv, i, iii
c) iii, iv, i, ii
d) iv, i, ii, iii
Answer: c
Explanation: Tangents are the lines which touch the curves at only one point. Normals are perpendiculars of tangents. As in the circles first we found the normal using foci (centre in circle) and then perpendicular at given point gives tangent.

9. Which of the following is not belonged to ellipse?
a) Latus rectum
b) Directrix
c) Major axis
d) Asymptotes
Answer: d
Explanation: Latus rectum is the line joining one of the foci and perpendicular to major axis. Asymptotes are the tangents which meet the hyperbola at infinite distance. Major axis consists of foci and perpendicular to minor axis.

Construction of Ellipse – 2

1. Mathematically, what is the equation of ellipse?
a) $x^2/a^2 + y^2/b^2 = -1$
b) $x^2/a^2 – y^2/b^2 = 1$
c) $x^2/a^2 + y^2/b^2 = 1$
d) $x^2/a^2 – y^2/b^2 = 1$
Answer: c
Explanation: Equation of ellipse is given by; $x^2/a^2 + y^2/b^2 = 1$. Here, a and b are half the distance of lengths of major and minor axes of the ellipse. If the value of a = b then the resulting ellipse will be a circle with centre (0,0) and radius equal to a units.

2. In general method of drawing an ellipse, a vertical line called as ____ is drawn first.
a) Tangent
b) Normal
c) Major axis
d) Directrix
Answer: d

Explanation: In general method of drawing an ellipse, a vertical line called as directrix is drawn first. The focus is drawn at a given distance from the directrix drawn. The eccentricity of the ellipse is less than one.

3. If eccentricity of ellipse is 3/7, how many divisions will the line joining the directrix and the focus have in general method?
a) 10
b) 7
c) 3
d) 5
Answer: a
Explanation: In general method of drawing an ellipse, if eccentricity of the ellipse is given as 3/7 then the line joining the directrix and the focus will have 10 divisions. The number is derived by adding the numerator and denominator of the eccentricity.

4. In the general method of drawing an ellipse, after parting the line joining the directrix and the focus, a _____ is made.
a) Tangent
b) Vertex
c) Perpendicular bisector
d) Normal
Answer: b
Explanation: In the general method of drawing after parting the line joining the directrix and the focus, a vertex is made. An arc with radius equal to the length between the vertex and the focus, is drawn with the vertex as the centre.

5. An ellipse is defined as a curve traced by a point which has the sum of distances between any two fixed points always same in the same plane.
a) True
b) False
Answer: a
Explanation: An ellipse can also be defined as a curve that can be traced by a point moving in the same plane with the sum of the distances between any two fixed points always same. The two fixed points are called as focus.

6. An ellipse has ____ foci.
a) 1
b) 2

c) 3
d) 4
Answer: b
Explanation: An ellipse has 2 foci. These foci are fixed in a plane. The sum of the distances of a point with the foci is always same. The ellipse can also be defined as the curved traced by the points which exhibit this property.

7. If information about the major and minor axes of ellipse is given then by how many methods can we draw the ellipse?
a) 2
b) 3
c) 4
d) 5
Answer: d
Explanation: There are 5 methods by which we can draw an ellipse if we know the major and minor axes of that ellipse. Those five methods are arcs of circles method, concentric circles method, loop of the thread method, oblong method, trammel method.

8. In arcs of circles method, the foci are constructed by drawing arcs with centre as one of the ends of the ____ axis and the radius equal to the half of the ____ axis.
a) Minor, major
b) Major, major
c) Minor, minor
d) Major, minor
Answer: a
Explanation: In arcs of circles method, the foci are constructed by drawing arcs with centre as one of the ends of the minor axis and the radius equal to the half of the major axis. This method is used when we know only major and minor axes of the ellipse.

9. If we know the major and minor axes of the ellipse, the first step of drawing the ellipse, we draw the axes ____ each other.
a) Parallel to
b) Perpendicular bisecting
c) Just touching
d) Coinciding
Answer: b
Explanation: If we know the major and minor axes of the ellipse, the first step of the

drawing the ellipse is to draw the major and minor axes perpendicular bisecting each other. The major and the minor axes are perpendicular bisectors of each other.

10. Loop of the thread method is the practical application of _____ method.
a) Oblong method
b) Trammel method
c) Arcs of circles method
d) Concentric method
Answer: c
Explanation: Loop of the thread method is the practical application of the arcs of circles method. The lengths of the ends of the minor axis are half of the length of the major axis. In this method a pin is inserted at the foci point and the thread is tied to a pencil which is used to draw the curve.

Construction of Parabola

1. Which of the following is incorrect about Ellipse?
a) Eccentricity is less than 1
b) Mathematical equation is $x^2 = 4ay$
c) Length of latus rectum is 4a
d) The distance from focus to vertex is equal to perpendicular distance from vertex to directrix
Answer: a
Explanation: The eccentricity is equal to one. That is the ratio of perpendicular distance from point on curve to directrix is equal to distance from point to focus. The eccentricity is less than 1 for ellipse, greater than one for hyperbola, zero for circle.

2. Which of the following constructions use parabolic curves?
a) Cooling towers
b) Water channels
c) Light reflectors
d) Man-holes
Answer: a
Explanation: Arches, Bridges, sound reflectors, light reflectors etc use parabolic curves. Cooling towers, water channels use Hyperbolic curves as their design. Arches, bridges, dams, monuments, man-holes, glands and stuffing boxes etc use elliptical curves.

3. The length of the latus rectum of the parabola y2 =ax is _____

a) 4a

b) a

c) a/4

d) 2a

Answer: b

Explanation: Latus rectum is the line perpendicular to axis and passing through focus ends touching parabola. Length of latus rectum of y^2 =4ax, x^2 =4ay is 4a; y^2 =2ax, x^2=2ay is 2a; y^2 =ax, x^2 =ay is a.

4. Which of the following is not a parabola equation?

a) $x^2 = 4ay$

b) $y^2 – 8ax = 0$

c) $x^2 = by$

d) $x^2 = 4ay^2$

Answer: d

Explanation: The remaining represents different forms of parabola just by adjusting them we can get general notation of parabola but $x^2 = 4ay^2$ gives equation for hyperbola. And $x^2 + 4ay^2 =1$ gives equation for ellipse.

5. The parabola $x^2 = ay$ is symmetric about x-axis.

a) True

b) False

Answer: b

Explanation: From the given parabolic equation $x^2 = ay$ we can easily say if we give y values to that equation we get two values for x so the given parabola is symmetric about y-axis. If the equation is $y^2 = ax$ then it is symmetric about x-axis.

6. Steps are given to find the axis of a parabola. Arrange the steps.

i. Draw a perpendicular GH to EF which cuts parabola.

ii. Draw AB and CD parallel chords to given parabola at some distance apart from each other.

iii. The perpendicular bisector of GH gives axis of that parabola.

iv. Draw a line EF joining the midpoints lo AB and CD.

a) i, ii, iii, iv

b) ii, iv, i, iii

c) iii, iv, i, ii

d) iv, i, ii, iii

Answer: b

Explanation: First we drawn the parallel chords and then line joining the midpoints of the previous lines which is parallel to axis so we drawn the perpendicular to this line and then perpendicular bisector gives the axis of parabola.

7. Steps are given to find focus for a parabola. Arrange the steps.
i. Draw a perpendicular bisector EF to BP, Intersecting the axis at a point F.
ii. Then F is the focus of parabola.
iii. Mark any point P on the parabola and draw a perpendicular PA to the axis.
iv. Mark a point B on the on the axis such that BV = VA (V is vertex of parabola). Join B and P.
a) i, ii, iii, iv
b) ii, iv, i, iii
c) iii, iv, i, ii
d) iv, i, ii, iii

Answer: c

Explanation: Initially we took a parabola with axis took any point on it drawn perpendicular to axis. And from the point perpendicular meets the axis another point is taken such that the vertex is equidistant from before point and later point. Then from that one to point on parabola a line is drawn and perpendicular bisector for that line meets the axis at focus.

8. Which of the following is not belonged to ellipse?
a) Latus rectum
b) Directrix
c) Major axis
d) Axis

Answer: c

Explanation: Latus rectum is the line joining one of the foci and perpendicular to major axis. Major axis and minor axis are in ellipse but in parabola only one focus and one axis exists since eccentricity is equal to 1.

Construction of Hyperbola

1. Which of the following is Hyperbola equation?
a) $y^2 + x^2/b^2 = 1$
b) $x^2 = 1ay$
c) $x^2 /a^2 – y^2/b^2 = 1$

d) $X^2 + Y^2 = 1$

Answer: c

Explanation: The equation $x^2 + y^2 = 1$ gives a circle; if the x^2 and y^2 have same co-efficient then the equation gives circles. The equation x^2= 1ay gives a parabola. The equation $y^2 + x^2/b^2 = 1$ gives an ellipse.

2. Which of the following constructions use hyperbolic curves?

a) Cooling towers

b) Dams

c) Bridges

d) Man-holes

Answer: a

Explanation: Cooling towers, water channels use Hyperbolic curves as their design. Arches, Bridges, sound reflectors, light reflectors etc use parabolic curves. Arches, bridges, dams, monuments, man-holes, glands and stuffing boxes etc use elliptical curves.

3. The lines which touch the hyperbola at infinite distance are _____

a) Axes

b) Tangents at vertex

c) Latus rectum

d) Asymptotes

Answer: d

Explanation: Axis is line passing through the focuses of hyperbola. The line which passes through the focus and perpendicular to major axis is latus rectum. Tangent is the line which touches the curve at only one point.

4. Which of the following is the eccentricity for hyperbola?

a) 1

b) 3/2

c) 2/3

d) 1/2

Answer: b

Explanation: The eccentricity for ellipse is always less than 1. The eccentricity is always 1 for any parabola. The eccentricity is always 0 for a circle. The eccentricity for a hyperbola is always greater than 1.

5. If the asymptotes are perpendicular to each other then the hyperbola is called rectangular hyperbola.

a) True
b) False
Answer: a
Explanation: In ellipse there exist two axes (major and minor) which are perpendicular to each other, whose extremes have tangents parallel them. There exist two conjugate axes for ellipse and 1 for parabola and hyperbola.

6. A straight line parallel to asymptote intersects the hyperbola at only one point.
a) True
b) False
Answer: a
Explanation: A straight line parallel to asymptote intersects the hyperbola at only one point. This says that the part of hyperbola will lay in between the parallel lines through outs its length after intersecting at one point.

7. Steps are given to locate the directrix of hyperbola when axis and foci are given. Arrange the steps.
i. Draw a line joining A with the other Focus F.
ii. Draw the bisector of angle FAF1, cutting the axis at a point B.
iii. Perpendicular to axis at B gives directrix.
iv. From the first focus F1 draw a perpendicular to touch hyperbola at A.
a) i, ii, iii, iv
b) ii, iv, i, iii
c) iii, iv, i, ii
d) iv, i, ii, iii
Answer: d
Explanation: The directrix cut the axis at the point of intersection of angular bisector of lines passing through the foci and any point on hyperbola. Just by knowing this we can find the directrix just by drawing perpendicular at that point to axis.

8. Steps are given to locate asymptotes of hyperbola if its axis and focus are given. Arrange the steps.
i. Draw a perpendicular AB to axis at vertex.
ii. OG and OE are required asymptotes.
iii. With O midpoint of axis (centre) taking radius as OF (F is focus) draw arcs cutting AB at E, G.
iv. Join O, G and O, E.
a) i, iii, iv, ii

b) ii, iv, i, iii
c) iii, iv, i, ii
d) iv, i, ii, iii
Answer: b
Explanation: Asymptotes pass through centre is main point and then the asymptotes cut the directrix and perpendiculars at focus are known and simple. Next comes is where the asymptotes cuts the perpendiculars, it is at distance of centre to vertex and centre to focus respectively.

9. The asymptotes of any hyperbola intersects at _____
a) On the directrix
b) On the axis
c) At focus
d) Centre
Answer: d
Explanation: The asymptotes intersect at centre that is midpoint of axis even for conjugate axis it is valid. Along with the hyperbola asymptotes are also symmetric about both axes so they should meet at centre only.

Construction of Cycloidal Curves

1. _____ is a curve generated by a point fixed to a circle, within or outside its circumference, as the circle rolls along a straight line.
a) Cycloid
b) Epicycloid
c) Epitrochoid
d) Trochoid
Answer: d
Explanation: Cycloid form if generating point is on the circumference of generating circle. Epicycloid represents generating circle rolls on directing circle. Epitrochoid is that the generating point is within or outside the generating circle but generating circle rolls on directing circle.

2. _____ is a curve generated by a point on the circumference of a circle, which rolls without slipping along another circle outside it.
a) Trochoid
b) Epicycloid

c) Hypotrochoid
d) Involute
Answer: b
Explanation: Trochoid is curve generated by a point fixed to a circle, within or outside its circumference, as the circle rolls along a straight line. ‘Hypo’ represents the generating circle is inside the directing circle.

3. _____ is a curve generated by a point on the circumference of a circle which rolls without slipping on a straight line.
a) Trochoid
b) Epicycloid
c) Cycloid
d) Evolute
Answer: c
Explanation: Trochoid is curve generated by a point fixed to a circle, within or outside its circumference, as the circle rolls along a straight line. Cycloid is a curve generated by a point on the circumference of a circle which rolls along a straight line. ‘Epi’ represents the directing path is circle.

4. When the circle rolls along another circle inside it, the curve is called a _____
a) Epicycloid
b) Cycloid
c) Trochoid
d) Hypocycloid
Answer: d
Explanation: Cycloid is a curve generated by a point on the circumference of a circle which rolls along a straight line. ‘Epi’ represents the directing path is circle. Trochoid is curve generated by a point fixed to a circle, within or outside its circumference, as the circle rolls along a straight line. ‘Hypo’ represents the generating circle is inside the directing circle.

5. Match the following

1.	Generating point is within the circumference of circle and generating circle rolls on straight line.	i.	Inferior trochoid

2.	Generating point is on the circumference of circle and generating circle rolls on straight line.	ii.	Epicycloid
3.	Generating point is outside the circumference of circle and generating circle rolls on straight line.	iii.	Cycloid
4.	Generating point is on the circumference of circle and generating circle rolls along another circle outside it.	iv.	Superior trochoid

a) 1, i; 2, iii; 3, iv; 4, ii
b) 1, ii; 2, iii; 3, i; 4, iv
c) 1, ii; 2, iv; 3, iii; 4, i
d) 1, iv; 2, iii; 3, ii; 4, i

Answer: a

Explanation: Trochoid is curve generated by a point fixed to a circle, within or outside its circumference, as the circle rolls along a straight line. Inferior or superior depends on whether the generating point in within or outside the generating circle. If directing path is straight line then the curve is cycloid.

6. Match the following

1.	Generating point is within the circumference of circle and generating circle rolls on another circle outside it	i.	Superior Epitrochoid
2.	Generating point is within or outside the circumference of circle and generating circle rolls inside another circle.	ii.	Inferior Epitrochoid
3.	Generating point is outside the circumference of circle and generating circle rolls on another circle outside it.	iii.	Hypotrochoid
4.	Generating point is on the circumference of circle and generating circle rolls along another circle inside it.	iv.	Hypocycloid

a) 1, i; 2, iii; 3, iv; 4, ii
b) 1, ii; 2, iii; 3, i; 4, iv
c) 1, ii; 2, iv; 3, iii; 4, i
d) 1, iv; 2, iii; 3, ii; 4, i
Answer: b
Explanation: Inferior or superior depends on whether the generating point in within or outside the generating circle. ‘Hypo’ represents the generating circle is inside the directing circle. Trochoid is curve generated by a point fixed to a circle, within or outside its circumference, as the circle rolls along a straight line.

7. Steps are given to find the normal and tangent for a cycloid. Arrange the steps if C is the centre for generating circle and PA is the directing line. N is the point on cycloid.
i. Through M, draw a line MO perpendicular to the directing line PA and cutting at O.
ii. With centre N and radius equal to radius of generating circle, draw an arc cutting locus of C at M.
iii. Draw a perpendicular to ON at N which is tangent.
iv. Draw a line joining O and N which is normal.
a) iii, i, iv, ii
b) ii, i, iv, iii
c) iv, ii, i, iii
d) i, iv, iii, ii
Answer: b
Explanation: The normal at any point on a cycloidal curve will pass through the corresponding point of contact between the generating circle and the directing line. So with help of locus of centre of generating circle we found the normal and then tangent.

8. Steps are given to find the normal and tangent to an epicycloid. Arrange the steps if C is the centre for generating circle and O is the centre of directing cycle. N is the point on epicycloid.
i. Draw a line through O and D cutting directing circle at M.
ii. Draw perpendicular to MN at N. We get tangent.
iii. With centre N and radius equal to radius of generating circle, draw an arc cutting the locus of C at D.
iv. Draw a line joining M and N which is normal.
a) iii, i, iv, ii

b) ii, i, iv, iii
c) iv, ii, i, iii
d) i, iv, iii, ii
Answer: a
Explanation: The normal at any point on an epicycloidal curve will pass through the corresponding point of contact between the generating circle and the directing circle. And also with help of locus of centre of generating circle we found the normal and then tangent.

9. The generating circle will be inside the directing circle for _____
a) Cycloid
b) Inferior trochoid
c) Inferior epitrochoid
d) Hypocycloid
Answer: d
Explanation: The generating circle will be inside the directing circle for hypocycloid or hypotrochoid. Trochoid is a curve generated by a point fixed to a circle, within or outside its circumference, as the circle rolls along a straight line or over circle if not represented with hypo as prefix.

10. The generating point is outside the generating circle for_____
a) Cycloid
b) Superior Trochoid
c) Inferior Trochoid
d) Epicycloid
Answer: b
Explanation: If the generating point is on the circumference of generating circle then the curve formed may be cycloids or hypocycloids. Trochoid is a curve generated by a point fixed to a circle, within or outside its circumference, as the circle rolls along a straight line or a circle. But here given is outside so it is superior trochoid.

Construction of Involute

1. Mathematical equation for Involute is _____

a) $x = a \cos^3 \Theta$

b) $x = r \cos\Theta + r\,\Theta \sin\Theta$

c) $x = (a+b)\cos\Theta - a\cos\left(\frac{a+b}{a}\Theta\right)$

d) $y = a(1-\cos\Theta)$

Answer: b

Explanation: x= a cos3 Θ is equation for hypocycloid, x= (a+ b) cosΘ – a cos ((a+b)/aΘ) is equation for epicycloid, y = a (1-cosΘ) is equation for cycloid and x = r cosΘ + r Θ sinΘ is equation for Involute.

2. Steps are given to draw involute of given circle. Arrange the steps f C is the centre of circle and P be the end of the thread (starting point).

i. Draw a line PQ, tangent to the circle and equal to the circumference of the circle.

ii. Draw the involute through the points P1, P2, P3 ……..etc.

iii. Divide PQ and the circle into 12 equal parts.

iv. Draw tangents at points 1, 2, 3 etc. and mark on them points P1, P2, P3 etc. such that 1P1 =P1l, 2P2 = P2l, 3P3= P3l etc.

a) ii, i, iv, iii

b) iii, i , iv, ii

c) i, iii, iv, ii

d) iv, iii, i, ii

Answer: c

Explanation: Involute is curve which is formed by thread which is yet complete a single wound around a circular object so thus the thread having length equal to circumference of circular object. And the involute curve follows only the thread is kept straight while wounding.

3. Steps are given to draw tangent and normal to the involute of a circle (center is C) at a point N on it. Arrange the steps.

i. With CN as diameter describe a semi-circle cutting the circle at M.

ii. Draw a line joining C and N.

iii. Draw a line perpendicular to NM and passing through N which is tangent.

iv. Draw a line through N and M. This line is normal.

a) ii, i, iv, iii

b) iii, i , iv, ii
c) i, iii, iv, ii
d) iv, iii, i, ii
Answer: a
Explanation: The normal to an involute of a circle is tangent to that circle. So simply by finding the appreciable tangent of circle passing through the point given on involute gives the normal and then by drawing perpendicular we can find the tangent to involute.

4. Steps given are to draw an involute of a given square ABCD. Arrange the steps.
i. With B as centre and radius BP1 (BA+ AD) draw an arc to cut the line CB-produced at P2.
ii. The curve thus obtained is the involute of the square.
iii. With centre A and radius AD, draw an arc to cut the line BA-produced at a point P1.
iv. Similarly, with centres C and D and radii CP2 and DP3 respectively, draw arcs to cut DC-produced at P3 and AD-produced at P4.
a) ii, i, iv, iii
b) iii, i , iv, ii
c) i, iii, iv, ii
d) iv, iii, i, ii
Answer: b
Explanation: It is easy to draw involutes to polygons. First we have to point the initial point and then extending the sides. Then cutting the extended lines with cumulative radiuses of length of sides gives the points on involute and then joining them gives involute.

5. Steps given are to draw an involute of a given triangle ABC. Arrange the steps.
i. With C as centre and radius C1 draw arc cutting AC-extended at 2.
ii. With A as center and radius A2 draw an arc cutting BA- extended at 3 completing involute.
iii. B as centre with radius AB draw an arc cutting the BC- extended at 1.
iv. Draw the given triangle with corners A, B, C.
a) ii, i, iv, iii
b) iii, i , iv, ii
c) i, iii, iv, ii
d) iv, iii, i, ii
Answer: d

Explanation: It will take few simple steps to draw involute for a triangle since it has only 3 sides. First we have to point the initial point and then extending the sides. Then cutting the extended lines with cumulative radiuses of length of sides gives the points on involute and then joining them gives involute.

6. Steps given are to draw an involute of a given pentagon ABCDE. Arrange the steps.
i. B as centre and radius AB, draw an arc cutting BC –extended at 1.
ii. The curve thus obtained is the involute of the pentagon.
iii. C as centre and radius C1, draw an arc cutting CD extended at 2.
iv. Similarly, D, E, A as centres and radius D2, E3, A4, draw arcs cutting DE, EA, AB at 3, 4, 5 respectively.
a) ii, i, iv, iii
b) iii, i , iv, ii
c) i, iii, iv, ii
d) iv, iii, i, ii
Answer: c
Explanation: It is easy to draw involutes to polygons. First we have to point the initial point and then extending the sides. Then cutting the extended lines with cumulative radiuses of length of sides gives the points on involute and then joining them gives involute.

7. For inferior trochoid or inferior epitrochoid the curve touches the directing line or directing circle.
a) True
b) False
Answer: b
Explanation: Since in the inferior trochoids the generating point is inside the generating circle the path will be at a distance from directing line or circle even if the generating circle is inside or outside the directing circle.

8. ‘Hypo’ as prefix to cycloids give that the generating circle is inside the directing circle.
a) True
b) False
Answer: a
Explanation: ‘Hypo’ represents the generating circle is inside the directing circle. ‘Epi’ represents the directing path is circle. Trochoid represents the generating point is not on the circumference of generating circle.

Construction of Spiral

1. Which of the following represents an Archemedian spiral?
a) Tornado
b) Cyclone
c) Mosquito coil
d) Fibonacci series
Answer: c
Explanation: Archemedian spiral is a curve traced out by a point moving in such a way that its movement towards or away from the pole is uniform with the increase of the vectorial angle from the starting line. It is generally used for teeth profiles of helical gears etc.

2. Steps are given to draw normal and tangent to an archemedian curve. Arrange the steps, if O is the center of curve and N is point on it.
i. Through N, draw a line ST perpendicular to NM. ST is the tangent to the spiral.
ii. Draw a line OM equal in length to the constant of the curve and perpendicular to NO.
iii. Draw the line NM which is the normal to the spiral.
iv. Draw a line passing through the N and O which is radius vector.
a) ii, iv, i, iii
b) i, iv, iii, ii
c) iv, ii, iii, i
d) iii, i, iv, ii
Answer: c
Explanation: The normal to an archemedian spiral at any point is the hypotenuse of the right angled triangle having the other two sides equal in length to the radius vector at that point and the constant of the curve respectively.

3. Which of the following does not represents an Archemedian spiral?
a) Coils in heater
b) Tendrils
c) Spring
d) Cyclone
Answer: d
Explanation: Tendrils are a slender thread-like structures of a climbing plant, often growing in a spiral form. For cyclones the moving point won’t have constant velocity. The archemedian spirals have constant increase in length of moving point. Spring is a helix.

4. Match the following. Given points are about spirals.

1.	The point about which the line rotates is called _____	i.	Radius vector
2.	The line joining any point on the curve with the pole is called _____	ii.	Convolution
3.	Each complete revolution of the spiral is termed as _____	iii.	Vectorial angle
4.	Angle between radius vector and the line in its initial position is called _____	iv.	Pole

a) 1, i; 2, ii; 3, iii; 4, iv
b) 1, ii; 2, iii; 3, i; 4, iv
c) 1, iv; 2, i; 3, ii; 4, iii
d) 1, ii; 2, iv; 3, iii; 4, i

Answer: c

Explanation: The line joining any point on the curve with the pole is called radius vector. Angle between radius vector and the line in its initial position is called vectorial angle. Each complete revolution of the spiral is termed as convolutions. A spiral may make any number of convolutions before it reaches the pole.

5. Match the following.

1.	Tendrils	i.	Helix
2.	Spring	ii.	Archemedian spiral
3.	Mosquito coil	iii.	Fibonacci spiral
4.	Cyclone	iv.	Lituus spiral

a) 1, i; 2, ii; 3, iii; 4, iv
b) 1, ii; 2, iii; 3, i; 4, iv

c) 1, ii; 2, iv; 3, iii; 4, i
d) 1, iv; 2, i; 3, ii; 4, iii
Answer: d
Explanation: These are general structures we used to see in our daily life which have certain particular names when comes to spirals. Since some of them are natural structures they may obey or disobey the perfect spiral shapes but looks alike to particular spirals.

6. Match the following, given are the equations of different types of spirals.

1.	Lituus spiral	i.	$r = a + b.\ \Theta$
2.	Logarithmic spiral	ii.	$r=\Theta$-1/2
3.	Archemedian spiral	iii	$r= a\ e^{b\Theta}$
4.	Fermat's spiral	iv.	$r=\Theta^{1/2}$

a) 1, i; 2, ii; 3, iii; 4, iv
b) 1, ii; 2, iii; 3, i; 4, iv
c) 1, ii; 2, iv; 3, iii; 4, i
d) 1, iv; 2, i; 3, ii; 4, iii
Answer: b
Explanation: Given are equations in polar co-ordinate system, which have r (radius) and theta Θ (angle). Where a, b are some constants and e represents exponential function.

7. Logarithmic spiral is also called Equiangular spiral.
a) True
b) False
Answer: a
Explanation: The logarithmic spiral is also known as equiangular spiral because of its property that the angle which the tangent at any point on the curve makes with the radius vector at that point is constant. The values of vectorial angles are in arithmetical progression.

8. In logarithmic Spiral the radius vectors are in arithmetical progression.
a) True
b) False
Answer: b
Explanation: In logarithmic Spiral the values of vectorial angles are in arithmetical progression and radius vectors are in geometrical progression that is the lengths of consecutive radius vectors enclosing equal angles are always constant.

9. The mosquito coil we generally see in house hold purposes and heating coils in electrical heater etc are generally which spiral.
a) Logarithmic spiral
b) Equiangular spiral
c) Fibonacci spiral
d) Archemedian spiral
Answer: d
Explanation: Archemedian spiral is a curve traced out by a point moving in such a way that its movement towards or away from the pole is uniform with the increase of the vectorial angle from the starting line. The use of this curve is made in teeth profiles of helical gears, profiles of cam etc.

Basics of Conic Sections – 1

1. The sections cut by a plane on a right circular cone are called as _____
a) Parabolic sections
b) Conic sections
c) Elliptical sections
d) Hyperbolic sections
Answer: b
Explanation: The sections cut by a plane on a right circular cone are called as conic sections or conics. The plane cuts the cone on different angles with respect to the axis of the cone to produce different conic sections.

2. Which of the following is a conic section?
a) Circle
b) Rectangle
c) Triangle
d) Square

Answer: a

Explanation: Circle is a conic section. When the plane cuts the right circular cone at right angles with the axis of the cone, the shape obtained is called as circle. If the angle is oblique we get the other parts of the conic sections.

3. In conics, the _____ is revolving to form two anti-parallel cones joined at the apex.

a) Ellipse

b) Circle

c) Generator

d) Parabola

Answer: c

Explanation: In conics, the generator is revolving to form two anti-parallel cones joined at the apex. The plane is then made to cut these cones and we get different conic sections. If we cut at right angles with respect to the axis of the cone we get a circle.

4. While cutting, if the plane is at an angle and it cuts all the generators, then the conic formed is called as _____

a) Circle

b) Ellipse

c) Parabola

d) Hyperbola

Answer: b

Explanation: If the plane cuts all the generators and is at an angle to the axis of the cone, then the resulting conic section is called as ellipse. If the cutting angle was right angle and the plane cuts all the generators then the conic formed would be circle.

5. If the plane cuts at an angle to the axis but does not cut all the generators then what is the name of the conics formed?

a) Ellipse

b) Hyperbola

c) Circle

d) Parabola

Answer: d

Explanation: If the plane cuts at an angle with respect to the axis and does not cut all the generators then the conics formed is a parabola. If the plane cuts all the generators then the conic section formed is called as ellipse.

6. When the plane cuts the cone at angle parallel to the axis of the cone, then _____ is formed.
a) Hyperbola
b) Parabola
c) Circle
d) Ellipse
Answer: a
Explanation: When the plane cuts the cone at an angle parallel to the axis of the cone, then the resulting conic section is called as hyperbola. If the plane cuts the cone at an angle with respect to axis of the cone then the resulting conic sections are called as ellipse and parabola.

7. Which of the following is not a conic section?
a) Apex
b) Hyperbola
c) Ellipse
d) Parabola
Answer: a
Explanation: Conic sections are formed when a plane cuts through the cone at an angle with respect to the axis of the cone. If the angle is right angle then the conics is circle, if the angle is oblique then the resulting conics are parabola and ellipse.

8. The locus of point moving in a plane such that the distance between a fixed point and a fixed straight line is constant is called as _____
a) Conic
b) Rectangle
c) Square
d) Polygon
Answer: a
Explanation: The locus of a point moving in a plane such that the distance between a fixed point and a fixed straight line is always constant. The fixed straight line is called as directrix and the fixed point is called as focus.

9. The ratio of the distance from the focus to the distance from the directrix is called as eccentricity.
a) True
b) False
Answer: a

Explanation: The ratio of the distance from the focus to the distance from the directrix is called as eccentricity. It is denoted as e. The value of eccentricity can give information regarding which type of conics it is.

10. Which of the following conics has an eccentricity of unity?
a) Circle
b) Parabola
c) Hyperbola
d) Ellipse
Answer: b
Explanation: Eccentricity is defined as the ratio of the distance from the focus to the distance from the directrix. It is denoted as e. The value of eccentricity can give information regarding which type of conics it is. The eccentricity of parabola is unity that is 1.

11. Which of the following has an eccentricity less than one?
a) Circle
b) Parabola
c) Hyperbola
d) Ellipse
Answer: d
Explanation: Eccentricity is defined as the ratio of the distance from the focus to the distance from the directrix. It is denoted as e. The value of eccentricity can give information regarding which type of conics it is. The eccentricity of ellipse is less than one.

12. If the distance from the focus is 10 units and the distance from the directrix is 30 units, then what is the eccentricity?
a) 0.3333
b) 0.8333
c) 1.6667
d) 0.0333
Answer: a
Explanation: Eccentricity is defined as the ratio of the distance from the focus to the distance from the directrix. Hence from the formula of eccentricity, e = 10 ÷ 30 = 0.3333. Since the value of eccentricity is less than one the conic is ellipse.

13. If the value of eccentricity is 12, then what is the name of the conic?
a) Ellipse
b) Hyperbola

c) Parabola
d) Circle
Answer: b
Explanation: Eccentricity is defined as the ration of the distance from the focus to the distance from the directrix. It is denoted as e. If the value of eccentricity is greater than unity then the conic section is called as hyperbola.

14. If the distance from the focus is 3 units and the distance from the directrix is 3 units, then how much is the eccentricity?
a) Infinity
b) Zero
c) Unity
d) Less than one
Answer: c
Explanation: Eccentricity is defined as the ration of the distance from the focus to the distance from the directrix and it is denoted as e. Hence from the definition, e = 3 ÷ 3 = 1. Hence the value of eccentricity is equal to unity.

15. If the distance from the focus is 2 mm and the distance from the directrix is 0.5 mm then what is the name of the conic section?
a) Circle
b) Ellipse
c) Parabola
d) Hyperbola
Answer: d
Explanation: The eccentricity is defined as the ratio of the distance from the focus to the distance from the directrix. It is denoted as e. If the value of the eccentricity is greater than unity then the conic section is called as hyperbola.

Basics of Conic Sections – 2

1. Which of the following is a conic section?
a) Apex
b) Circle
c) Rectangle
d) Square
Answer: b

Explanation: Conic sections are formed when a plane cuts through the cone at an angle with respect to the axis of the cone. If the angle is right angle then the conics is circle, if the angle is oblique then the resulting conics are parabola and ellipse.

2. Which of the following has an eccentricity more than unity?
a) Parabola
b) Circle
c) Hyperbola
d) Ellipse
Answer: c
Explanation: Eccentricity is defined as the ratio of the distance from the focus to the distance from the directrix. It is denoted as e. The value of eccentricity can give information regarding which type of conics it is. The eccentricity of hyperbola is more than one.

3. If the distance from the focus is 10 units and the distance from the directrix is 30 units, then what is the name of the conic?
a) Circle
b) Parabola
c) Hyperbola
d) Ellipse
Answer: d
Explanation: Eccentricity is defined as the ratio of the distance from the focus to the distance from the directrix. Hence from the formula of eccentricity, e = 10 ÷ 30 = 0.3333. Since the value of eccentricity is less than one the conic is ellipse.

4. If the distance from the focus is 2 mm and the distance from the directrix is 0.5 mm then what is the value of eccentricity?
a) 0.4
b) 4
c) 0.04
d) 40
Answer: b
Explanation: Eccentricity is defined as the ratio of the distance from the focus to the distance from the directrix and it is denoted by e. Therefore, by definition, e = 2 ÷ 0.5 = 4. Hence the conic section is called as hyperbola.

5. If the distance from the focus is 3 units and the distance from the directrix is 3 units, then what is the name of the conic section?

a) Ellipse
b) Hyperbola
c) Circle
d) Parabola

Answer: d

Explanation: Eccentricity is defined as the ratio of the distance from the focus to the distance from the directrix and it is denoted by e. Therefore, by definition, e = 3 ÷ 3 = 1. Hence the conic section is called as parabola.

6. If the distance from the directrix is 5 units and the distance from the focus is 3 units then what is the name of the conic section?
a) Ellipse
b) Parabola
c) Hyperbola
d) Circle

Answer: a

Explanation: Eccentricity is defined as the ratio of the distance from the focus to the distance from the directrix and it is denoted by e. Hence, by definition, e = 3 ÷ 5 = 0.6. Hence the conic section is called as ellipse.

7. If the distance from a fixed point is greater than the distance from a fixed straight line then what is the name of the conic section?
a) Parabola
b) Circle
c) Hyperbola
d) Ellipse

Answer: c

Explanation: The fixed point is called as focus and the fixed straight line is called as directrix. Eccentricity is defined as the ratio of the distance from the focus to the distance from the directrix and it is denoted by e. If e is greater than one then the conic section is called as hyperbola.

8. If the distance from a fixed straight line is equal to the distance from a fixed point then what is the name of the conic section?
a) Ellipse
b) Parabola
c) Hyperbola
d) Circle

Answer: b

Explanation: The fixed straight line is called as directrix and the fixed point is called as focus. Eccentricity is defined as the ratio of the distance from the focus to the distance from the directrix and it is denoted by e. Eccentricity of parabola is unity.

9. If the distance from the directrix is greater than the distance from the focus then what is the value of eccentricity?

a) Unity

b) Less than one

c) Greater than one

d) Zero

Answer: b

Explanation: Eccentricity is defined as the ratio of the distance from the focus to the distance from the directrix and it is denoted by e. Therefore, by definition the value of eccentricity is less than one hence the conic section is ellipse.

10. If the distance from the directrix is 5 units and the distance from the focus is 3 units then what is the value of eccentricity?

a) 1.667

b) 0.833

c) 0.60

d) 0.667

Answer: c

Explanation: Eccentricity is defined as the ratio of the distance from the focus to the distance from the directrix and it is denoted by e. Therefore, by definition, e = 3 ÷ 5 = 0.6. Hence the conic section is called as ellipse.

11. If the distance from a fixed straight line is 5mm and the distance from a fixed point is 14mm then what is the name of the conic section?

a) Hyperbola

b) Parabola

c) Ellipse

d) Circle

Answer: a

Explanation: The fixed straight line is called as directrix and the fixed point is called as focus. Eccentricity is defined as the ratio of the distance from the focus to the distance from the directrix and it is denoted by e. Hence from definition e = 14 ÷ 5 = 2.8. The eccentricity of hyperbola is greater than one.

12. If the distance from the directrix is greater than the distance from the focus then what is the name of the conic section?
a) Hyperbola
b) Parabola
c) Ellipse
d) Circle
Answer: c
Explanation: Eccentricity is defined as the ratio of the distance from the focus to the distance from the directrix and it is denoted by e. Therefore, by definition the value of eccentricity is less than one hence the conic section is ellipse.

13. If the distance from a fixed straight line is equal to the distance from a fixed point then what is the value of eccentricity?
a) Unity
b) Greater than one
c) Infinity
d) Zero
Answer: a
Explanation: The fixed straight line is called as directrix and the fixed point is called as focus. Eccentricity is defined as the ratio of the distance from the focus to the distance from the directrix and it is denoted by e. Hence from definition e = x ÷ x = 1.

14. If the distance from a fixed point is greater than the distance from a fixed straight line then what is the value of eccentricity?
a) Unity
b) Infinity
c) Zero
d) Greater than one
Answer: d
Explanation: The fixed point is called as focus and the fixed straight line is called as directrix. Eccentricity is defined as the ratio of the distance from the focus to the distance from the directrix and it is denoted by e. Hence from definition, the value of eccentricity is greater than one.

15. If the distance from a fixed straight line is 5mm and the distance from a fixed point is 14mm then what is the value of eccentricity?
a) 0.357
b) 3.57

c) 2.8
d) 0.28
Answer: c
Explanation: The fixed straight line is called as directrix and the fixed point is called as focus. Eccentricity is defined as the ratio of the distance from the focus to the distance from the directrix and it is denoted by e. Hence from definition e = 14 ÷ 5 = 2.8.

Basics of Conic Sections – 3

1. Choose the correct option.

a) Eccentricity = $\frac{distance\ of\ the\ point\ from\ the\ focus}{distance\ of\ the\ point\ from\ the\ vertex}$

b) Eccentricity = $\frac{distance\ of\ the\ point\ from\ the\ focus}{distance\ of\ the\ point\ from\ the\ directrix}$

c) Eccentricity = $\frac{distance\ of\ the\ point\ from\ the\ directrix}{distance\ of\ the\ point\ from\ the\ focus}$

d) Eccentricity = $\frac{distance\ of\ the\ point\ from\ the\ latus\ rectum}{distance\ of\ the\ point\ from\ the\ focus}$

Answer: b
Explanation: The point where the extension of major axis meets the curve is called vertex. The conic is defined as the locus of a point in such a way that the ratio of its distance from a fixed point and a fixed straight line is always constant. The ratio gives the eccentricity. The fixed point is called the focus and the fixed line is called directrix.

2. Match the following.
1. E < 1 i. Rectangular hyperbola
2. E = 1 ii. Hyperbola
3. E > 1 iii. Ellipse
4. E > 1 iv. Parabola
a) 1, i; 2, ii; 3, iii; 4, iv
b) 1, ii; 2, iii; 3, iv; 4, i
c) 1, iii; 2, iv; 3, ii; 4, i
d) 1, iv; 2, iii; 3, ii; 4, i
Answer: c
Explanation: The conic is defined as the locus of a point in such a way that the ratio of its distance from a fixed point and a fixed straight line is always constant. The fixed point is

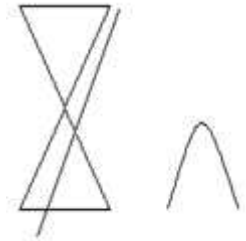
called the focus and the fixed line is called directrix. The change in ratio as given above results in different curves.

3. A plane is parallel to a base of regular cone and cuts at middle. The cross-section is _____
a) Circle
b) Parabola
c) Hyperbola
d) Ellipse
Answer: a
Explanation: A cone is formed by reducing the cross-section of circle the point. So there exist circles along the cone parallel to base. Since the given plane is parallel to base of the regular cone. The cross-section will be circle.

4. The cross-section is a _____ when a plane is inclined to the axis and cuts all the generators of a regular cone.
a) Rectangular Hyperbola
b) Hyperbola
c) Circle
d) Ellipse
Answer: d
Explanation: A cone is a solid or hollow object which tapers from a circular base to a point. Here given an inclined plane which cuts all the generators of a regular cone. So the cross-section will definitely ellipse.

5. The curve formed when eccentricity is equal to one is _____
a) Parabola
b) Circle
c) Semi-circle
d) Hyperbola
Answer: a
Explanation: The answer is parabola. Circle has an eccentricity of zero and semi circle is

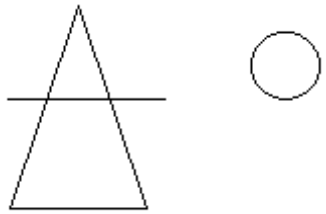
part of circle and hyper eccentricity is greater than one.



6. The cross-section gives a _____ when the cutting plane is parallel to axis of cone.
a) Parabola
b) Hyperbola
c) Circle
d) Ellipse
7. A plane cuts the cylinder the plane is not parallel to the base and cuts all the generators. The Cross-section is _____
a) Circle
b) Ellipse
c) Parabola
d) Hyperbola
Answer: b
Explanation: Given is a plane which is inclined but cutting all the generators so it will be ellipse. Cutting of all generators gives us information that the cross-section will be closed curve and not parabola or hyperbola. Circle will form only if plane is parallel to base.

8. A plane cuts the cylinder and the plane is parallel to the base and cuts all the generators. The Cross-section is _____
a) Circle
b) Ellipse
c) Parabola
d) Rectangular hyperbola
Answer: a
Explanation: The plane which is parallel to base will definitely cut the cone at all generators. Here additional information also given that the plane is parallel to base so the

cross-section will be circle.



9. The curve which has eccentricity zero is _____
a) Parabola
b) Ellipse
c) Hyperbola
d) Circle
Answer: d
Explanation: The eccentricity is the ratio of distance from a point on curve to focus and to distance from the point to directrix. For parabola it is 1 and for ellipse it is less than 1 and for hyperbola it is greater than 1. And for circle it is zero.

10. Rectangular hyperbola is one of the hyperbola but the asymptotes are perpendicular in case of rectangular hyperbola.
a) True
b) False
Answer: a
Explanation: Asymptotes are the tangents which meet the curve hyperbola at infinite distance. If the asymptotes are perpendicular to each other then hyperbola takes the name of rectangular hyperbola.

Construction of Evolutes and Helix

1. Steps are given to determine the centre of curvature at a given point on a conic. Arrange the steps. Let P be the given point on the conic and F is the focus.
Join P with F.
Draw a line NR perpendicular to PN and cutting PF or PF-extended at R.
Draw a line RO perpendicular to PR and cutting PN-extended at O which is centre of curvature.
At P, draw a normal PN, cutting the axis at N.
a) i, iv, ii, iii
b) iv, i, iii, ii

c) iii, i, iv, ii
d) ii, iv, i, iii
Answer: a
Explanation: The centre O of the circle of curvature lies on the normal to the curve at P. This centre is called center of curvature at P. So for that we first found normal and accordingly the curve we found center of curvature.

2. Steps are given to determine the centre of curvature at a given point on an Ellipse. Arrange the steps. Let P be the given point on the conic and F and F1 are the foci.
i. Produce F1G to H so that GH = VF. Join H with F.
ii. Then O is the required centre of curvature.
iii. Draw a line GO parallel to HF and intersecting the axis at O.
iv. Draw a line F1G inclines to the axis and equal to VF1.
a) i, iv, ii, iii
b) iv, i, iii, ii
c) iii, i, iv, ii
d) ii, iv, i, iii
Answer: b
Explanation: First we just took the arbitrary line passing through one of the foci and then extended up to the length from that focus to opposite vertex and then extended further up to length of distance between vertex and respective focus. Drawing parallel lines on to the focus gave us O.

3. Steps are given to determine the centre of curvature at a given point on an Ellipse. Arrange the steps. Let P be the given point on the conic and F is one of the focus.
i. Join A with C.
ii. Then O1 and O2 are the centres of curvature when the point P is at A and C respectively.
iii. Draw a rectangle AOCE in which AO = ½ major axis and CO = ½ minor axis.
iv. Through E, draw a line perpendicular to AC and cutting the major axis at O1 and the minor axis O2.
a) i, iv, ii, iii
b) iv, i, iii, ii
c) iii, i, iv, ii
d) ii, iv, i, iii

Answer: c

Explanation: First we just took the arbitrary line passing through one of the foci and then extended up to the length from that focus to opposite vertex and then extended further up to length of distance between vertex and respective focus. Drawing parallel lines on to the focus gave us O.

4. Steps are given to determine the centre of curvature at a given point on a hyperbola. Arrange the steps. Let P be the given point on the conic, V is vertex and F and F1 are the foci.

i. Draw a line GO parallel to HF and cutting the axis at O.

ii. Draw a line F1G inclined to the axis and equal to FV1.

iii. Then O is the centre of curvature at the vertex V.

iv. On F1G, mark a point H such that HG = VF. Join H with F.

a) i, iv, ii, iii

b) iv, i, iii, ii

c) iii, i, iv, ii

d) ii, iv, i, iii

Answer: d

Explanation: First we just took the arbitrary line passing through one of the foci and then extended up to the length from that focus to opposite vertex and then extended further up to length of distance between vertex and respective focus. Drawing parallel lines on to the focus gave us O.

5. Steps are given to draw the evolute of a cycloid. Arrange the steps.

i. Mark a point P on the cycloid and draw the normal PN to it.

ii. Similarly, mark a number of points on the cycloid and determine centres of curvature at these points.

iii. The curve drawn through these centres is the evolute of the cycloid. It is an equal cycloid.

iv. Produce PN to Op so that NOp = PN. Op is the centre of curvature at the point P.

a) i, iv, ii, iii

b) iv, i, iii, ii

c) iii, i, iv, ii

d) ii, iv, i, iii

Answer: a

Explanation: Evolute is generally the locus of center of curvature from point on any curve.

So for center of curvature we first need to draw normals at the point on curve and then center of curvature and then similarly other center of curvatures and joining the whole gives us the evolute.

6. Steps are given to draw the evolute of a hypocycloid. Arrange the steps.
i. Draw the diameter PQ of the rolling circle. Join Q with O, the centre of the directing circle.
ii. Mark a number of points on the hypocycloid and similarly, obtain centres of curvature at these points. The curve drawn through these centres is the evolute of the hypocycloid.
iii. Produce PN to cut OQ- produced at Op, which is the centre of curvature at the point P.
iv. Mark a point P on the hypocycloid and draw the normal PN to it.
a) i, iv, ii, iii
b) iv, i, iii, ii
c) iii, i, iv, ii
d) ii, iv, i, iii
Answer: b
Explanation: Evolute is generally the locus of center of curvature from point on any curve. So for that we first found the center of curvature of a point and then similarly other joining the whole gives us the evolute.

7. The evolute of the involute of a circle is the circle itself.
a) True
b) False
Answer: a
Explanation: In the involute of a circle, the normal NM at any point N is tangent to the circle at the point of contact M. M is the centre of curvature at the point N. Hence, the evolute of the involute is the circle itself.

8. The difference between two consecutive crest/root of a screw is called _____
a) Helix
b) Mean diameter
c) Pitch
d) Revolution
Answer: b
Explanation: Mean diameter is the average of maximum diameter and the minimum

diameter which is caused by the crest and root of screws, bolts etc. revolution is the one complete turn of helix around its own axis.

9. Pitch of the given bolt is 10 mm. The bolt completed the ½ revolution in forward direction. How much the bolt advances through axis?
a) 10 mm
b) 5 mm
c) 2.5 mm
d) 20 mm
Answer: b
Explanation: The axial advance of the point during one complete revolution is called the pitch of the helix. So here pitch is 10 mm and the point start upwards from the base of the cylinder, in ½ revolutions, the point will move up to a distance of 5mm from base.

10. Helix angle can be expressed as tanϴ = _____

a) $\frac{Pitch}{circumference\ of\ the\ circle}$

b) $\frac{circumference\ of\ the\ circle}{pitch}$

c) $\frac{Pitch}{mean\ diameter}$

d) $\frac{outer\ diameter}{inner\ diameter}$

Answer: a
Explanation: The helix is seen as a straight line and is the hypotenuse of a right-angled triangle having base equal to the circumference of the circle and the vertical side equal to the pitch of the helix. The angle ϴ which it makes with the base, is called the helix angle.

11. Number of revolutions are 10 and pitch is 2mm. Find the length of spring.
a) 10
b) 40
c) 30
d) 20
Answer: d
Explanation: Here there is mention the type of edges of spring so there would be no additional length. Length of the bolt = pitch x number of revolutions, L = 2 mm x 10, L = 20 mm.

12. Length of spring is 5cm and pitch measured is 4mm. Find the number of revolutions.
a) 20
b) 12.5
c) 13
d) 12
Answer: d
Explanation: Here there is mention the type of edges of spring so there would be no additional length. Length of the bolt = pitch x number of revolutions, 5cm = 50 mm =4 x (r), r = 50/4 =12.5 mm.

Construction of Helical Springs

1. A Spring is made of wire whose cross-section is a square of 15 mm side. Inner diameter of spring is 60 mm then outer diameter will be _____
a) 45
b) 75
c) 90
d) 80
Answer: c
Explanation: Outer diameter is equal to the sum of inner diameter and 2 times the diameter of wire. Here the cross section of wire is square so diameter can be considered as 15 mm. outer diameter = 60 +2 x 15 = 90 mm.

2. A Spring is made of wire whose cross-section is an equilateral triangle of 8 mm side. Inner diameter of spring is 40 mm then outer diameter will be _____
a) 57.88 mm
b) 54.88 mm
c) 60 mm
d) 56 mm
Answer:
Explanation: Outer diameter = inner diameter + (2 x diameter of wire), Here wire has cross section of equilateral triangle of side 8 mm so it covers a length of 8.94 (square root (82 + 42)) mm from inner to outer end of spring. Outer diameter = 40 + 2 x 8.94 = 57.88 mm.

3. Spring index = _____

a) $\frac{Mean\ diameter\ of\ a\ coil}{diameter\ of\ wire}$

b) $\frac{pitch}{circumference\ of\ the\ circle}$

c) $\frac{Diameter\ of\ wire}{Mean\ diameter\ of\ a\ coil}$

d) $\frac{circumference\ of\ the\ circle}{pitch}$

Answer: a

Explanation: Spring index is the ratio of mean diameter of coil to diameter of wire. Pitch to circumference ration is helix angle. In mechanical components usually have some standard in sizes and shapes etc. for which they should maintain some ratio among particular things to indicate some of various sized similar components.

4. Mean diameter of coil is given as 100 mm and diameter of wire is 5 mm. Spring index is_____

a) 40

b) 30

c) 25

d) 20

Answer: d

Explanation: Spring index is the ratio of mean diameter of coil to diameter of wire. Spring index = 100mm / 5 mm =20. Spring index does not have units since it is ration of similar units.

5. Spring index is given as 12.5 and diameter of wire given is 5 mm. Mean diameter of coil is _____

a) 60 mm

b) 62.5 mm

c) 6 cm

d) 56.2 mm

Answer:

Explanation: Spring index is the ratio of mean diameter of coil to diameter of wire. 12.5 = mean diameter of coil / 5mm, mean diameter of coil = 12.5 x 5 mm = 62.5 mm. We need to use same units while substituting in formulae.

6. Spring index is given as 15 and mean diameter of coil is 90 mm. Diameter of wire is _____

a) 6 mm
b) 5 mm
c) 7 mm
d) 8 mm

Answer: a

Explanation: The ratio of mean diameter of coil to diameter of wire gives spring index. 90 mm / diameter of wire = 15, diameter of wire = 90 mm / 15 = 6 mm. This spring index sometimes gives the strength to spring and used in calculating stress through it.

7. Mean diameter of coil is 170 mm and spring index is 17. Diameter of wire is _____

a) 1 cm
b) 5 mm
c) 153 mm
d) 1.5 cm

Answer: a

Explanation: The ratio of mean diameter of coil to diameter of wire gives spring index. 170 mm / diameter of wire = 17, diameter of wire = 170 mm / 17 = 10 mm= 1 cm.

8. Diameter of wire is 7.5 mm and spring index is 15. Outer diameter of the coil is _____

a) 112.5 mm
b) 120 mm
c) 1.2 cm
d) 20 cm

Answer: b

Explanation: The ratio of mean diameter of coil to diameter of wire gives spring index. Mean diameter is average of outer and inner diameter of coil in other words outer diameter = diameter of wire +mean diameter or inner diameter = mean diameter – diameter of wire. Mean diameter = 7.5 x 15 = 112.5 mm. Outer diameter = 112.5 mm + 7.5 mm = 120 mm.

9. Mean diameter of coil is 100 mm and inner diameter is 95 mm, spring index is _____

a) 10
b) 5
c) 12

d) 15

Answer: a

Explanation: Spring index is the ratio of mean diameter of coil to diameter of wire. Outer diameter = inner diameter + 2 x diameter of wire. So here diameter of wire is 10 mm. Spring index = 100mm/10mm = 10.

10. Outer diameter is 95 mm and inner diameter is 88 mm. Mean diameter is _____

a) 90 mm
b) 91.5 mm
c) 95.1 mm
d) 88 mm

Answer: b

Explanation: Mean diameter is average of outer and inner diameter of spring. Difference between the outer and inner diameter gives diameter of wire and ratio of mean diameter to diameter of wire gives spring index.

11. Inner diameter of the coil is 70 mm and diameter of wire is 8 mm, spring index is _____

a) 9.25
b) 8.75
c) 9.75
d) 7.8

Answer: c

Explanation: Outer diameter = inner diameter + 2 x diameter of wire, outer diameter = 70 +2 x 8 = 86 mm. Spring index = mean diameter of coil / diameter of wire. Spring index = ((86+70)/2)/8 = 9.75.

12. Spring index is 10 and diameter of wire is 10 mm. Outer diameter of coil is _____

a) 100 mm
b) 90 mm
c) 110 mm
d) 120 mm

Answer: c

Explanation: Spring index = mean diameter of coil / diameter of wire, 10 = mean diameter /10 mm, mean diameter = 10 x 10 mm = 100 mm. Outer diameter = mean diameter + diameter of wire, Outer diameter = 100 mm+ 10 mm = 110 mm.

Construction of Screw Threads

1. For a Double-threaded screw, Pitch of the helix = lead = _____ the pitch of the screw.
a) Four times
b) Thrice
c) Twice
d) One time
Answer: c
Explanation: In double-threaded screws, two threads of the same size run parallel to each other. The axial advance per revolution namely the lead is made twice the lead of the single-threaded screw, the pitch of the thread being kept the same in both cases.

2. When a double –threaded screw is made to turn 120 degrees about axis. How much the screw advances through axis?
a) $\frac{1}{3}$ of pitch of helix
b) $\frac{1}{3}$ of pitch of screw
c) $\frac{1}{4}$ of pitch of helix
d) The advancement is equal to pitch of helix.
Answer: a
Explanation: For a Double-threaded screw, Pitch of the helix = lead = Twice the pitch of the screw. 120 is $\frac{1}{3}$ part of 360 (complete rotation). So the lead advances to $\frac{1}{3}$ of pitch of helix and $\frac{2}{3}$ of pitch of screw.

3. A triple-threaded screw advances _____ times of its pitch of screw for one complete rotation.
a) 6
b) 2
c) 3
d) 4
Answer: c
Explanation: In a Double-threaded screw, Pitch of the helix = lead = Twice the pitch of the screw, similarly in a triple-threaded screw, pitch of the helix = lead = Thrice the pitch of the screw and so on.

4. A multiple-threaded screw is designed in such a way for one complete rotation of screw advances to a distance of 5 times the pitch of the screw. If need to make the lead only up to 3 times of the pitch of screw then how much angle

should we rotate the screw?
a) 214 degrees
b) 216 degrees
c) 120 degrees
d) 72 degrees
Answer: b
Explanation: Given that for one complete rotation the screw advances to a distance of 5 times the pitch of screw but we need only 3 times the pitch of screw. Total rotation is 360 degrees. 360 x 3/5 = 216 degrees.

5. A double –threaded screw has pitch of screw 2 mm. How much the screw advances if it is made 3 revolutions?
a) 5
b) 6
c) 12
d) 10
Answer: c
Explanation: It is given the screw is double- threaded screw which advances to a distance of 2 times the pitch of screw for one complete turn also given pitch of 2 mm. so for one turn the screw advances to 2 x 2mm = 4 mm. The screw is made to turn 3 revolutions so the screw advances to 3 x 4 mm =12 mm.

6. A triple –threaded screw is made 4 revolutions. What is the pitch of screw if the screw advances to 6 cm?
a) 24 mm
b) 5 mm
c) 1 cm
d) 5 cm
Answer: b
Explanation: The screw advances to 6 cm = 60 mm if 4 revolutions are made that is it will advances 60/4 = 15 mm if one revolution is made. 15 mm is the pitch of helix. Given the screw is triple –threaded so pitch of screw is 15/ 3 = 5 mm.

7. A double–threaded screw is made _____ revolutions. The pitch of screw is 6 mm and the screw advanced to 6 cm.
a) 6
b) 5
c) 7

d) 4

Answer: b

Explanation: Pitch of the screw is 6 mm given screw is double-threaded so for one revolution the screw advances to 6 mm x 2 = 12 mm. But the screw advanced to 6 cm = 60 mm. Number of revolutions = total screw advancement/ screw advancement for single revolution = 60 /12 = 5.

8. A multiple-threaded screw has pitch of screw 4mm and if the screw is made to 5 revolutions the screw will advances to 40 mm. What type of screw is it?

a) Single-threaded screw

b) Double threaded screw

c) Triple-threaded screw

d) Four –threaded screw

Answer: b

Explanation: 5 revolutions = 40 mm, 1 revolution = 40mm/5 = 8 mm. Given pitch of screw is 4 mm that is pitch of helix is equal to two times of pitch of screw. So the screw used here is double-threaded screw.

9. For a triple threaded screw the pitch of screw is 5 mm. The lead (pitch of helix) is_____

a) 15

b) 8

c) 10

d) 30

Answer: a

Explanation: In a Double-threaded screw, Pitch of the helix = lead = Twice the pitch of the screw, similarly in a triple-threaded screw, pitch of the helix = lead = Thrice the pitch of the screw and so on. Lead = 3 x 5 mm = 15 mm.

10. The double-threaded screw is made to rotate one complete rotation the screw advanced to 10 mm. Lead (pitch of helix) is given as 10 mm. The pitch of screw is ____

a) 10 mm

b) 5 mm

c) 1 mm

d) 12 mm

Answer: b

Explanation: In a double –threaded screw, the lead = the pitch of helix = 2 times of pitch of

screw. The pitch of screw = 10mm / 2 =5 mm. Even if the single- threaded screw is changed to double threaded screw the cross-section of thread and pitch of screw won't change.

11. The double- threaded screw is made to rotate 2 revolutions for this the screw advances to 40 mm. What is the pitch of helix?
a) 40 mm
b) 10 mm
c) 20 mm
d) 22 mm
Answer: c
Explanation: 2 revolutions = 40 mm so 1 revolution = 40 mm/ 2 = 20 mm. In any type of screw the advancement of screw for one revolution is equal to pitch of helix. So here also the pitch of helix is 20 mm.

12. The triple- threaded screw is made to rotate 10 revolutions for this the screw advances to 90 mm. What is the pitch of screw?
a) 4.5 mm
b) 9 mm
c) 1 mm
d) 3 mm
Answer: d
Explanation: 90 mm advance = 10 revolutions, 1 revolution = 9 mm advancement. Since it is triple threaded it advances to 3 times of pitch of screw. Therefore the pitch of screw is 9mm /3 = 3 mm.

Helix upon a Cone

1. In a regular cone the angle between base and slanting surface is 45 degrees and the base diameter is 100 mm. If a helix is to be build on such a cone with a pitch of 5. How many revolutions do the helix made in this cone?
a) 14.1
b) 18
c) 10
d) 20
Answer: c
Explanation: Given angle between base and slanting surface is 45 and diameter of base is

100 mm height of cone is 100/2 x tan (45) =50. Pitch of helix is 5. Number of revolutions = total length of helix/ pitch of helix = 50/5 = 10.

2. In a regular cone the angle between base and slanting surface is 60 degrees and the base diameter is 75 mm. If a helix is to be build on such a cone up to half of cones height with 6 revolutions in it. Pitch of the helix is?
a) 10.8
b) 5.4
c) 6.4
d) 12.9
Answer: b
Explanation: Height of cone = diameter/2 x tan (angle) = 75/2 x tan (60) = 129.9mm/2= 64.95 mm. Half height is 32.475 mm. Helix made 6 revolution is this height so one revolution height is 32.475/6 = 5.4 mm which is the pitch of helix.

3. A conical spring is to be designed with base diameter 100 mm and other end diameter 50 mm and pitch of spring is 5 mm to a height of 80 mm. How many revolutions are there in spring?
a) 15
b) 16
c) 17
d) 18
Answer: b
Explanation: Whatever the end diameters of a conical spring the number of revolutions depends on the pitch and height of the spring. Number of revolutions = length of spring/pitch of helix = 80 mm/5 mm = 16.

4. Pitch of helix is 7 mm and number of revolutions is 15. Length of spring is?
a) 100 mm
b) 10.5 cm
c) 110 mm
d) 12 cm
Answer: b
Explanation: Length of spring = pitch of helix x number of revolutions, 7 mm x 15 = 0.7 cm x 15 = 10.5 cm = 105 mm. Length also includes diameter of wire but here it is not mentioned and also not given the diameter of wire.

5. Base diameter of conical helix is 80 mm, height of spring is 30 mm, angle between the base and slanting side of cone is 45 degrees and diameter of wire is 4 mm. What is the outer diameter at top edge of spring?
a) 14
b) 24
c) 32
d) 18
Answer: c
Explanation: Since the given angle is 45 degrees the max height of helix is equal to radius of base. Height given is 30 mm due to wire diameter the total helix height will be 26. 40 -26 =14 will be the radius of top end helix and due to diameter of wire the outer diameter of top end is 14 x 2 + 4= 32 mm.

6. Mean diameter of conical spring is 100 mm, height of spring is 50 mm, angle between the base and slanting side of cone is 45 degrees and diameter of wire is 5 mm. What is the inner diameter at top edge of spring?
a) 10
b) 5
c) 20
d) 15
Answer: c
Explanation: Since the given angle is 45 degrees the max height of spring is equal to radius of base. Height given is 50 mm. Due to diameter of wire height of helix is 45 mm. 50-45 =5 will be the radius of top end helix and due to diameter of wire the inner diameter of top end is 5 x 2 -5= 5 mm.

7. Conical spring is also called tapered spring.
a) True
b) False
Answer: a
Explanation: Yes, conical spring is also called tapered spring since the diameter throughout the spring varies that is increases or decreases from one to other. Conical springs are better than cylindrical springs since conical springs can resist buckling effect.

8. The base diameter of a conical helix is 120 mm and other end diameter is 70 mm. The height of helix is 40 mm. What is the angle between the base and slanting side is?
a) 58 degrees

b) 60 degrees
c) 30 degrees
d) 45 degrees
Answer: a
Explanation: Base radius= 60 mm. Other end radius = 35 mm. 60 mm– 35mm = 25 mm. height is 40 mm. tan (angle) = height/ base radius = 40 mm/25 mm = 1.6. Angle = tan-1(1.6) = 57.99 degrees approximately equals to 58 degrees.

9. The base diameter of a conical helix is 100 mm. The angle between the base and slanting side is 45 degrees. Pitch of helix is 5 mm. What is the height of helix and number of revolutions?
a) 50 mm, 10
b) 25 mm, 5
c) 30 mm, 7
d) 100 mm, 15
Answer: a
Explanation: Base radius = 50 mm. Angle given is 45 degrees. Tan (angle) = height/ base, tan (45) = height/ 50, height = 50 x tan (45) = 50 mm, so at height of 50 mm the helix end. Number of revolutions = height/ pitch = 50 mm/ 5 mm = 10.

10. The base diameter of a conical helix is 100 mm and other end diameter is 80 mm. The height of helix is 50 mm. What is the angle between the base and slanting side is?
a) 58 degrees
b) 79 degrees
c) 89 degrees
d) 45 degrees
Answer: a
Explanation: Base radius= 50 mm. Other end radius = 40 mm. 50 mm– 40mm = 10 mm. height is 50 mm. tan (angle) = height/ base radius = 50 mm/10 mm = 5. Angle = tan-1(5) = 78.69 degrees approximately equals to 79 degrees.

11. The base diameter of a conical helix is 80 mm. The angle between the base and slanting side is 60 degrees. Pitch of helix is 6 mm. What is the height of helix and number of revolutions?
a) 69.2 mm, 12
b) 39.2 mm, 6
c) 30 mm, 7

d) 80 mm, 12

Answer: a

Explanation: Base radius = 40 mm. Angle given is 60 degrees. Tan (angle) = height/ base, tan (60) = height/ 40, height = 40 x tan (60) = 69.2 mm, so at height of 69.2 mm the helix end. Number of revolutions = height/ pitch = 69.2 mm/ 6 mm = 11.5 approximately 12.

12. Base diameter of conical helix is 60 mm, height of spring is 30 mm, angle between the base and slanting side of cone is 45 degrees and diameter of wire is 3 mm. What is the outer diameter at top edge of spring?

a) 14

b) 15

c) 30

d) 18

Answer: b

Explanation: Since the given angle is 45 degrees the max height of helix is equal to radius of base. Height given is 30 mm due to wire diameter the total helix height will be 26. 30 -26 =4 will be the radius of top end helix and due to diameter of wire the outer diameter of top end is 4 x 2 + 3= 15 mm.

13. Base diameter of conical helix is 50 mm, height of helix is 30 mm, angle between the base and slanting side of cone is 60 degrees. What is the top end diameter of the helix?

a) 7.67 mm

b) 15.3 mm

c) 14.7 mm

d) 6.7 mm

Answer: b

Explanation: Base radius = 25 mm. 30/tan (60) = difference between the base radius and top end radius = 17.3 mm. 25 mm- 17.3 mm = 7.67 mm (radius of top end radius). Diameter is 15.3 mm.

Cam

1. The shape of the cam to transmit uniform linear motion is determined by the application of the principle of _____

a) Logarithmic spiral

b) Archimedean spiral

c) Equitorial spiral
d) Fibonacci spiral
Answer: b
Explanation: Archimedean curve is traced out by a point moving in such a way that its movement towards or away from the pole is uniform such that the angle and distance follows the linear function from the starting line. This is used in teeth profiles of helical gears and cam profiles etc.

2. Cam converts _____ to _____
a) force, energy
b) rotary motion, linear motion
c) kinetic energy, potential energy
d) potential energy, kinetic energy
Answer: b
Explanation: Spring stores the forces in form of potential energy but cam is just a machine member which is designed as shaft or plate etc. as for required movement follower either uniform or variable, depending up on the shape of cam profile.

3. What is the following term not related to cam?
a) Base circle
b) Rise, fall
c) Dwell period
d) Pitch
Answer: d
Explanation: Base circle is the minimum rise contour that follower can make from cam profile. Rise and fall are the movement of follower as per profile of cam. Dwell period is that during which the follower will not rise or fall from its position. Pitch is related to helix.

4. A cam profile is drawn which gives a uniform rise and fall of 40 mm to a point during each revolution of cam. The follower will rise to a distance of 20 mm if the shaft is rotated to an angle of _____
a) 180 degrees
b) 90 degrees
c) 120 degrees
d) 150 degrees
Answer: b
Explanation: Given a cam profile is made throughout without any dwell and also with

continuous rise- fall period. So 180 = maximum rise. And since the given profile is uniform it follows the linear function. 40 is for 180 and 20 is for 90 degrees.

5. A cam profile is drawn which gives a uniform rise and fall of 60 mm to a point during each revolution of cam. The follower will rise to a distance of ____ mm if the shaft is rotated to an angle of 180 degrees.
a) 20
b) 40
c) 30
d) 60
Answer: d
Explanation: Given a cam profile is made throughout without any dwell and also with continuous rise- fall period. So 180 = maximum rise = 60 mm and further the follower fall uniformly while shaft rotating from 180 degree position to 360 degree position.

6. A cam should be designed only using uniform rise and fall throughout the cam without any dwell period and rise and fall periods should be same. The follower is making a rise of 40 mm when the shaft is rotated to an angle of 150 degrees. What is the maximum rise in follower?
a) 48
b) 57.5
c) 62.5
d) 50
Answer: a
Explanation: Given a cam profile is made throughout without any dwell and also with continuous rise- fall period. So 180 = maximum rise, since uniform the rise or fall follows linear function. (40/150) x 180 = 48 mm.

7. A cam should be designed only using uniform rise and fall throughout the cam, without any dwell period and rise and fall periods should be same. The maximum rise in follower is 50 mm. How much the follower will rise when the shaft is rotated to an angle of 120 degrees?
a) 25 mm
b) 43.3 mm
c) 33.3 mm
d) 30 mm
Answer: c
Explanation: Given a cam profile is made throughout without any dwell and also with

continuous rise- fall period. So at 180 degrees there will be maximum rise. Since it is uniform rise-fall it follows linear function. 50/180 x 120 = 33.3 mm.

8. A cam should be designed only using uniform rise and fall within half of cam, the remaining is dwell period, and without any dwell period in between the rise - fall periods and rise and fall periods should be same. The maximum rise in follower is 30 mm. How much the follower will rise when the follower is 120 degrees from its initial position of cam?
a) 30
b) 20
c) 15
d) 10
Answer: d
Explanation: According to the given conditions there is only movement in follower up to 180 degrees of shaft rotation and between it at the middle the follower make maximum rise that is at 90 degrees. 120 – 90 = 30 degrees. For 90 degrees it is 30 mm so for 30 degrees it will be 10 mm when the follower is 120 degrees from its initial position of cam.

9. A cam should be designed only using uniform rise and fall within half of cam, the remaining is dwell period, and without any dwell period in between the rise-fall periods and rise and fall periods should be same. The maximum rise in follower is 45 mm. How much the follower will rise when the follower is 45 degrees from its initial position of cam?
a) 22.5
b) 0
c) 30
d) 15
Answer: a
Explanation: According to the given conditions there is only movement in follower up to 180 degrees of shaft rotation and between it at the middle the follower make maximum rise that is at 90 degrees. 90- 45 = 45 degrees. For 90 degrees it is 45 mm so for 45 degrees it will be 45/2 = 22.5 mm when the follower is 45 degrees from its initial position of cam.

10. A cam should be designed only using uniform rise and fall within second half of cam profile, the first half is dwell period, without any dwell period in between the rise and fall periods and rise and fall periods should be same. The maximum rise in follower is 45 mm. How much the follower will rise when the follower is 120 degrees from its initial position of cam?

a) 15
b) 30
c) 20
d) 0
Answer: d
Explanation: According to the given conditions there is only movement in follower from 180 degrees to 360 degrees of shaft rotation and between it, at the middle of rise-fall period the follower make maximum rise that is at 270 degrees. So the follower will not move since there is no rise or fall at angle 120 in cam designed.

11. A cam should be designed only using uniform rise and fall within second half of cam profile, the first half is dwell period, without any dwell period in between the rise and fall periods and rise and fall periods should be same. The maximum rise in follower is 55 mm. How much the follower will rise when the follower is 240 degrees from its initial position of cam?
a) 18.3
b) 0
c) 27.5
d) 36.6
Answer: a
Explanation: According to the given conditions there is only movement in follower from 180 degrees to 360 degrees of shaft rotation and between it, at the middle of rise-fall period the follower make maximum rise that is at 270 degrees. And this follows the linear function. 360- 180 = 180, 360- 270 = 90, 360-240= 120 degrees. For 90 degrees from 180 degree position it is 55 mm so for other 30 degrees it will be 55 x 1/3 = 18.3 mm when the follower is 240 degrees from its initial position of cam.

12. A cam should be designed only using uniform rise and fall within first half of cam profile, the remaining is dwell period, and without any dwell period in between the rise-fall periods and rise and fall periods should be same. The maximum rise in follower is 35 mm. How much the follower will rise when the follower is 240 degrees from its initial position of cam?
a) 17.5
b) 11.6
c) 0
d) 23.3
Answer: c

Explanation: According to the given conditions there is only movement in follower up to 180 degrees of shaft rotation and between it at the middle the follower make maximum rise that is at 90 degrees. So there will be no rise in the follower in the second half of cam profile.

13. The cam profile draw for knife edge follower and roller follower will be different.
a) True
b) False
Answer: b
Explanation: Whatever the follower will be the cam profile is drawn only considering the rise, fall, dwell periods and what is function needed. But the terminology of circles that exist in cam profile changes a little bit.

Loci of Points by Different Methods

1. The locus of a point P about another point O such that its distance from O is constant is _____
a) a line passing through O
b) two parallel lines equidistant from O
c) a circle with center O
d) a curve with O in it
Answer: c
Explanation: Since in the circle the distance from any point P on it to centre O is equal which is called radius of that circle. The compass is built based on this locus concept in drawing circles.

2. The locus of a point P such that its distance from a fixed line AB is constant is_____
a) a circle with AB as largest chord (diameter)
b) a line perpendicular to AB passing through midpoint of AB
c) a line parallel to AB
d) a line perpendicular to AB cutting AB at centre
Answer: c
Explanation: There is no other chance of locating point P whose distance from a fixed line is constant other than a line parallel to given line and passing through point P and this help in drawing parallel lines.

3. Locus of a point P equidistant from two fixed points A and B is _____
a) an ellipse
b) a line perpendicular to AB passing through midpoint of AB
c) a circle with AB as largest chord
d) a parallel line of AB
Answer: b
Explanation: The line which makes equal distance from the two fixed points will definitely pass through the midpoint of line joining the two points and will definitely perpendicular to the line formed by joining the two points.

4. The locus of point which is equidistant from 2 non parallel lines is _____
a) a straight line bisecting the angle between them
b) a line which cuts both lines at same distances from point of intersection of given lines
c) a closed curve around them
d) a line perpendicular to 1st line
Answer: a
Explanation: The line obtained is the angular bisector of the two lines given so carries points which are equidistant from the both the lines, if the lines are perpendicular to each other the line makes 45 degrees with both the line, if the lines are parallel then locus would be parallel line to both and will in between them making same distance from both the lines.

5. Locus of a point P equidistant from a fixed line and fixed point F is _____
a) a circle with centre F
b) a ellipse with foci P and F
c) a parabola
d) a hyperbola
Answer: c
Explanation: The point T given here is otherwise known as focus in parabola and also the ratio to perpendicular distance from the fixed line to distance from P to T is called eccentricity which is equal to 1 for parabola.

6. Locus of the point P such that the sum of distances from two fixed points is always constant is _____
a) a ellipse
b) a hyperbola

c) a parabola having those fixed point on its axis
d) a line perpendicular to line joining those two points and passing through the midpoint of it

Answer: a

Explanation: The two points given are foci of ellipse. Ellipse is a curve whose eccentricity is less than one. The process given is one of the methods to draw ellipse in easy way. Since the sum of distances from two fixed points to point P on curve is always constant.

7. A sliding member AB has attached to a rocker BC, this BC is attached to crank CD. D is fixed end and as crank is rotating about D the slider slides parallel to it. What is the locus of point P on any point on rocker?
a) Ellipse
b) Circle
c) Line
d) Semi-circle

Answer: a

Explanation: The whole mechanism given here is slider crank mechanism. The C traces the path of circle. But as the rocker has ends in which one is sliding and other is making circle the point on such a member will always trace the path ellipse.

8. A sliding member AB has attached to a rocker BC, this BC is attached to crank CD. D is fixed end and as crank is rotating about D the slider slides parallel to it. What is the locus of C?
a) Ellipse
b) Circle
c) Line
d) Semi-circle

Answer: b

Explanation: The whole mechanism given here is slider crank mechanism. The asked point C which is at end of crank always rotates around the D and the member length will not change so the curve traced by that point is circle.

9. Locus of the point P which is rotating about another point O with uniform angular velocity and the PO is increasing at constant rate is _____
a) an ellipse
b) archimedean spiral
c) helix
d) logarithmic spiral

Answer: b

Explanation: It is a curve traced out by a point moving in such a way that it’s movement towards or away from the pole is uniform with the increase of vectorial angle from the starting line. These types of curves are used in drawing profiles of cam.

10. The locus of point P whose perpendicular distance from a fixed line and distance from a point T is equal is _____

a) a circle
b) an ellipse
c) a parabola
d) a hyperbola

Answer: c

Explanation: The point T given here is otherwise known as focus in parabola and also the ratio to perpendicular distance from the fixed line to distance from P to T is called eccentricity which is equal to 1 for parabola.

11. The locus of point P moving such that the ratio of the lengths of consecutive distances from point O enclosing equal angles is always constant is_____

a) archimedean spiral
b) logarithmic spiral
c) a parabola
d) a circle

Answer: b

Explanation: The distance from the P to O that is pole is called radius vector. The values of vectorial angles are in arithmetic progression and the corresponding values of radius vectors are in geometrical progression.

Basics of Orthographic Projections

1. The straight lines which are drawn from various points on the contour of an object to meet a plane are called as _____

a) connecting lines
b) projectors
c) perpendicular lines
d) hidden lines.

Answer: b

Explanation: The object will generally kept at a distance from planes so to represent the shape in that view projectors are drawn perpendicular to plane in orthographic projection. Projectors are simply called lines of sights when an observer looks towards an object from infinity.

2. When the projectors are parallel to each other and also perpendicular to the plane, the projection is called _____

a) Perspective projection
b) Oblique projection
c) Isometric projection
d) Orthographic projection

Answer: d

Explanation: In orthographic projection the projectors are parallel to each other and also perpendicular to the plane but in oblique projection the projectors are inclined to the plane of projection and projectors are parallel to each other.

3. In the Oblique projection an object is represented by how many views?

a) one view
b) two views
c) three views
d) four views

Answer: a

Explanation: Oblique projection is one method of pictorial projection. Oblique projection shows three dimensional objects on the projection plane in one view only. This type of drawing is useful for making an assembly of an object and provides directly a production drawing.

4. The object we see in our surrounding usually without drawing came under which projection?

a) Perspective projection
b) Oblique projection
c) Isometric projection
d) Orthographic projection

Answer: a

Explanation: Perspective projection gives the view of an object on a plane surface, called the picture plane, as it would appear to the eye, when viewed from a fixed position. It may also be defined as the figure formed on the projection plane when visual rays from the eye to the object cut the plane.

5. In orthographic projection each projection view represents how many dimensions of an object?
a) 1
b) 2
c) 3
d) 0
Answer: b
Explanation: In orthographic projection and oblique projection the projection planes which represent one view of an object only shows width, height; width, thickness; height, thickness only but in isometric and perspective projections width, height and thickness can also be viewed.

6. In orthographic projection an object is represented by two or three views on different planes which _____
a) gives views from different angles from different directions
b) are mutually perpendicular projection planes
c) are parallel along one direction but at different cross-section
d) are obtained by taking prints from 2 or 3 sides of object
Answer: b
Explanation: By viewing in mutual perpendicular planes- Vertical plane, horizontal plane, profile plane which indirectly gives us front view in x-direction, top-view in y –direction and thickness in z-direction which are mutually perpendicular. Ortho means perpendicular.

7. To represent the object on paper by orthographic projection the horizontal plane (H.P) should be placed in which way?
a) The H.P is turned in clockwise direction up to 90 degrees
b) The H.P is turned in anti-clockwise direction up to 90 degrees
c) H.P plane is placed to left side of vertical plane parallel to it
d) H.P plane is placed to right side of vertical plane parallel to it
Answer: a
Explanation: The vertical plane and horizontal plane are perpendicular planes intersected at reference line. So on paper to represent perpendicular planes any of the planes should arrange to get real picture of required projection.

8. The hidden parts inside or back side of object while represented in orthographic projection are represented by which line?
a) Continuous thick line
b) Continuous thin line

c) Dashed thin line
d) Long-break line
Answer: c
Explanation: Continuous thick line is used for visible outlines, visible edges, crests of screw threads, limits of full depth thread etc. Continuous thin line is used for extension, projection, short centre, leader, reference lines, imaginary lines of intersection etc.

9. Orthographic projection is the representation of two or more views on the mutual perpendicular projection planes.
a) True
b) False
Answer: a
Explanation: Orthographic projection is the representation of two or more views on the mutual perpendicular projection planes. But for oblique projection the object is viewed in only one view. And in isometric view the object is kept resting on the ground on one of its corners with a solid diagonal perpendicular to the V.P.

10. In perspective projection and oblique projection the projectors are not parallel to each other.
a) True
b) False
Answer: b
Explanation: In Oblique projection the projectors are parallel to each other but inclined to projection plane but in perspective projection all the projectors are not parallel to each other and so to projection plane.

11. What is additional 3rd view on orthographic projection in general for simple objects?
a) Front view
b) Top view
c) Side view
d) View at 45 degrees perpendicular to horizontal plane
Answer: c
Explanation: In general for simple objects engineers use only front view and top view or else front view and side view or else top view and side view. If every view is visualized side view gives height and thickness of object.

12. The front view of an object is shown on which plane?
a) Profile plane
b) Vertical plane
c) Horizontal plane
d) Parallel plane
Answer: b
Explanation: The front view will be represented on vertical plane, top view will be represented on horizontal plane and side view will be shown on profile plane. The front view shows height and width of object.

13. The Top view of an object is shown on which plane?
a) Profile plane
b) Vertical plane
c) Horizontal plane
d) Parallel plane
Answer: c
Explanation: The front view will be shown on vertical plane, top view will be represents on horizontal plane and side view will be represents on profile plane. The top view gives thickness and width of the object.

14. The side view of an object is shown on which plane?
a) Profile plane
b) Vertical plane
c) Horizontal plane
d) Parallel plane
Answer: a
Explanation: The front view will be represents on vertical plane, top view will be shown on horizontal plane and side view will be represents on profile plane. The side view gives height and thickness of object.

Planes of Projections and Four Quadrants

1. The 2nd quadrant is in which position?
a) Below H.P, behind V.P
b) Above H.P, behind V.P
c) Above H.P, in-front of V.P
d) Below H.P, in-front of V.P

Answer: b

Explanation: The position of reference planes will be similar to quadrants in x, y plane co-ordinate system. As the 2nd quadrant lies above the x-axis and behind the y-axis here also the 2nd quadrant is above H.P, behind V.P.

2. The 3rd quadrant is in which position?

a) Below H.P, behind V.P

b) Above H.P, behind V.P

c) Above H.P, in-front of V.P

d) Below H.P, in-front of V.P

Answer: a

Explanation: The position of reference planes will be similar to quadrants in x, y plane co-ordinate system. As the 3rd quadrant lies below the x-axis and behind the y-axis here also the 3rd quadrant is below H.P, behind V.P.

3. The 4th quadrant is in which position?

a) Below H.P, behind V.P

b) Above H.P, behind V.P

c) Above H.P, in-front of V.P

d) Below H.P, in-front of V.P

Answer: d

Explanation: The position of reference planes will be similar to quadrants in x, y plane co-ordinate system. As the 4th quadrant lies below the x-axis and in front of the y-axis here also the 4th quadrant is below H.P, in front of V.P.

4. The 1st quadrant is in which position?

a) Below H.P, behind V.P

b) Above H.P, behind V.P

c) Above H.P, in-front of V.P

d) Below H.P, in-front of V.P

Answer: c

Explanation: The position of reference planes will be similar to quadrants in x, y plane co-ordinate system. As the 1st quadrant lies above the x-axis and in front of the y-axis here also the 1st quadrant is above H.P, in front of V.P.

5. The position of the views with respect to the reference line will not change according to the quadrant in which the object may be situated.

a) True

b) False

Answer: b

Explanation: The position of the views with respect to the reference line will change according to the quadrant in which the object may be situated because the representation of views will on 2 dimensional sheet for that the planes has to rotate and with respective to reference line and this will be different for different quadrant.

6. The first and the third quadrants are always opened out while rotating the planes.

a) True

b) False

Answer: a

Explanation: According to the standards it is made that the planes rotate in clockwise direction while drawing the orthographic projections of objects on the different quadrant. So as the horizontal rotates 90 degrees in clockwise with respect to reference line the views in 2nd and 4th quadrants overlap but in 1st and 3rd the views will not coincide so they are said to be opened.

7. An object is kept in one of the quadrants of principal planes of projection, for both the front view and top view of the object, the view came first and then the object (the observer is at top right side of principal planes). The object is in which quadrant?

a) 1st quadrant

b) 2nd quadrant

c) 3rd quadrant

d) 4th quadrant

Answer: c

Explanation: If we imagine the principal planes and the observer at top right side of those planes we can clearly watch the positions of object with respect to their view. Here the object is in 3rd quadrant so view will come first.

8. An object is kept in one of the quadrants of principal planes of projection, for both the front view and top view of the object the object came first and then the views on planes (the observer is at top right side of principal planes). The object is in which quadrant?

a) 1st quadrant

b) 2nd quadrant

c) 3rd quadrant

d) 4th quadrant

Answer: a

Explanation: If we imagine the principal planes and the observer at top right side of those planes we can clearly watch the positions of object with respect to their view. Here the object is in 1st quadrant so object will come first in both the views.

9. An object is kept in one of the quadrants of principal planes of projection, for the front view the view is first and object is next and for top view the object came first and then the view on plane (the observer is at top right side of principal planes). The object is in which quadrant?

a) 1st quadrant

b) 2nd quadrant

c) 3rd quadrant

d) 4th quadrant

Answer: b

Explanation: If we imagine the principal planes and the observer at top right side of those planes we can clearly watch the positions of object with respect to their view. Here the object is in 2nd quadrant so view will come first for front view and object will come first for top view.

10. The line formed by intersection of principal planes is called _____

a) projection line

b) origin line

c) line of intersection

d) reference line

Answer: d

Explanation: The line formed by intersection of principal planes or reference planes of projection that is the vertical plane or frontal plane and horizontal plane is called reference line which is denoted by the letters xy.

11. The vertical plane is also called _____

a) straight plane

b) perpendicular plane

c) frontal plane

d) pole plane

Answer: c

Explanation: Vertical plane will be vertical to ground and perpendicular with horizontal plane. As the observer will always be at right-top side of planes of projections the front

view will always be placed on vertical plane only so the vertical plane is also called frontal plane.

12. The negative horizontal plane and positive horizontal makes _____ angle with each other.
a) 90 degrees
b) 180 degrees
c) 120 degrees
d) 270 degrees
Answer: b
Explanation: The negative horizontal plane means the part of horizontal plane which lies in 2nd quadrant. The positive and negative planes are parallel to each other so the angle between the parallel planes is always 180 degrees.

13. The positive vertical plane and positive horizontal plane makes _____ angle with each other in anti clockwise direction.
a) 180 degrees
b) 270 degrees
c) 0 degrees
d) 90 degrees
Answer: b
Explanation: Given the direction is anti-clockwise direction so the angle in 270 degrees if it is given clockwise direction the angle should be 90 degrees since the given planes are consecutive planes in planes of projection.

First Angle Projection Method

1. In 1st angle projection the object is kept in _____
a) 1st quadrant
b) 2nd quadrant
c) 3rd quadrant
d) 4th quadrant
Answer: a
Explanation: We can keep object in any quadrant of projection planes but every time we keep in different quadrants gives different relative positions in projections. Here 1st angle represents the initial stage in forming projection of planes so 1st quadrant represents 1st angle projection.

2. 1st angle projection is recommended by _____
a) USA
b) ISI
c) Bureau of Indian Standards
d) ASME
Answer: c
Explanation: First angle projection is recommended by Bureau of Indian Standards but USA and other countries recommend third angle projection. The changes in both the projections are relative positions in projection.

3. In 1st angle projection the _____ lies between _____ and _____
a) object, projection plane, observer
b) projection plane, object, observer
c) reference line, side view, front view
d) reference line, left side view, right side view
Answer: a
Explanation: The observer is always at the right side top end. So as the observer watches the object comes first and then the projection plane as the object in the 1st quadrant in 1st angle projection. So object lies between projection plane and observer.

4. In 1st angle projection the front view will be below the top view.
a) True
b) False
Answer: b
Explanation: As the object is in first quadrant and the front view projects on vertical plane and top view projects on horizontal plane. And for representing the projection the horizontal plane has to turn 90 degrees in clockwise direction. The top view will be below the front view.

5. In 1st angle projection the positions of front and top views are _____
a) top view lies above the front view
b) front view lies above the top view
c) front view lie left side to top view
d) top view lie left side to front view
Answer: b
Explanation: As the object is in first quadrant and the front view projects on vertical plane

and top view projects on horizontal plane. And for representing the projection the horizontal plane has to turn 90 degrees in clockwise direction.

6. In 1st angle projection the left side view will be left side of front view.
a) True
b) False
Answer: b
Explanation: In first angle projection the object's left side will be projected only if we watch from left side of object and the impression will fall to the right side of front view similar to the other side also so the left side view is placed on the right side of front view.

7. The positions of right side view and front view of an object kept in 1st quadrant and projection are drawn?
a) Right side view is right side of front view
b) Right side view is left side of front view
c) Right side view is above the front view
d) Right side view is below the front view
Answer: b
Explanation: In first angle projection the object's right side will be projected only if we watch from right side of object and the impression will fall to the left side of front view similar to the other side also so the right side view is placed on the left side of front view.

8. The positions of reference line and top view in 1st angle projection are _____
a) reference line lies above the top view
b) reference line lies below the top view
c) reference line lie left side to top view
d) reference line lie right side to top view
Answer: a
Explanation: Reference line will be the xy line which is formed by intersection of vertical plane and horizontal plane. In the first angle projection the projections of object is taken by placing object in 1st quadrant and top view is projected on to horizontal plane which is after the reference line.

9. If an object is placed in 1st quadrant such that one of the surfaces of object is coinciding with vertical plane, what is the correct position of views from the following?
a) The front view touches the reference line

b) The side view touches the reference line
c) The top view touches the reference line
d) The bottom view touches the reference line
Answer: c
Explanation: In the first angle projection the projections of object is taken by placing object in 1st quadrant. If the object's surface is coinciding the vertical plane which indirectly saying the distance from vertical plane is zero so top view of that object touches the reference line.

10. If an object is placed in 1st quadrant such that one of the surfaces of object is coinciding with horizontal plane, what is the correct position of views from the following?
a) The front view touches the reference line
b) The side view touches the reference line
c) The top view touches the reference line
d) The bottom view touches the reference line
Answer: a
Explanation: In the first angle projection the projections of object is taken by placing object in 1st quadrant. If the object's surface is coinciding the horizontal plane which indirectly saying the distance from horizontal plane is zero so front view of that object touches the reference line.

11. If an object is placed in 1st quadrant such that one of the surfaces of object is coinciding with both vertical plane and horizontal plane, what is the correct position of views from the following?
a) The top view touches the reference line
b) The top view and side view touch each other
c) Both side views touch each other
d) The top view and front touches each other at reference line
Answer: d
Explanation: If the object is placed in 1st quadrant and the object's surface is coinciding with both the horizontal plane and vertical plane which indirectly saying the distance from both the planes is zero so both top and front views of that object touches the reference line.

12. Where is the position of bottom view in 1st angle projection?
a) left side of right hand side view
b) right side of right hand side view

c) above the front view
d) below the top view
Answer: c
Explanation: First angle projection means the object is placed in first quadrant and the top view of the object is below the front view so the bottom view is above the front view. This is obtained as the bottom view is viewed from bottom and so is projected upwards.

13. Where is the position of back view in 1st angle projection?
a) left side of right hand side view
b) right side of right hand side view
c) above the front view
d) below the top view
Answer: b
Explanation: In the first angle projection the top view of the object is below the front view and then come the side views to the left and right of front view and then back view which can either be kept on ends of side views but as standard notation it is placed on right side of right side view.

Third Angle Projection Method

1. In 3rd angle projection the object is kept in _____
a) 1st quadrant
b) 2nd quadrant
c) 3rd quadrant
d) 4th quadrant
Answer: c
Explanation: We can keep object in any quadrant of projection planes but every time we keep in different quadrants gives different relative positions in projections. Here 3rd angle represents the initial stage in forming projection of planes so 3rd quadrant represents 3rd angle projection.

2. 3rd angle projection is recommended by _____
a) USA
b) ISI
c) Bureau of Indian Standards
d) IS
Answer: a

Explanation: Third angle projection is recommended by USA and other countries and 1st angle projection is recommended by Bureau of Indian Standards. The changes in both the projections are relative positions in projection.

3. In 3rd angle projection the _____ lies between _____ and _____

a) object, projection plane, observer
b) projection plane, object, observer
c) reference line, side view, front view
d) reference line, left side view, right side view

Answer: b

Explanation: The observer is always at the right side top end. So as the observer watches the projection plane comes first and then the object as the object in the 3rd quadrant in 3rd angle projection, so plane of projection lies between object and observer.

4. In 3rd angle projection the front view will be below the top view.

a) True
b) False

Answer: a

Explanation: As the object is in third quadrant and the front view projects on vertical plane and top view projects on horizontal plane. And for representing the projection the horizontal plane has to turn 90 degrees in clockwise direction. The top view will be above the front view.

5. In 3rd angle projection the positions of front view and top views are?

a) Top view lies above the front view
b) Front view lies above the top view
c) Front view lie left side to top view
d) Top view lie left side to front view

Answer: a

Explanation: As the object is in third quadrant and the front view projects on vertical plane and top view projects on horizontal plane. And for representing the projection the horizontal plane has to turn 90 degrees in clockwise direction.

6. In 3rd angle projection the left side view will be left side of front view.

a) True
b) False

Answer: a

Explanation: In third angle projection the object's left side will be projected only if we watch from right side of object so impression will fall to the left side of front view since the plane of projection is back side of object and also the right side view is placed on the right side of front view.

7. The positions of right side view and front view of an object kept in 3rd quadrant and projection are drawn?
a) right side view is right side of front view
b) right side view is left side of front view
c) right side view is above the front view
d) right side view is below the front view
Answer: a
Explanation: In third angle projection the object's right side will be projected only if we watch from left side of object and the impression will fall to the right side of front view similar to the other side also so the left side view is placed on the left side of front view.

8. The positions of reference line and top view in 3rd angle projection are?
a) reference line lies above the top view
b) reference line lies below the top view
c) reference line lie left side to top view
d) reference line lie right side to top view
Answer: b
Explanation: Reference line will be the xy line which is formed by intersection of vertical plane and horizontal plane. In the third angle projection the projections of object is taken by placing object in 3rd quadrant and top view is projected on to horizontal plane which is above the reference line.

9. If an object is placed in 3rd quadrant such that one of the surfaces of object is coinciding with vertical plane, what is the correct position of views from the following?
a) The front view touches the reference line
b) The side view touches the reference line
c) The top view touches the reference line
d) The bottom view touches the reference line
Answer: c
Explanation: In the third angle projection the projections of object is taken by placing object in 3rd quadrant. If the object's surface is coinciding the vertical plane which indirectly

saying the distance from vertical plane is zero so top view of that object touches the reference line.

10. If an object is placed in 3rd quadrant such that one of the surfaces of object is coinciding with horizontal plane, what is the correct position of views from the following?
a) The front view touches the reference line
b) The side view touches the reference line
c) The top view touches the reference line
d) The bottom view touches the reference line
Answer: a
Explanation: In the third angle projection the projections of object is taken by placing object in 3rd quadrant. If the object's surface is coinciding the horizontal plane which indirectly saying the distance from horizontal plane is zero so front view of that object touches the reference line.

11. If an object is placed in 3rd quadrant such that one of the surfaces of object is coinciding with both vertical plane and horizontal plane, what is the correct position of views from the following?
a) The top view touches the reference line
b) The top view and side view touch each other
c) Both side views touch each other
d) The top view and front touches each other at reference line
Answer: d
Explanation: If the object is placed in 3rd quadrant and the object's surface is coinciding with both the horizontal plane and vertical plane which indirectly saying the distance from both the planes is zero so both top and front views of that object touches the reference line.

12. Where is the position of bottom view in 3rd angle projection?
a) left side of right hand side view
b) right side of right hand side view
c) above the front view
d) below the top view
Answer: d
Explanation: Third angle projection means the object is placed in third quadrant and the top view of the object is above the front view so the bottom view is below the front view. This is obtained as the top view is placed above so bottom should be placed below.

13. Where is the position of back view in 3rd angle projection?
a) left side of right hand side view
b) right side of right hand side view
c) above the front view
d) below the top view
Answer: b
Explanation: In the third angle projection the top view of the object is above the front view and then come the side views to the left and right of front view and then back view which can either be kept on ends of side views but as standard notation it is placed on right side of right side view.

BIS Code of Practice

1. Code of Practice for General Engineering Drawing is published in _____
a) 1960
b) 1955
c) 2003
d) 1973
Answer: b
Explanation: The Indian standards Institution now Bureau of Indian Standards, in its earlier versions of Indian standard (IS: 696) ‘Code of Practice for General Engineering Drawing’ published in 1955 and revised in 1960 had recommended the use of third –angle projection method.

2. The second revised version of the B.I.S. published in _____
a) 1960
b) 1955
c) 2003
d) 1973
Answer: d
Explanation: In the second revised version of this standard published in December 1973, the committee responsible for it preparation left the option of selecting first-angle or third angle projection method to the users.

3. In which year the B.I.S. standard got revised and recommended the use of third angle projection method?
a) 1960

b) 1955
c) 2003
d) 1973
Answer: a
Explanation: The Indian standards Institution now Bureau of Indian Standards, in its earlier versions of Indian standard (IS: 696) ‘Code of Practice for General Engineering Drawing’ published in 1955 and revised in 1960 had recommended the use of third –angle projection method.

4. The committee again reviewed the position and finally recommended revised _____ for implementation of 1st angle projection.
a) SP: 46 -1988
b) SP: 45 -1988
c) SP: 46 – 1955
d) SP: 46 – 1960
Answer: a
Explanation: The committee again reviewed the position and finally recommended revised SP: 46 -1988 and SP: 46 -2003 for implementation of first-angle method of projection in our country, by replacing earlier IS: 696 drawing standard.

5. Finally the standards SP: 46- 2003 and SP: 46 – 1988 are revised and replaced with earlier _____ drawing standards.
a) IS: 698
b) IS: 697
c) IS: 696
d) IS: 695
Answer: c
Explanation: The committee again reviewed the position and finally recommended revised SP: 46 -1988 and SP: 46 -2003 for implementation of first-angle method of projection in our country, by replacing earlier IS: 696 drawing standard.

6. IS 15021: Part 2: 2001 is standard for _____
a) axonometric representations
b) orthographic representations
c) di-metric representations
d) isometric representations
Answer: b
Explanation: IS 15021: Part 2: 2001 is standard for Orthographic representations. IS

11065: Part 2: 1985 is standard for Di-metric projection. IS 11065: Part 1: 1984 is standard for Isometric projection.

7. IS 11065: Part 2: 1985 is standard for _____
a) di-metric projection
b) isometric projection
c) orthographic projection
d) sizes and layout of drawing sheets
Answer: a
Explanation: IS 15021: Part 2: 2001 is standard for Orthographic representations. IS 11065: Part 2: 1985 is standard for Di-metric projection. IS 11065: Part 1: 1984 is standard for Isometric projection. IS 10711: 2001/ISO 5457: 1999 is standard for Sizes and Layout of Drawing Sheets.

8. IS 10711: 2001/ISO 5457: 1999 is standard for_____
a) scales for use in technical drawings
b) folding of drawing prints
c) sizes and Layout of Drawing Sheets
d) axonometric projection
Answer: c
Explanation: IS 10711: 2001/ISO 5457: 1999 is standard for Sizes and Layout of Drawing Sheets. IS 10713: 1983/ISO 5455: 1979 is standard for Scales for use in technical drawings. IS 11664: 1986 is standard for Folding of drawing prints.

9. IS 10713: 1983/ISO 5455: 1979 is standard for_____
a) scales for use in technical drawings
b) folding of drawing prints
c) sizes and Layout of Drawing Sheets
d) axonometric projection
Answer: a
Explanation: IS 10711: 2001/ISO 5457: 1999 is standard for Sizes and Layout of Drawing Sheets. IS 10713: 1983/ISO 5455: 1979 is standard for Scales for use in technical drawings. IS 11664: 1986 is standard for Folding of drawing prints.

10. IS 11664: 1986 is standard for _____
a) scales for use in technical drawings
b) folding of drawing prints
c) sizes and Layout of Drawing Sheets

d) axonometric projection

Answer: b

Explanation: IS 10711: 2001/ISO 5457: 1999 is standard for Sizes and Layout of Drawing Sheets. IS 10713: 1983/ISO 5455: 1979 is standard for Scales for use in technical drawings. IS 11664: 1986 is standard for Folding of drawing prints.

Problems on Orthographic Projection

1. A regular cone is rested on base on horizontal plane the front view will be _____

a) circle
b) scalene triangle
c) equilateral triangle
d) isosceles triangle

Answer: d

Explanation: Given the cone is regular cone that means the tip of cone will be at center if viewed from top, so for such a cone the front view will be triangle and in particular isosceles triangle and the top view will be circle.

2. A Cube is placed on horizontal plane such that one of the space diagonal is perpendicular to horizontal plane the top view will be _____

a) octagon
b) square
c) hexagon
d) rectangle

Answer: c

Explanation: A cube is a 3 dimensional object whose length, width and thickness will be same and also given space diagonal is perpendicular to horizontal plane the top view, side view and front view will be hexagon only.

3. A cylinder’s axis is perpendicular to profile plane the top view will be _____

a) circle
b) cylinder
c) rectangle
d) parallelogram

Answer: c

Explanation: Given a cylinder whose axis is perpendicular to profile plane so the top view and front view will be rectangle and side view will be circle. If the cylinder is slightly tilted with respect to profile then top view and front view will be parallelogram.

4. An egg is placed vertical to horizontal plane the top view will be _____

a) ellipse
b) circle
c) oval
d) sphere

Answer: b

Explanation: Given the egg is placed vertical to horizontal plane the front view and side view will be same and it might be conical, oval or elliptical etc. the top view always be circle. That's why the egg boxes are made impression of semi spheres.

5. A Cardboard is made to cut in shape of 'A' and as we placed in projection planes and from top view the legs of cardboard touch the profile plane and cardboard is parallel to horizontal plane. Which of the following is wrong?

a) The front view gives thickness of cardboard
b) The side views give width of cardboard
c) The front view gives height of cardboard
d) The top view gives thickness of cardboard

Answer: d

Explanation: From given information we can understand that the cardboard is parallel to horizontal plane and direction of 'A' placed in projection planes so the front view and side view gives thickness, the front view and top view gives height of cardboard and side view and top view gives width of cardboard.

6. An object is placed in between projection planes, the front view and side view gives the same rectangle and top view is giving square the object is _____

a) a square cylinder, such that square base is parallel to horizontal plane
b) a square cylinder, such that square base is parallel to vertical plane
c) a square cylinder, such that square base is parallel to profile plane
d) a square cylinder, such that axis is parallel to horizontal

Answer: a

Explanation: Given that the object is viewing from front and side as rectangle and top view

is square so we can understand that pyramid has height more than the side of square and accordingly the view the object can be cuboid (square cylinder).

7. A plate of negligible thickness of circular shape is placed parallel to horizontal plane the front view will be _____

a) line
b) circle
c) rectangle
d) ellipse

Answer: a

Explanation: Given a plate which is in circular shape given plate is parallel to horizontal plane so the front view and side views will be line whose length is equal to diameter of circle as the thickness is negligible the front view, side view can't be rectangle and top view will be circle.

8. A regular tetrahedron is placed on horizontal plane on one of its base, the front view, top view and side view gives triangle.

a) True
b) False

Answer: a

Explanation: A regular tetrahedron is formed by enclosing 4 equal triangles. And given one of the base is parallel to horizontal so in what angle the tetrahedron might be turned the front view and side view will be triangle.

9. A regular cone is placed on horizontal plane on its base the top view is _____

a) circle
b) rectangle
c) square
d) triangle

Answer: a

Explanation: A regular cone generally will have base circle and constant difference in cross-section. When a cone placed on horizontal that is base is parallel to horizontal plane then the front view and side views will show triangle for both and top view will shows circle.

10. The views will change if we keep the object in different quadrants.

a) True
b) False

Answer: b

Explanation: Whenever we change the object from one quadrant to other quadrant the relative positions of projection drawn will change accordingly but the views of the object will not change.

11. A Square pyramid is resting on vertical plane with base parallel to vertical plane. The side view will be _____

a) triangle

b) polygon with 4 sides

c) square

d) polygon with 5 sides

Answer: a

Explanation: A Square pyramid have base of square which is resting on vertical plane as said above so the side views, top view and bottom view gives the triangle and front view and back view gives square.

12. A triangular prism is placed in projection plane such that the square surface is parallel to horizontal plane. The top view, front view will be _____

a) square, rectangle respectively

b) rectangle, triangle respectively

c) rectangle, rectangle respectively

d) triangle, rectangle respectively

Answer: c

Explanation: Given a triangular prism is placed in projection plane such that the square base is parallel to horizontal plane. A triangular prism is nothing but triangular cylinder as per position given the front view and top view will be rectangle and side view will be triangle.

13. A pentagonal prism is placed the axis is perpendicular to horizontal plane, the top view and front view are _____

a) pentagon, rectangle

b) rectangle, rectangle

c) pentagon, triangle

d) rectangle, triangle

Answer: a

Explanation: Given a pentagonal prism is placed in projection plane such that the axis is perpendicular to horizontal plane. A pentagonal prism is nothing but pentagonal cylinder as

per position given the front view and side view will be rectangle and top view will be pentagon.

14. A regular rhombic bi-pyramid is placed in projection planes such that one of its longest diagonal is perpendicular to vertical plane the front view will be _____

a) square
b) rhombus
c) triangle
d) rectangle

Answer: b

Explanation: Given a regular rhombic bi-pyramid is placed in projection planes such that one of its longest diagonal is perpendicular to vertical plane. As per position given the front view and side view will be rhombus and top view will be square.

15. A hexagonal nut is placed on horizontal plane such that the axis is perpendicular to profile plane. The top view and side view will be _____

a) rectangle, hexagon
b) hexagon, rectangle
c) rectangle, rectangle
d) rectangle, circle

Answer: a

Explanation: Given a hexagonal nut is placed on horizontal plane such that the axis is perpendicular to profile plane. As per position given the front view, back view, top view and bottom view will be rectangle and side view will be hexagon.

Projection of Points in First Quadrant

1. Two points are placed in 1st quadrant of projection planes such that the line joining the points is perpendicular to profile plane the side view and top view will be _____

a) single point, two points
b) two points, single point
c) single point, single point
d) two points, two points

Answer: a

Explanation: Here given the two points such that the joining line is perpendicular to profile plane in 1st quadrant asked side view and top view. The views in any quadrant will remain same but the relative positions in projection will change accordingly the quadrant.

2. A point is 5 units away from the vertical plane and 4 units away from profile plane and 3 units away from horizontal plane in 1st quadrant then the projections are drawn on paper the distance between the front view and top view of point is _____

a) 7 units
b) 8 units
c) 9 units
d) 5 units

Answer: b

Explanation: Since the point is 3 units away from the horizontal plane the distance from the point to xy reference line will be 3 units. And then the point is at distance of 5 units from the vertical plane the distance from reference line and point will be 5, sum is 8.

3. A point is 8 units away from the vertical plane and 2 units away from profile plane and 4 units away from horizontal plane in 1st quadrant then the projections are drawn on paper the distance between the side view and front view of point is _____

a) 12 units
b) 6 units
c) 10 units
d) 8 units

Answer: c

Explanation: Since the point is 2 units away from the profile plane the distance from the point to reference line will be 2 units. And then the point is at distance of 8 units from the vertical plane the distance from reference line and point will be 8,sum is 10.

4. A point is 2 units away from the vertical plane and 3 units away from profile plane and 7 units away from horizontal plane in 1st quadrant then the projections are drawn on paper the distance between the front view and side view of point is _____

a) 10
b) 5
c) 9
d) 7

Answer: b

Explanation: Since the point is 3 units away from the profile plane the distance from the point to reference line will be 3 units. And then the point is at distance of 2 units from the profile plane the distance from reference line and point will be 2 units, sum is 5.

5. A point is 20 units away from the vertical plane and 12 units away from profile plane and 9 units away from horizontal plane in 1st quadrant then the projections are drawn on paper the distance between the side view and front view of point is _____

a) 29 units
b) 21 units
c) 32 units
d) 11 units

Answer: c

Explanation: Since the point is 12 units away from the profile plane the distance from the point to reference line will be 12 units. And then the point is at distance of 20 units from profile plane the distance from reference line and point will be 20 units, sum is 32.

6. A point is 2 units away from the vertical plane and 3 units away from profile plane and 7 units away from horizontal plane in 1st quadrant then the projections are drawn on paper the shortest distance from top view and side view of point is _____

a) 10.29
b) 5.14
c) 9
d) 7

Answer: c

Explanation: Since here distance from side view and top view is asked for that we need the distance between the front view and side view (3+2); front view and top view (7+2)and these lines which form perpendicular to each other gives needed distance, answer is square root of squares of both the distances $\sqrt{(5^2+9^2)}$ =10.29 units.

7. If a point P is placed in between the projection planes. The distance from side view to reference line towards front view and the distance between top view and reference line towards top view will be same.

a) True
b) False

Answer: a

Explanation: The projection will be drawn by turning the other planes parallel to vertical plane in clockwise direction along the lines of intersecting of planes. And so as we fold again the planes at respective reference lines and then drawing perpendiculars to the planes at those points the point of intersection gives the point P.

8. A point is 20 units away from the vertical plane and 12 units away from profile plane and 9 units away from horizontal plane in 1st quadrant then the projections are drawn on paper the distance between the side view and top view of point is _____

a) 29 units
b) 21 units
c) 35.8 units
d) 17.9 units

Answer: c

Explanation: Since here distance from side view and top view is asked for that we need the distance between the front view and side view (12+9); front view and top view (9+20)and these lines which form perpendicular to each other gives needed distance, answer is square root of squares of both the distances $\sqrt{(21^2+29^2)}$ = 35.80 units.

9. A point is 5 units away from the vertical plane and profile plane and 10 units away from horizontal plane in 1st quadrant then the projections are drawn on paper the distance between the side view and top view of point is _____

a) 15
b) 10
c) 32.5
d) 18.02 units

Answer:

Explanation: Since here distance from side view and top view is asked for that we need the distance between the front view and side view (5+5); front view and top view (10+5)and these lines which form perpendicular to each other gives needed distance, answer is square root of squares of both the distances $\sqrt{(10^2+15^2)}$ = 18.02 units.

10. A point is 15 units away from the vertical plane and 12 units away from profile plane and horizontal plane in 1st quadrant then the projections are drawn on paper the distance between the front view and top view of point is _____

a) 27

b) 15
c) 12
d) 24
Answer: a
Explanation: Since the point is 12 units away from the horizontal plane the distance from the point to xy reference line will be 12 units. And then the point is at distance of 15 units from the vertical plane the distance from reference line and point will be 15, sum is 27.

11. A point is 12 units away from the vertical plane and profile plane 15 units away from horizontal plane in 1st quadrant then the projections are drawn on paper the distance between the front view and side view of point is _____
a) 27
b) 15
c) 12
d) 24
Answer: d
Explanation: Since the point is 12 units away from the profile plane the distance from the point to xy reference line will be 12 units. And then the point is at distance of 12 units from the profile plane the distance from reference line and point will be 12, sum is 24.

12. A point is 7 units away from the vertical plane and horizontal plane 9 units away from profile plane in 1st quadrant then the projections are drawn on paper the distance between the front view and top view of point is _____
a) 27
b) 15
c) 16
d) 14
Answer: d
Explanation: Since the point is 7 units away from the horizontal plane the distance from the point to xy reference line will be 7 units. And then the point is at distance of 7 units from the vertical plane the distance from reference line and point will be 7, sum is 14 units.

13. A point is 16 units away from the vertical plane and horizontal plane 4 units away from profile plane in 1st quadrant then the projections are drawn on paper the distance between the side view and top view of point is _____
a) 37.73 units
b) 32.98 units

c) 16
d) 8
Answer: d
Explanation: Since here distance from side view and top view is asked for that we need the distance between the front view and side view (4+16); front view and top view (16+16)and these lines which form perpendicular to each other gives needed distance, answer is square root of squares of both the distances $\sqrt{20^2+32^2}$) = 37.73 units.

Projection of Points in Second Quadrant

1. A point is in 2nd quadrant 20 units away from the horizontal plane and 10 units away from the vertical plane. Orthographic projection is drawn. What is the distance from point of front view to reference line, top view point to reference line?
a) 20, 10
b) 10, 20
c) 0, 20
d) 10, 0
Answer: a
Explanation: Given object is point placed in 2nd quadrant the top view gives the distance from vertical plane (10) and front view gives the distance from horizontal plane (20) both are placed overlapped in orthographic projection since the object is placed in 2nd quadrant.

2. A point is in 2nd quadrant 15 units away from the vertical plane and 10 units away from the horizontal plane. Orthographic projection is drawn. What is the distance from point of front view to reference line, top view point to reference line?
a) 15, 10
b) 10, 15
c) 0, 15
d) 10, 0
Answer: b
Explanation: Given object is point the top view gives the distance from vertical plane (15) and front view gives the distance from horizontal plane (10) both are placed overlapped in

orthographic projection since the planes need to rotate to draw projection as the object is placed in 2nd quadrant.

3. A point is in 2nd quadrant, 15 units away from the vertical plane, 10 units away from the horizontal plane and 8 units away from the profile plane. Orthographic projection is drawn. What is the distance from point of front view to point of top view?
a) 5
b) 2
c) 7
d) 8
Answer: a
Explanation: As the point is in 2nd quadrant while drawing the projections the planes should rotate along the hinges such that the plane with top view overlaps the front view. So the distance between them is difference of distances from respective planes that is 5 (15-10) here.

4. A point is in 2nd quadrant, 15 units away from the vertical plane, 10 units away from the horizontal plane and 8 units away from the profile plane. Orthographic projection is drawn. What is the distance from point of front view to point of side view?
a) 25
b) 23
c) 18
d) 5
Answer: b
Explanation: Side view is obtained by turning the profile plane along the hinge with vertical parallel to vertical plane. Side view and front view have same distance from reference line. Sum of distances from the point to vertical plane and profile plane gives the following that is 15+8 = 23 units.

5. A point in 2nd quadrant is 15 cm away from both the horizontal plane and vertical plane and orthographic projections are drawn. The distance between the points formed by front view and top view is _____
a) 0
b) 30
c) 15
d) 15+ distance from profile

Answer: a

Explanation: Given the point is in 2nd quadrant. While drawing orthographic projections the front view and top view overlaps and also the distance of point is same from planes of projections so the distance between them is zero.

6. A point in 2nd quadrant is 10 units away from the horizontal plane and 13 units away from both the vertical plane and profile plane. Orthographic projections are drawn find the distance from side view and front view.

a) 10
b) 13
c) 20
d) 26

Answer: d

Explanation: Given the point is in 2nd quadrant. The front view and side view lie parallel to the horizontal plane when orthographic projections are drawn. The distance from side view to vertical reference is 13 and distance from front view to profile plane is 13. Sum is 13+13= 26.

7. A point in 2nd quadrant is 25 units away from both the horizontal plane and profile plane and 15 units away from the vertical plane. Orthographic projections are drawn find the distance from side view and front view.

a) 25
b) 15
c) 30
d) 40

Answer: d

Explanation: Given the point is in 2nd quadrant. The front view and side view lie parallel to the horizontal plane when orthographic projections are drawn. The distance from side view to vertical reference is 15 and distance from front view to profile plane is 25. Sum is 15+25 =40.

8. A point in 2nd quadrant is 12 units away from the horizontal plane and vertical plane and 13 units away from both the profile plane. Orthographic projections are drawn find the distance from side view and front view.

a) 13
b) 26
c) 25
d) 24

Answer: c

Explanation: Given the point is in 2nd quadrant. The front view and side view lie parallel to the horizontal plane when orthographic projections are drawn. The distance from side view to vertical reference is 12 and distance from front view to profile plane is 13. Sum 12 + 13 =25.

9. A point in 2nd quadrant is 15 units away from the horizontal plane and 10 units away from both the vertical plane and profile plane. Orthographic projections are drawn find the distance from side view and top view.

a) 25

b) 20.6

c) 25.49

d) 15.8

Answer: b

Explanation: Given the point is in 2nd quadrant. Since here distance from side view and top view is asked for that we need the distance between the front view and side view (10+10); front view and top view (10-15) and these lines which form perpendicular to each other gives needed distance, answer is $\sqrt{(20^2+5^2)}$ = 20.6 units.

10. A point in 2nd quadrant is 25 units away from both the horizontal plane and profile plane 15 units away from the vertical plane. Orthographic projections are drawn find the distance from side view and top view.

a) 40

b) 50.99

c) 33.54

d) 41.23

Answer: d

Explanation: Given the point is in 2nd quadrant. Since here distance from side view and top view is asked for that we need the distance between the front view and side view (25+15); front view and top view (25-15) and these lines which form perpendicular to each other gives needed distance, answer is $\sqrt{(40^2+10^2)}$ = 41.23units.

11. A point in 2nd quadrant is 12 units away from the horizontal plane and vertical plane 13 units away from both the profile plane. Orthographic projections are drawn find the distance from side view and top view.

a) 25.6

b) 25

c) 17.69

d) 13

Answer: b

Explanation: Given the point is in 2nd quadrant. Since here distance from side view and top view is asked for that we need the distance between the front view and side view (12+13); front view and top view (12-12) and these lines which form perpendicular to each other gives needed distance, answer is $\sqrt{(25^2+0^2)}$ = 25units.

12. A point in 2nd quadrant is 10 cm away from the vertical plane and 15 cm away from the horizontal plane, orthographic projections are drawn. What is the distance from side view of point to line of vertical reference?

a) 10

b) 15

c) 25

d) Can't found

Answer: a

Explanation: Given the point is in 2nd quadrant. The distance from the side view of point to line of vertical reference will be the distance from the point to the vertical plane in plane of projection that is as given 10 cm.

13. A point is in 2nd quadrant which is 5 meters away from horizontal and 3 meters away from profile plane. Orthographic projections are drawn. What is the distance from the top view to xy reference line?

a) 5

b) 3

c) 8

d) Can't found

Answer: d

Explanation: Given the point is in 2nd quadrant. The xy reference line is between the vertical plane and horizontal plane but distance from vertical point is not given in question so we can't found some given information.

14. A point is in 2nd quadrant which is 7 meters away from horizontal and 2 meters away from profile plane. Orthographic projections are drawn. What is the distance from the front view to xy reference line?

a) 7

b) 2

c) 5

d) 9

Answer: a

Explanation: Given the point is in 2nd quadrant. The distance from front view is given by distance between point and horizontal plane here it is given 7 meters. And distance from vertical reference will be 2 meters.

15. A point is in 2nd quadrant which is 8 meters away from vertical and 6 meters away from profile plane. Orthographic projections are drawn. What is the distance from the side view to vertical reference line?

a) 8

b) 6

c) 2

d) Can't found

Answer: a

Explanation: Given the point is in 2nd quadrant. The distance from side view is given by distance between point and vertical plane here it is given 8 meters. And distance from front view will be 6 meters.

Projection of Points in Third Quadrant

1. Two points are placed in 3rd quadrant of projection planes such that the line joining the points is perpendicular to vertical plane the side view and top view will be _____

a) single point, two points

b) two points, single point

c) single point, single point

d) two points, two points

Answer: d

Explanation: Here given the two points such that the joining line is perpendicular to vertical plane in 3rd quadrant asked side view and top view. The views in any quadrant will remain same but the relative positions in projection will change accordingly the quadrant.

2. A point is 7 units away from the vertical plane and 3 units away from profile plane and 3 units away from horizontal plane in 3rd quadrant then the projections are drawn on paper the distance between the front view and top view of point is _____

a) 10 units

b) 8 units

c) 9 units
d) 5 units
Answer: a
Explanation: Since the point is 3 units away from the horizontal plane the distance from the point to xy reference line will be 3 units. And then the point is at distance of 7 units from the vertical plane the distance from reference line and point will be 7, sum is 10.

3. A point is 9 units away from the vertical plane and 5 units away from profile plane and 4 units away from horizontal plane in 3rd quadrant then the projections are drawn on paper the distance between the side view and front view of point is _____
a) 12 units
b) 14 units
c) 10 units
d) 8 units
Answer: b
Explanation: Since the point is 5 units away from the profile plane the distance from the point to reference line will be 5 units. And then the point is at distance of 9 units from the vertical plane the distance from reference line and point will be 9, sum is 14.

4. A point is 7 units away from the vertical plane and 5 units away from profile plane and 7 units away from horizontal plane in 3rd quadrant then the projections are drawn on paper the distance between the front view and side view of point is _____
a) 10
b) 5
c) 9
d) 12
Answer: d
Explanation: Since the point is 5 units away from the profile plane the distance from the point to reference line will be 5 units. And then the point is at distance of 7 units from the profile plane the distance from reference line and point will be 7 units, sum is 12.

5. A point is 8 units away from the vertical plane and 12 units away from profile plane and 9 units away from horizontal plane in 3rd quadrant then the projections are drawn on paper the distance between the side view and front view of point is _____
a) 29 units

b) 20 units
c) 21 units
d) 17 units
Answer: c
Explanation: Since the point is 12 units away from the profile plane the distance from the point to reference line will be 12 units. And then the point is at distance of 8 units from profile plane the distance from reference line and point will be 8 units, sum is 20.

6. A point is 20 cm away from the vertical plane and 8 units away from profile plane and 17 cm away from horizontal plane in 3rd quadrant then the projections are drawn on paper the shortest distance from top view and side view of point is _____
a) 37
b) 44.65
c) 46.40
d) 37.53
Answer: c
Explanation: Since here distance from side view and top view is asked for that we need the distance between the front view and side view (8+20); front view and top view (17+20)and these lines which form perpendicular to each other gives needed distance, answer is square root of squares of both the distances $\sqrt{(28^2+37^2)}$ =46.40 units.

7. If a point P is placed in between the projection planes in third quadrant. The distance from side view to reference line towards front view and the distance between top view and reference line towards top view will be same.
a) True
b) False
Answer: a
Explanation: The projection will be drawn by turning the other planes parallel to vertical plane in clockwise direction along the lines of intersecting of planes. And so as we fold again the planes at respective reference lines and then drawing perpendiculars to the planes at those points the point of intersection gives the point P.

8. A point is 2 m away from the vertical plane and 1 m away from profile plane and 9 m away from horizontal plane in 3rd quadrant then the projections are drawn on paper the distance between the side view and top view of point is _____
a) 21

b) 14.86
c) 11.4
d) 10.4
Answer: b
Explanation: Since here distance from side view and top view is asked for that we need the distance between the front view and side view (1+9); front view and top view (9+2)and these lines which form perpendicular to each other gives needed distance, answer is square root of squares of both the distances $\sqrt{(10^2+11^2)}$ =14.86 m.

9. A point is 6 units away from the vertical plane and profile plane and 10 units away from horizontal plane in 3rd quadrant then the projections are drawn on paper the distance between the side view and top view of point is _____

a) 15
b) 16
c) 12
d) 20
Answer: d
Explanation: Since here distance from side view and top view is asked for that we need the distance between the front view and side view (6+6); front view and top view (10+6)and these lines which form perpendicular to each other gives needed distance, answer is square root of squares of both the distances $\sqrt{(12^2+16^2)}$ = 20 units.

10. A point is 15 cm away from the vertical plane and 10 cm away from profile plane and horizontal plane in 3rd quadrant then the projections are drawn on paper the distance between the front view and top view of point is _____

a) 27 cm
b) 15 cm
c) 12 cm
d) 25 cm
Answer: d
Explanation: Since the point is 10 cm away from the horizontal plane the distance from the point to xy reference line will be 10 cm. And then the point is at distance of 15 cm from the vertical plane the distance from reference line and point will be 15, sum is 25 cm.

11. A point is 6 m away from the vertical plane and profile plane 5 m away from horizontal plane in 3rd quadrant then the projections is drawn on paper the

distance between the front view and side view of point is _____

a) 27

b) 15

c) 12

d) 24

Answer: c

Explanation: Since the point is 6 m away from the profile plane the distance from the point to xy reference line will be 6 m. And then the point is at distance of 6 from the profile plane the distance from reference line and point will be 6, sum is 12.

12. A point is 50 cm away from the vertical plane and horizontal plane 80 cm away from profile plane in 3rd quadrant then the projections is drawn on paper the distance between the front view and top view of point is _____

a) 130

b) 100

c) 160

d) 0

Answer: b

Explanation: Since the point is 50 cm away from the horizontal plane the distance from the point to xy reference line will be 50 cm. And then the point is at distance of 50 cm from the vertical plane the distance from reference line and point will be 50 cm, sum is 100 cm.

13. A point is 5 units away from the vertical plane and horizontal plane 4 units away from profile plane in 3rd quadrant then the projections are drawn on paper the distance between the side view and top view of point is _____

a) 13.45

b) 12.72

c) 19

d) 12.04

Answer: a

Explanation: Since here distance from side view and top view is asked for that we need the distance between the front view and side view (4+5); front view and top view (5+5)and these lines which form perpendicular to each other gives needed distance, answer is square root of squares of both the distances $\sqrt{(10^2+9^2)}$ = 13.45 units.

14. A point is 3 m away from the vertical plane and horizontal planes in 3rd quadrant then the projections are drawn on paper the distance between the side view and vertical reference line?

a) 3
b) 0
c) Can’t found
d) 6
Answer: a
Explanation: The side view’s distance from reference line will be the perpendicular distance from vertical plane and front view’s distance from reference line will be the perpendicular distance from horizontal plane.

15. A point is 3 m away from the vertical plane and 7 m away from profile plane in 3rd quadrant then the projections are drawn on paper the distance between the side view and vertical reference line?
a) 6
b) 3
c) 14
d) 7
Answer: b
Explanation: The side view’s distance from vertical reference line will be the perpendicular distance from vertical plane and top view’s distance from vertical reference line will be the perpendicular distance from profile plane.

Projection of Points in Fourth Quadrant

. A point is in 4th quadrant 10 units away from the horizontal plane and 20 units away from the vertical plane. Orthographic projection is drawn. What is the distance from point of front view to reference line, top view point to reference line?
a) 20, 10
b) 10, 20
c) 0, 20
d) 10, 0
Answer: b
Explanation: Given object is point placed in 4th quadrant the top view gives the distance from vertical plane (20) and front view gives the distance from horizontal plane (10) both are placed overlapped in orthographic projection since the object is placed in 4th quadrant.

2. A point is in 4th quadrant 15 cm away from the vertical plane and 10 cm away from the horizontal plane. Orthographic projection is drawn. What is the distance from point of front view to reference line, top view point to reference line?
a) 15, 10
b) 10, 15
c) 0, 15
d) 10, 0
Answer: b
Explanation: Given object is point the top view gives the distance from vertical plane (15) and front view gives the distance from horizontal plane (10) both are placed overlapped in orthographic projection since the planes need to rotate to draw projection as the object is placed in 4th quadrant.

3. A point is in 4th quadrant, 5 m away from the vertical plane, 1 m away from the horizontal plane and 8 units away from the profile plane. Orthographic projection is drawn. What is the distance from point of front view to point of top view?
a) 6
b) 4
c) 10
d) 2
Answer: b
Explanation: As the point is in 4th quadrant while drawing the projections the planes should rotate along the hinges such that the plane with top view overlaps the front view. So the distance between them is difference of distances from respective planes that is 5 (5-1) here.

4. A point is in 4th quadrant, 15 dm away from the vertical plane, 10 dm away from the horizontal plane and 8 units away from the profile plane. Orthographic projection is drawn. What is the distance from point of front view to point of side view?
a) 25
b) 23
c) 18
d) 5
Answer: b
Explanation: Side view is obtained by turning the profile plane along the hinge with vertical parallel to vertical plane. Side view and front view have same distance from reference line.

Sum of distances from the point to vertical plane and profile plane gives the following that is 15+8 = 23 dm.

5. A point in 4th quadrant is 30 mm away from both the horizontal plane and vertical plane and orthographic projections are drawn. The distance between the points formed by front view and top view is _____

a) 0
b) 30
c) 15
d) 15+ distance from profile

Answer: a

Explanation: Given the point is in 4th quadrant. While drawing orthographic projections the front view and top view overlaps and also the distance of point is same from planes of projections so the distance between them is zero.

6. A point in 4th quadrant is 13 inches away from the horizontal plane and 10 inches away from both the vertical plane and profile plane. Orthographic projections are drawn find the distance from side view and front view.

a) 10
b) 13
c) 20
d) 26

Answer: c

Explanation: Given the point is in 4th quadrant. The front view and side view lie parallel to the horizontal plane when orthographic projections are drawn. The distance from side view to vertical reference is 10 and distance from front view to profile plane is 10. Sum is 10+10= 20 inches.

7. A point in 4th quadrant is 10 units away from both the horizontal plane and profile plane and 15 units away from the vertical plane. Orthographic projections are drawn find the distance from side view and front view.

a) 25
b) 15
c) 30
d) 40

Answer: a

Explanation: Given the point is in 4th quadrant. The front view and side view lie parallel to the horizontal plane when orthographic projections are drawn. The distance from side view

to vertical reference is 15 and distance from front view to profile plane is 10. Sum is 15+10 =25 units.

8. A point in 4th quadrant is 18 units away from the horizontal plane and vertical plane and 17 units away from both the profile plane. Orthographic projections are drawn find the distance from side view and front view.
a) 1
b) 24
c) 35
d) 36
Answer: c
Explanation: Given the point is in 4th quadrant. The front view and side view lie parallel to the horizontal plane when orthographic projections are drawn. The distance from side view to vertical reference is 12 and distance from front view to profile plane is 13. Sum is 18 + 17 =35 units.

9. A point in 4th quadrant is 8 inches away from the horizontal plane and 20 inches away from both the vertical plane and profile plane. Orthographic projections are drawn find the distance from side view and top view.
a) 41.76
b) 20
c) 43.08
d) 16
Answer: a
Explanation: Given the point is in 4th quadrant. Since here distance from side view and top view is asked for that we need the distance between the front view and side view (20+20); front view and top view (20-8) and these lines which form perpendicular to each other gives needed distance, answer is $\sqrt{(40^2+12^2)}$ = 41.76 units.

10. A point in 4th quadrant is 5 m away from both the horizontal plane and profile plane 3 m away from the vertical plane. Orthographic projections are drawn find the distance from side view and top view.
a) 8
b) 8.2
c) 10.19
d) 12.8
Answer: b
Explanation: Given the point is in 4th quadrant. Since here distance from side view and top

view is asked for that we need the distance between the front view and side view (5+3); front view and top view (5-3) and these lines which form perpendicular to each other gives needed distance, answer is √(8^2+2^2) = 8.2 m.

11. A point in 4th quadrant is 13 inches away from the horizontal plane and vertical plane 10 inches away from both the profile plane. Orthographic projections are drawn find the distance from side view and top view.
a) 26
b) 25.6
c) 17.69
d) 13
Answer: a
Explanation: Given the point is in 4th quadrant. Since here distance from side view and top view is asked for that we need the distance between the front view and side view (13+10); front view and top view (13-13) and these lines which form perpendicular to each other gives needed distance, answer is $\sqrt{(26^2+0^2)}$ = 26 inches.

12. A point in 4th quadrant is 15 cm away from the vertical plane and 10 cm away from the horizontal plane, orthographic projections are drawn. What is the distance from side view of point to line of vertical reference?
a) 10
b) 15
c) 25
d) Can’t found
Answer: b
Explanation: Given the point is in 4th quadrant. The distance from the side view of point to line of vertical reference will be the distance from the point to the vertical plane in plane of projection that is as given 15 cm.

13. A point is in 4th quadrant which is 15 inches away from horizontal and 30 inches away from profile plane. Orthographic projections are drawn. What is the distance from the top view to xy reference line?
a) 5
b) 3
c) 8
d) Can’t found
Answer: d
Explanation: Given the point is in 4th quadrant. The xy reference line is between the

vertical plane and horizontal plane but distance from vertical point is not given in question so we can’t found some given information.

14. A point is in 4th quadrant which is 17 dm away from horizontal and 12 dm away from profile plane. Orthographic projections are drawn. What is the distance from the front view to xy reference line?
a) 17
b) 12
c) 5
d) 29
Answer: a
Explanation: Given the point is in 4th quadrant. The distance from front view is given by distance between point and horizontal plane here it is given 17 dm. And distance from vertical reference will be 12 dm.

15. A point is in 4th quadrant which is 18 mm away from vertical and 20 mm away from profile plane. Orthographic projections are drawn. What is the distance from the side view to vertical reference line?
a) 18
b) 2
c) 20
d) Can’t found
Answer: a
Explanation: Given the point is in 4th quadrant. The distance from side view is given by distance between point and vertical plane here it is given 18 mm. And distance from front view will be 20 mm.

Projection of Straight Lines Parallel to Plane

1. If a line AB parallel to both the horizontal plane and vertical plane then the line AB is _____
a) parallel to profile plane
b) lies on profile plane
c) perpendicular to profile plane
d) inclined to profile plane
Answer: c
Explanation: For any line if it is parallel to two perpendicular planes then the line will

definitely perpendicular to other plane perpendicular to both the previous planes. And whether the line lies on the plane or not depends on conditions given but we can't just imagine.

2. A line AB of length 20 cm is placed in 1st quadrant and parallel to profile plane and the end A and B are 15, 10 cm away from the horizontal plane respectively. The length of the line in top view is _____ cm.

a) 11.18
b) 13.2
c) 17.32
d) 19.36

Answer: d

Explanation: The distance between the projectors drawn from A and B to horizontal plane gives the length of line in top view given the line parallel to profile plane. The difference in distances from A and B to horizontal plane is 5 (15-10). Given length is 20 cm so required length is √(〖20〗^2-5^2)= 19.36 cm.

3. A line of length 15 cm is parallel to horizontal plane and makes an angle of 30 degrees with vertical plane. The length of line in top view is ____ cm.

a) 30
b) 15
c) 12.9
d) 7.5

Answer: b

Explanation: Given the line is parallel to horizontal plane and makes an angle of 30 degrees with vertical plane. The top view gives the actual length of the line because the top view is always the projection of objects on horizontal plane to which the line is parallel.

4. A line AB of length 10 cm is placed in 2nd quadrant parallel to vertical plane and 5 cm away from the vertical plane and ends are 7 cm and 4 cm from horizontal plane. The top view and front view lines apart from each other.

a) True
b) False

Answer: b

Explanation: Accordingly the given distances and length if the projections are drawn the front view and top view intersect with each other as for 2nd quadrant the projections of front view and top view overlaps.

5. A line of length 16 cm is parallel to horizontal plane and makes an angle of 30 degrees with vertical plane placed in 3rd quadrant. The length of line in front view is ____ cm.

a) 32
b) 16
c) 13.8
d) 8

Answer: c

Explanation: The line given is parallel to horizontal plane and makes an angle of 30 degrees with vertical plane so the length of line front view will be cosine (30)x actual length of line =13.8 cm. There will be no difference the line is in any quadrant.

6. A line AB of length 15 cm is placed in 4th quadrant and parallel to profile plane and the end A and B are 8, 6 cm away from the horizontal plane respectively. The length of the line in front view is _____ cm.

a) 14.8
b) 9
c) 7
d) 2

Answer: d

Explanation: The difference in distances from A and B to horizontal plane is 2 (8-6) cm. And this front view of line in orthographic projection is perpendicular to the reference line as the line in projection planes is parallel to profile plane.

7. A line AB of length 2 m is placed in 2nd quadrant and parallel to vertical plane and the end A and B are 0.5 m and 0.3 m away from the horizontal plane respectively. The length of the line in top view is _____ m.

a) 1.98
b) 1.97
c) 1.936
d) 2

Answer: a

Explanation: The distance between the projectors drawn from A and B to horizontal plane gives the length of line in top view given the line parallel to vertical plane. The difference in distances from A and B to horizontal plane is 0.2 (0.5-0.3). Given length is 2 m so required length is $\sqrt{(2^2-0.2^2)}$= 1.98m.

8. A line of length 30 inches is parallel to profile plane and makes an angle of 60 degrees with vertical plane. The length of line in top view is ____ inches.
a) 30
b) 15
c) 25.9
d) 51.9
Answer: c
Explanation: Given the line is parallel to profile plane and makes 60 degrees with vertical plane. There will be no need for distance from profile plane. The length of line from top view will be sin(60) x length of the line= sin(60) x 30 inches =25.9 inches.

9. A line of length 25 cm is parallel to horizontal plane and makes an angle of 45 degrees with profile plane. The length of line in side view is ____ cm.
a) 25
b) 12.5
c) 88.3
d) 17.67
Answer: d
Explanation: Given the line is parallel to profile plane and makes 45 degrees with profile plane. There will be no need for distance from profile plane. The length of line from top view will be sin (45) x length of the line= sin (45) x 25 cm = 17.67 cm

10. The length of line parallel to one of the plane of projection planes will show same length if view of that line is drawn on to the plane.
a) True
b) False
Answer: a
Explanation: The length of line parallel to one of the plane of projection planes will show same length if view of that line is drawn on to the plane because the projections on the plane to that line are parallel to other planes.

11. A line parallel to horizontal plane and at a distance of 10 units to it and both the end of line are 6 units away from the vertical plane. Which of the following statement is false?
a) The line parallel to vertical plane
b) The side view of line gives a point.
c) The length of line in front view is 10 units.
d) The length of line in top view is 6 units.

Answer: d

Explanation: The line which is equidistance from a plane is said to be parallel to it. The line which is parallel to two perpendicular planes will be perpendicular to other perpendicular plane to the earlier planes.

12. A line AB of length 12 inches is perpendicular to profile plane at distance of 6 inches from vertical plane and 3 inches from horizontal plane. The distance from line to xy reference line in top view is _____inches.

a) 6
b) 3
c) 12
d) 0

Answer: a

Explanation: Given the line perpendicular to profile plane. Top view gives the length of line and distance from the xy reference line which is the perpendicular distance from the line to vertical plane. It is given in question as 6 inches.

13. A line AB of length 3 m is perpendicular to vertical plane at distance of 2 m from profile plane and 0.5 m from horizontal plane. The distance from line to xy reference line in front view is _____m.

a) 1.5
b) 0.5
c) 2
d) 3

Answer: b

Explanation: Given the line perpendicular to vertical plane. Front view shows as point and distance from the xy reference line and vertical reference line. The distance from horizontal plane is given in question as 0.5 m.

14. A line AB of length 24 cm is parallel to vertical plane and perpendicular to profile plane held at a distance of 5 cm away from horizontal plane and 6 cm away from the vertical plane. The distance from xy reference line to line AB is _____ cm in top view.

a) 6
b) 12
c) 5
d) 7.8

Answer: a

Explanation: Asked for top view, which gives the distance from vertical plane and profile plane because the top view is parallel to horizontal plane. Also given the line is perpendicular to profile plane. the distance from xy reference line to line AB will be 6 cm.

15. A line AB of length 24 cm is parallel to vertical plane and perpendicular to profile plane held at a distance of 5 cm away from horizontal plane and 6 cm away from the vertical plane. The distance from xy reference line to line AB is _____ cm in front view.

a) 6
b) 12
c) 5
d) 7.8

Answer: c

Explanation: Asked for front view, which gives the distance from horizontal plane and profile plane because the front view is parallel to vertical plane. Also given the line is perpendicular to profile plane. the distance from xy reference line to line AB will be 5 cm.

Projection of Line Contained by Plane

1. A line AB is on the vertical plane of projection planes, which view from the following gives the actual length of the line AB?

a) Front view
b) Top view
c) Side view
d) Isometric view

Answer: a

Explanation: Any line that lie or parallel to any of plane in projection planes the true length will be found at view which drawn on to that plane that is here the line is in vertical plane so the view which fall on vertical plane gives the true length which is other than front view.

2. A line AB is on the horizontal plane inclined to vertical plane at 45 degrees, which view from the following gives the actual length of the line AB?

a) Front view
b) Top view
c) Side view
d) Isometric view

Answer: b

Explanation: Any line that lie or parallel to any of plane in projection planes the true length will be found at view which drawn on to that plane that is here the line is in horizontal plane though it is inclined with other planes the true length will be given at view which fall on horizontal plane which is top view.

3. A line AB is on the profile plane inclined such that ends of line are 10, 12 cm away from horizontal plane, which view from the following gives the actual length of the line AB?
a) Front view
b) Top view
c) Side view
d) Isometric view
Answer: c
Explanation: Any line that lie or parallel to any of plane in projection planes the true length will be found at view which drawn on to that plane that is here the line is in profile plane though it's ends are at some distance the true length will be given at view which fall on profile plane which is side view.

4. A line PQ lie in both the vertical plane and profile plane the front and side views of that line coincides at vertical reference line.
a) True
b) False
Answer: a
Explanation: Given a line present in both the planes but it is know that two perpendicular planes meet at a line which is reference line so the given line might present on that line that is coincide with that line so the views also get coincide at that line.

5. If a line RS lie on both vertical and horizontal plane then which of the following two views coincides to give a line again?
a) Front, Top
b) Top, Side
c) Side, Isometric
d) Isometric, Front
Answer: a
Explanation: Isometric view is that the three dimensions of a solid are not only shown in one view. Here given the line is present in vertical and horizontal plane so the line will coincide in the front view and top view.

6. If a line LM lies on profile plane and horizontal plane then which of the following two views coincides to give a line again?
a) Front, Top
b) Top, Side
c) Side, Isometric
d) Isometric, Front
Answer: b
Explanation: Given the line LM is present in both the profile and horizontal planes which are perpendicular so the line will be at reference line formed between them also the line will coincide with the view of top and side.

7. If a line AB lies on horizontal plane and vertical plane then which of the following view gives a point?
a) Side view
b) Top view
c) Front view
d) Isometric view
Answer: a
Explanation: Given the line AB is present in both the vertical and horizontal planes which are perpendicular so the line will be at xy reference line formed between them which is perpendicular to profile plane so the side view gives the point.

8. A line of length 55 mm lies on profile plane whose ends are at a distance of 15 mm and 20 mm to horizontal plane. What is the length in top view?
a) 54.77 mm
b) 5 mm
c) 0 mm
d) 35 mm
Answer: a
Explanation: Given the line is of length 55 mm present on profile plane and ends are at 15 and 20 mm away from horizontal plane. As we imagine the projection planes we can get the top view and distance relation as given here $\sqrt{(55^2-(20-15)^2)}$ =54.77 mm.

9. A line of length 35 mm lies on vertical plane whose ends are at a distance of 15 mm and 10 mm to profile plane. What is the length in top view?
a) 0 mm
b) 35 mm
c) 5 mm

d) 34.64 mm

Answer: c

Explanation: Given the line is of length 35 mm present on vertical plane and ends are at 15 and 10 mm away from profile plane. As we imagine the projection planes we can get the top view and distance relation as given here. 15-10 =5 mm.

10. A line of length 12 cm lies on profile plane whose ends are at a distance of 4 cm and 5 cm to vertical plane. What is the length in top view?

a) 5 cm

b) 12 cm

c) 1 cm

d) 11.9 cm

Answer: c

Explanation: Given the line is of length 12 cm present on profile plane and ends are at 4 cm and 5 cm away from vertical plane. As we imagine the projection planes we can get the top view and distance relation as given here. 5-4 =1 cm.

11. A line of length 10 inches lies on profile plane whose ends are at a distance of 5 inches and 3 inches to vertical plane. What is the length in front view?

a) 9.79

b) 2

c) 10

d) 0

Answer: a

Explanation: Given the line is of length 10 inches present on profile plane and ends are at 5 and 3 inches away from vertical plane. As we imagine the projection planes we can get the front view and distance relation as given here. $\sqrt{(10^2-2^2)}$ = 9.79 inches.

12. A line of length 20 cm lies on profile plane whose ends are at a distance of 5 cm and 7 cm to horizontal plane. What is the length in top view?

a) 7

b) 14.8

c) 15

d) 2

Answer: b

Explanation: Given the line is of length 20 cm present on profile plane and ends are at 5 and 7 cm away from horizontal plane at right angles. As we imagine the projection planes we can get the top view and distance relation as given here. $\sqrt{(20^2-(7-5)^2)}$= 14.8 cm.

13. A line of length 15 dm lies on vertical plane whose ends are at a distance of 5 dm and 7 dm to horizontal plane. What is the length in side view?
a) 7
b) 14.8
c) 15
d) 2
Answer: d
Explanation: Given the line is of length 15 dm present on vertical plane and ends are at 5 and 7 dm away from horizontal plane at right angles. As we imagine the projection planes we can get the side view and distance relation as given here. 7-5 =2 dm.

14. A line of length 15 cm is on vertical plane makes an angle of 50 degrees with horizontal plane. What is the length of line in side view?
a) 0 cm
b) 11.49 cm
c) 9.6 cm
d) 15 cm
Answer: b
Explanation: Given the line of 15 cm length is present on the vertical plane and making an angle of 50 degrees with horizontal plane so side view's length will be 15 x sin (50) = 11.49 cm and front view will be 15 x sin (90-50).

15. A line of length 5 m is on horizontal plane makes an angle of 75 degrees with profile plane. What is the length of line in side view?
a) 1.29 m
b) 4.82 m
c) 2.41 m
d) 5 m
Answer: a
Explanation: Given the line of 5 m length is present on the horizontal plane and making an angle of 50 degrees with profile plane so side view's length will be 5 m x cos (75)=1.29 m and in front view it will be 5 x sin (75).

Projection of Line Perpendicular to one of the Plane

1. A line of length 15 cm touching the vertical plane and perpendicular to it held at a distance of 20 cm away from horizontal plane and 5 cm away from the profile

plane. Which of the following is false?
a) Front view will be point
b) The line is parallel to horizontal and profile plane
c) The length of the line in side view is 15 cm
d) One end of line is on the horizontal plane
Answer: d
Explanation: As with knowledge of views we can say the views from different sides and next if a line is perpendicular to one plane of projection planes it will parallel to other planes. Given one end is on vertical plane so the other end can't be on perpendicular plane.

2. A line of length 15 cm touching the vertical plane and perpendicular to it at a distance of 20 cm away from horizontal plane and 5 cm away from the profile plane. Which view gives the distance from line to profile plane is 5 cm?
a) Front view
b) Left side view
c) Top view
d) Right side view
Answer: c
Explanation: Given a line of length 15 cm touching the vertical plane and perpendicular to it at a distance of 20 cm away from horizontal plane and 5 cm away from the profile plane. So the view gives the distance from line to profile plane is 5 cm is top view.

3. A line of length 7 m touching the vertical plane and perpendicular to it at a distance of 2 m away from horizontal plane and 5 m away from the profile plane. Which view gives the distance from line to horizontal plane is 2 m?
a) Front view
b) Left side view
c) Top view
d) Right side view
Answer:
Explanation: Given a line of length 7 m touching the vertical plane and perpendicular to it at a distance of 2 m away from horizontal plane and 5 m away from the profile plane. So the view gives the distance from line to horizontal plane is 2 m.

4. A line is perpendicular to profile plane, the perpendicular distance from 1st end of the line to vertical plane is 20 cm and perpendicular distance of 2nd end of line to horizontal plane is 10 cm. What is the distance from 1st end of line to vertical

plane?
a) 15 cm
b) 20 cm
c) 10 cm
d) Can’t say
Answer: b
Explanation: As the projection of planes are mutual perpendicular plane if a line is perpendicular to one of the planes then it would be parallel to rest of the planes that is the both ends will be equidistant from plane.

5. A line is perpendicular to horizontal plane, the perpendicular distance from the line to vertical plane is 8 inches and perpendicular distance from the line to profile plane is 5 inches. What is the distance from the line to vertical reference line if it is viewed from front view?
a) 8 inches
b) 5 inches
c) 3 inches
d) 0 inches
Answer: b
Explanation: Given a line is perpendicular to horizontal plane, the perpendicular distance from the line to vertical plane is 8 inches and perpendicular distance from the line to profile plane is 5 inches. So the distance from the line to vertical reference line if it is viewed from front view is 5 inches.

6. A line is perpendicular to profile plane, the perpendicular distance from the line to vertical plane is 10 cm and perpendicular distance from the line to horizontal plane is 5 cm. What is the distance from the line to vertical reference line if it is viewed from side view?
a) 10 cm
b) 5 cm
c) 7.5 cm
d) 0 cm
Answer: b
Explanation: Given the line is perpendicular to profile plane, the perpendicular distance from the line to vertical plane is 10 cm and perpendicular distance from the line to horizontal plane is 5 cm. So the distance from the line to vertical reference line if it is viewed from side view will be 5cm.

7. A line of 12 cm length is perpendicular to profile plane and the least distance from this line to profile plane is 6 cm. This is at a distance of 4 cm from vertical plane and 5 cm from the horizontal plane. What is distance from the point on line far away from the profile plane to profile plane?
a) 12 cm
b) 9 cm
c) 18 cm
d) 6 cm
Answer: c
Explanation: Given a line of 12 cm length is perpendicular to profile plane and the least distance from this line to profile plane is 6 cm. This is at a distance of 4 cm from vertical plane and 5 cm from the horizontal plane. So the distance from the point on line far away from the profile plane to profile plane is 18 cm.

8. A line can’t be perpendicular to two perpendicular planes at the same time.
a) True
b) False
Answer: a
Explanation: Plane is collection of infinite lines the lines present in it will parallel to all the other lines in it. Perpendicular plane is such that the lines present in it will perpendicular to all the lines present in perpendicular plane. So a line perpendicular to one plane will can’t be perpendicular to perpendicular plane.

9. A line of 12 cm length is perpendicular to profile plane and the least distance from this line to profile plane is 6 cm. This is at a distance of 4 cm from vertical plane and 5 cm from the horizontal plane. What is distance from the line to xy reference line in top view?
a) 6 cm
b) 4 cm
c) 5 cm
d) 0 cm
Answer: b
Explanation: Given a line of 12 cm length is perpendicular to profile plane and the least distance from this line to profile plane is 6 cm. This is at a distance of 4 cm from vertical plane and 5 cm from the horizontal plane. So the distance from the line to xy reference line in top view is 4 cm.

10. A line of 12 cm length is perpendicular to profile plane and the least distance from this line to profile plane is 6 cm. This is at a distance of 4 cm from vertical plane and 5 cm from the horizontal plane. What is the distance from the line to xy reference line in front view?
a) 0 cm
b) 6 cm
c) 4 cm
d) 5 cm
Answer: d
Explanation: Given a line of 12 cm length is perpendicular to profile plane and the least distance from this line to profile plane is 6 cm. This is at a distance of 4 cm from vertical plane and 5 cm from the horizontal plane. So the distance from the line to xy reference line in front view is 5 cm.

11. A line is in vertical plane and perpendicular to horizontal plane at a distance of 10 cm from horizontal plane and 5 cm from profile plane. What is the distance from vertical reference line to line?
a) 10 cm
b) 0 cm
c) 5 cm
d) 7.5 cm
Answer: c
Explanation: Given the line is in vertical plane and perpendicular to horizontal plane at a distance of 10 cm from horizontal plane and 5 cm from profile plane. So the distance from vertical reference line to line is 5 cm.

12. A line is in vertical plane and perpendicular to horizontal plane at a distance of 10 cm from horizontal and 5 cm from profile plane. What is the distance from xy reference line to line in top view?
a) 10 cm
b) 5 cm
c) 6 cm
d) 0 cm
Answer: d
Explanation: Top view gives the distance from object to xy reference line and object to reference line between the profile plane and horizontal plane. But here the line is placed

vertical to horizontal plane so the view will be point and also the line is in vertical plane to distance will be zero.

13. If a line is perpendicular to one of the projection planes and lies on other two planes then the line will lies on reference line accordingly.
a) True
b) False
Answer: a
Explanation: If a line is perpendicular to one of the projection planes and lies on other two planes then the line will lies on reference line accordingly. As any line lies on two planes it will definitely passes through the reference line and so which is perpendicular to other plane.

Projection of Line Inclined to one Plane and Parallel to other

1. A line of length 10 cm parallel to horizontal plane and inclined to vertical plane with an angle of 25 degrees. What is the length in front view?
a) 10 cm
b) 0 cm
c) 9.06 cm
d) 4.22 cm
Answer: c
Explanation: Here accordingly the conditions given that line is parallel to horizontal plane and inclined to vertical plane at 25 degrees the front view's length is the cosine of actual length. 10 cm x cos (25) = 9.06 cm.

2. A line of length 5 inches parallel to horizontal plane and inclined to vertical plane with an angle of 35 degrees. What is the length in side view?
a) 7.28 inches
b) 2.86 inches
c) 4.09 inches
d) 5 inches
Answer: b
Explanation: Here accordingly the conditions given that line is parallel to horizontal plane and inclined to vertical plane at 35 degrees the side view's length is the sine of actual length. 5 inches x sin (35) = 2.86 inches.

3. A line of length 0.3 m parallel to profile plane and inclined to vertical plane with an angle of 25 degrees. What is the length in side view?
a) 0.3 m
b) 0.27 m
c) 0.12 m
d) 0.15 m
Answer: a
Explanation: Here accordingly the conditions given that line is parallel to horizontal plane and inclined to vertical plane the side view's length is the actual length of line but front view or top view give different lengths.

4. A line of length 5 dm is parallel to vertical plane and inclined to horizontal plane with an angle of 55 degrees. What is the length in top view?
a) 2.86 dm
b) 4.09 dm
c) 5 dm
d) 2.5 dm
Answer: a
Explanation: Here accordingly the conditions given that line is parallel to vertical plane and inclined to horizontal plane at 55 degrees the top view's length is the cosine of actual length. 5 dm x cos (55) = 2.86 dm.

5. A line of length 5 dm is parallel to vertical plane and inclined to horizontal plane with an angle of 65 degrees. What is the length in side view?
a) 2.11 dm
b) 4.53 dm
c) 5 dm
d) 0 dm
Answer: b
Explanation: Here accordingly the conditions given that line is parallel to vertical plane and inclined to horizontal plane at 55 degrees the top view's length is the cosine of actual length. 5 dm x sin (65) = 4.53 dm.

6. A line of length 15 cm is parallel to horizontal plane and 10 cm away from it and making an angle of 45 degrees with profile plane. The distance from line to xy reference line in front view will be _____
a) 15 cm
b) 10 cm

c) 7.07 cm
d) 10.06 cm
Answer: b
Explanation: Given line is of any length but we are asked distance from line to xy reference line in front view which is the distance from the line to horizontal plane even if the line may inclined to other planes.

7. A line of length 15 cm is parallel to horizontal plane and vertical plane and 10 cm away from vertical plane. The distance from line to vertical reference line in side view will be _____
a) 10 cm
b) 15 cm
c) 0 cm
d) 10.06 cm
Answer: a
Explanation: Given line is of any length but given it is parallel to horizontal plane and vertical plane and 10 cm away from the vertical plane so as the side view gives the distance from horizontal plane and vertical plane here the distance is 10 cm.

8. A line of length 12 inches is parallel to vertical plane and 5 inches away from it and ends of it is 3, 4 inches away from the profile plane. The length of line in top view will be _____
a) 1 inch
b) 3 inches
c) 7 inches
d) 5 inches
Answer: a
Explanation: The line which is parallel to vertical has ends which are 3, 4 inches from profile plane and asked for top view so the difference between the distances of ends to profile plane gives the length in top view 4-3=1 inches.

9. A line of length 12 inches is parallel to vertical plane and 5 inches away from it and ends of it is 3, 4 inches away from the profile plane. The length of line in top view will be _____
a) 11.61 inches
b) 11.31 inches
c) 11.95 inches
d) 30.37 inches

Answer: c
Explanation: Given a line of length 12 inches and parallel to vertical plane and it may be any inches away from it the top view is calculated as given here $\sqrt{(12^2-1^2)}$= 11.95 inches. 1 is because of 4-3 inches = 1 inch.

10. A line of length 12 inches is parallel to vertical plane and 5 inches away from it and making an angle of 5 degrees with profile plane. The distance from line to xy reference line in top view will be _____inches.
a) 5 inches
b) 12 inches
c) 4.9 inches
d) 0.43 inches
Answer: a
Explanation: Given line is of any length but we are asked to find the distance from line to xy reference line in top view which is the distance from the line to vertical plane even if the line may inclined to other planes.

11. A line of length 12 inches is parallel to vertical plane and 5 inches away from it and ends make 6 and 7 inches from profile plane. The length of line in top view will be _____inches.
a) 11.61 inches
b) 11.31 inches
c) 11.95 inches
d) 30.37 inches
Answer: c
Explanation: Given a line of length 12 inches and parallel to vertical plane and it may be any inches away from it the top view is calculated as given here $\sqrt{(12^2-1^2)}$= 11.95 inches. 1 is because of 7-6 inches = 1 inch.

12. A line of length 12 cm is parallel to profile plane and 5 cm away from it and ends make 6 and 7 cm from horizontal plane. The length of line in side view will be _____cm.
a) 5 cm
b) 12 cm
c) 11.95 cm
d) 11.31 cm
Answer: b
Explanation: The front view of line on or parallel to vertical plane gives the actual length.

The top view of line on or parallel to horizontal plane gives the actual length. The side view of line on or parallel to the profile plane gives the actual length.

13. A line of length 25 cm is parallel to horizontal plane and 10 cm away from it and ends make 10 and 5 cm from profile plane. The length of line in front view will be _____inches.
a) 10 cm
b) 25 cm
c) 24.49 cm
d) 5 cm
Answer: c
Explanation: Given a line of length 25 cm and parallel to horizontal plane and it may be any inches away from it the front view is calculated as given here $\sqrt{(25^2-5^2)}$= 24.49 inches. 5 is because of 10-5 inches = 5 cm.

Projection of Line Inclined to both the Planes

1. A line of length 10 cm at first lied on the horizontal plane parallel to vertical plane and then keeping one of its ends fixed turned 30 degrees with respect to vertical plane and then turned 45 degrees with respect to horizontal plane. What is the length of line in top view?
a) 5 cm
b) 7.07 cm
c) 3.53 cm
d) 10 cm
Answer: b
Explanation: First imagine the line in horizontal plane parallel to vertical plane as here we are asked to find the top view's length even if the line is rotated within the horizontal plane the line length will not change and then rotated with respect to horizontal plane which is calculated as follows. 10 x cos (45)= 7.07 cm.

2. A line of length 10 cm at first lied on the horizontal plane parallel to vertical plane and then keeping one of its ends fixed turned 30 degrees with respect to vertical plane and then turned 45 degrees with respect to horizontal plane. What is the length of line in front view?
a) 8.66 cm
b) 7.07 cm

c) 3.53 cm
d) 6.12 cm
Answer: a
Explanation: First imagine the line in horizontal plane parallel to vertical plane as here we are asked to find the front view's length even if the line is rotated with respect to horizontal plane the line length will not change and then rotated with respect to the vertical plane which is calculated as follows 10 x cos (30) =8.66 cm.

3. A line of length 15 cm at first lied on the vertical plane parallel to horizontal plane and then keeping one of its ends fixed turned 30 degrees with respect to horizontal plane and then turned 50 degrees with respect to vertical plane. What is the length of line in top view?
a) 9.6 cm
b) 7.5 cm
c) 12.99 cm
d) 11.49 cm
Answer: c
Explanation: First imagine the line in vertical plane parallel to horizontal plane as here we are asked to find the top view's length so even if the line is rotated with respect to the horizontal plane the line length will not change and then rotated with respect to the vertical plane which is calculated as follows 15 x cos (30) =12.99 cm.

4. A line of length 15 cm at first lied on the vertical plane parallel to horizontal plane and then keeping one of its ends fixed turned 30 degrees with respect to horizontal plane and then turned 50 degrees with respect to vertical plane. What is the length of line in front view?
a) 9.6 cm
b) 12.99 cm
c) 7.5 cm
d) 11.49 cm
Answer: a
Explanation: First imagine the line in vertical plane parallel to horizontal plane as here we are asked to find the front view's length so even if the line is rotated with respect to the vertical plane the line length will not change and also rotated with respect to the horizontal plane which is calculated as follows 15 x cos (50) = 9.6 cm.

5. A line of length 15 cm at first lied on the profile plane parallel to horizontal plane and then keeping one of its ends fixed turned 30 degrees with respect to

horizontal plane and then turned 50 degrees with respect to profile plane. What is the length of line in top view?
a) 9.6 cm
b) 12.99 cm
c) 7.5 cm
d) 11.49 cm
Answer: b
Explanation: First imagine the line in profile plane parallel to horizontal plane as here we are asked to find the top view's length so even if the line is rotated within the horizontal plane the line length will not change and also rotated with respect to the horizontal plane which is calculated as follows 15 x cos (30) = 12.99 cm.

6. A line of length 15 cm at first lied on the profile plane parallel to horizontal plane and then keeping one of its ends fixed turned 30 degrees with respect to horizontal plane and then turned 50 degrees with respect to profile plane. What is the length of line in side view?
a) 9.6 cm
b) 12.99 cm
c) 7.5 cm
d) 11.49 cm
Answer: a
Explanation: First imagine the line in profile plane parallel to horizontal plane as here we are asked to find the side view's length so even if the line is rotated within the profile plane the line length will not change and then rotated with respect to the profile plane which is calculated as follows 15 x cos (50) = 9.6 cm.

7. A line of length 20 cm at first lied on the profile plane parallel to vertical plane and then keeping one of its ends fixed turned 40 degrees with respect to vertical plane and then turned 20 degrees with respect to profile plane. What is the length of line in top view?
a) 18.79 cm
b) 6.8 cm
c) 12.85 cm
d) 15.32 cm
Answer: c
Explanation: First imagine the line in profile plane parallel to vertical plane as here we are asked to find the top view's length so even if the line is rotated within the horizontal plane

the line length will not change and then rotated with respect to the horizontal plane which is calculated as follows 20 x sin (40) = 12.85 cm.

8. A line of length 20 cm at first lied on the profile plane parallel to vertical plane and then keeping one of its ends fixed turned 40 degrees with respect to vertical plane and then turned 20 degrees with respect to profile plane. What is the length of line in side view?
a) 18.79 cm
b) 6.8 cm
c) 12.85 cm
d) 15.32 cm
Answer: a
Explanation: First imagine the line in profile plane parallel to vertical plane as here we are asked to find the side view's length so even if the line is rotated within the profile plane the line length will not change and also rotated with respect to the profile plane which is calculated as follows 20 x cos (20) = 18.79 cm.

9. A line of length 15 cm at first lied on the vertical plane parallel to horizontal plane and then keeping one of its ends fixed turned 35 degrees with respect to horizontal plane and then turned 40 degrees with respect to vertical plane. What is the length of line in front view?
a) 9.6 cm
b) 11.4 cm
c) 12.28 cm
d) 8.6 cm
Answer: d
Explanation: First imagine the line in profile plane parallel to vertical plane as here we are asked to find the side view's length so even if the line is rotated within the vertical plane the line length will not change and also rotated with respect to the vertical plane which is calculated as follows 15 x sin (35) = 8.6 cm.

10. A line of length 15 cm at first lied on the vertical plane parallel to horizontal plane and then keeping one of its ends fixed turned 35 degrees with respect to horizontal plane and then turned 40 degrees with respect to vertical plane. What is the length of line in top view?
a) 9.6 cm
b) 11.4 cm
c) 12.28 cm

d) 8.6 cm

Answer: b

Explanation: First imagine the line in profile plane parallel to vertical plane as here we are asked to find the side view's length so even if the line is rotated within the horizontal plane the line length will not change and also rotated with respect to the horizontal plane which is calculated as follows 15 x cos (40) =11.4 cm.

11. A line of length X cm lied on horizontal plane turned 60 degrees with respect to horizontal plane by keeping one of its ends fixed and attained length of Y cm top view. Which of the following statement is true?

a) X =Y

b) X=2 * Y

c) X= ½ * Y

d) X >Y

Answer: c

Explanation: As cos (60) =0.5. The X would equal to ½ *Y. The relation would be like this. X=Y happens if we watch from front view. And X will not be greater than Y as X is made to turn either it would stay same or become less than it.

12. There will be no change in length if the line is viewed parallel to plane on which the line is present and also if the line is rotated with respect to perpendicular planes.

a) True

b) False

Answer: a

Explanation: There will be no change in length if the line is viewed parallel to plane on which the line is present and also if the line is rotated with respect to perpendicular planes. If the line is rotated with respect to the same plane on which it is located then a new measure is formed.

13. A line of length 25 cm at first lied on the profile plane parallel to horizontal plane and then keeping one of its ends fixed turned 55 degrees with respect to horizontal plane and then turned 65 degrees with respect to profile plane. What is the length of line in top view?

a) 22.65 cm

b) 10.56 cm

c) 14.33 cm

d) 20.47 cm

Answer: c

Explanation: First imagine the line in profile plane parallel to vertical plane as here we are asked to find the side view's length so even if the line is rotated within the horizontal plane the line length will not change and also rotated with respect to the horizontal plane which is calculated as follows 25 x cos (55)= 14.33 cm.

14. A line of length 25 cm at first lied on the profile plane parallel to horizontal plane and then keeping one of its ends fixed turned 55 degrees with respect to horizontal plane and then turned 65 degrees with respect to profile plane. What is the length of line in side view?

a) 22.65 cm

b) 10.56 cm

c) 14.33 cm

d) 20.47 cm

Answer: b

Explanation: First imagine the line in profile plane parallel to vertical plane as here we are asked to find the side view's length so even if the line is rotated within the profile plane the line length will not change and also rotated with respect to the profile plane which is calculated as follows 25 x cos(65)= 10.56 cm.

Line contained by a Plane Perpendicular to Both the Reference Planes

1. Line contained by a plane perpendicular to both the reference planes will lie on the _____ plane.

a) horizontal plane

b) vertical plane

c) straight plane

d) profile plane

Answer: d

Explanation: In general the horizontal plane and the vertical plane are referred as reference planes. So the plane which is perpendicular to the reference planes is profile plane which is also called as picture plane.

2. If a line is in profile plane making an angle of 30 degrees with vertical plane. In which angle the line makes with the horizontal plane?

a) Can't say

b) 90 degrees
c) 0 degrees
d) 60 degrees
Answer: d
Explanation: If a line placed within the plane the angles made by the line with other perpendicular planes will be complimentary that means their sum will be equal to 90 degrees.90 degrees- 30 degrees = 60 degrees.

3. The view which gives the actual length of line in profile plane is _____
a) front view
b) top view
c) side view
d) bottom view
Answer: c
Explanation: The view which is watched parallel to the plane gives the actual length of line here as is it profile plane the view will be side view if it comes to vertical plane the view is front view and if it comes to the horizontal plane the view is top view.

4. The length of line placed in profile plane from front view is product of actual length and ____(angle with horizontal plane).
a) cosine
b) sine
c) tangent
d) secant
Answer: b
Explanation: As the angle is between the line and horizontal plane the height is the length of line in front view. If angle with vertical is given the length will be product of actual length and cosine of angle between the line and vertical plane.

5. The length of line placed in profile plane and making an angle of 30 degrees with the vertical is 5 cm from front view. What is the actual length?
a) 5 cm
b) 8.66 cm
c) 10 cm
d) 5.77 cm
Answer: d
Explanation: The length of line making an angle with vertical if viewed from front view the

length will be the product of length of line cosine of angle given. L * cosine (30) =5 cm, X= 5/ cosine (30)= 5.77 cm.

6. The length of line placed in profile plane and making an angle of 40 degrees with the horizontal is 10cm from top view. What is the actual length?
a) 7.66 cm
b) 6.4 cm
c) 13.05 cm
d) 15.55 cm
Answer: c
Explanation: The length of line making an angle with horizontal if viewed from front view the length will be the product of length of line cosine of angle given. X * cosine (40) =10 cm, L= 10/ cosine (40)= 13.05 cm.

7. The length of line placed in profile plane and making an angle of 55 degrees with the vertical is 2 m from side view. What is the actual length?
a) 2 m
b) 3.4 m
c) 2.4 m
d) 1.6 m
Answer: a
Explanation: The view given is side view in this view whatever the angle made by line with any of the other planes except the profile plane it gives the actual length. So here the actual length and side view length become equal.

8. The length of line placed in profile plane and making an angle of 155 degrees with the horizontal is 3 cm from top view. What is the actual length?
a) 3.31 cm
b) 7.09 cm
c) 1.26 cm
d) 2.7 cm
Answer: a
Explanation: The line is making 155 degrees is equal to the line making 25 degrees as 180-155 =25. The length of line from top view will be cosine of actual length. L * cosine (25) =3 cm, L= 3/ cosine (25)= 3.31 cm.

9. A line of length 20 cm is placed in profile plane making an angle of 65 degrees with the horizontal. What is the length of line front view?

a) 18.12 cm
b) 8.45 cm
c) 20 cm
d) 22.06 cm
Answer: a
Explanation: The length of line making an angle with horizontal if viewed from front view the length will be the product of length of line sine of angle given. L= length given x sin (65), L=20 cm x sin (65) = 18.12 cm.

10. A line of length 20 cm is placed in profile plane making an angle of 65 degrees with the horizontal. What is the length of line top view?
a) 18.12 cm
b) 8.45 cm
c) 20 cm
d) 22.06 cm
Answer: b
Explanation: The length of line making an angle with horizontal if viewed from top view the length will be the product of length of line cosine of angle given. L= length given x cosine (65), L=20 cm x cosine (65) = 8.45 cm.

11. A line of length 20 cm is placed in profile plane making an angle of 65 degrees with the horizontal. What is the length of line side view?
a) 18.12 cm
b) 8.45 cm
c) 20 cm
d) 22.06 cm
Answer: c
Explanation: The view given is side view in this view whatever the angle made by line with any of the other planes except the profile plane it gives the actual length. So here the actual length and side view length become equal.

12. A line of length 1 m is placed in profile plane making an angle of 180 degrees with the horizontal. What is the length of line top view?
a) 1m
b) 0 m
c) 0.5 m
d) 1.5 m
Answer: a

Explanation: Given the line is making 180 degrees with the horizontal which is half revolution so the length will be constant from top view as in the side view but in front view the length will be zero meter.

True Length of a Straight Line and its Inclinations with the Reference Planes

1. A line which is parallel to vertical plane and making an angle of 50 degrees with horizontal has a length of 5 cm from side view. What is its true length?
a) 6.52 cm
b) 7.77 cm
c) 3.2 cm
d) 3.8 cm
Answer: a
Explanation: True length of line parallel to vertical plane and making angle with horizontal plane can be of two values either from top view or side view but from front view the length will be given length. As here it is given side view L= 5/sin (50).

2. A line which is parallel to profile plane and making an angle of 40 degrees with horizontal has a length of 4 cm from top view. What is its true length?
a) 3.06 cm
b) 5.22 cm
c) 6.22 cm
d) 2.57 cm
Answer: b
Explanation: True length of line parallel to profile plane and making angle with horizontal plane can be of two values either from top view or front view but from side view the length will be given length. As here it is given top view L= 4/cos (40).

3. A line which is parallel to vertical plane and making an angle of 20 degrees with profile has a length of 5 cm from top view. What is its true length?
a) 1.71 cm
b) 14.61 cm
c) 5.32 cm
d) 4.69 cm
Answer: b
Explanation: True length of line parallel to vertical plane and making angle with profile

plane can be of two values either from top view or side view but from front view the length will be given length. As here it is given top view L= 5/sin (20).

4. A line which is parallel to vertical plane and making an angle of 50 degrees with horizontal plane has a length of 5 cm from side view. What is its true length?
a) 3.2 cm
b) 3.8 cm
c) 7.77 cm
d) 6.52 cm
Answer: c
Explanation: True length of line parallel to vertical plane and making angle with horizontal plane can be of two values either from top view or side view but from front view the length will be given length. As here it is given side view L= 5/cos (50).

5. A line which is parallel to horizontal plane and making an angle of 75 degrees with vertical has a length of 5 cm from top view. What is its true length?
a) 4.82 cm
b) 1.29 cm
c) 19.31 cm
d) 5 cm
Answer: d
Explanation: True length of line parallel to vertical plane and making angle with horizontal can be of two values either from top view or side view but from front view the length will be given length. As here it is given top view the length given is true length.

6. A line which is parallel to vertical plane is made to turn to an angle of 50 degrees with horizontal and then turned to an angle of 40 degrees with vertical plane and now the line has a length of 5 cm from top view. What is its true length?
a) 7.77 cm
b) 6.52 cm
c) 3.8 cm
d) 3.2 cm
Answer: a
Explanation: True length of line parallel to vertical plane and making angle with horizontal can be of two values either from top view or side view but from front view the length will be given length. As here it is given top view L=5/cosine (50).

7. A line which is parallel to horizontal plane is made to turn to an angle of 35 degrees with vertical and then turned to an angle of 45 degrees with horizontal plane and now the line has a length of 8.5cm from top view. What is its true length?
a) 7.37 cm
b) 12.02 cm
c) 10.9 cm
d) 6.01 cm
Answer: b
Explanation: True length of line parallel to horizontal plane and making angle with respect to horizontal can be of two values either from top view or side view but from front view the length will be given length. As here it is given top view L= 8.5/cos(45).

8. A line which is parallel to horizontal plane is made to turn to an angle of 35 degrees with vertical and then turned to an angle of 45 degrees with horizontal plane and now the line has a length of 9 cm from front view. What is its true length?
a) 7.37 cm
b) 5.16 cm
c) 10.9 cm
d) 15.69 cm
Answer: c
Explanation: True length of line parallel to horizontal plane and making angle with vertical can be of two values either from front view or side view but from top view the length will be given length. As here it is given front view L = 9/cos(35).

9. A line parallel to profile plane is held at 30 degrees with horizontal plane and front view gives 2 cm of length. What is the true length of line?
a) 1 cm
b) 1.73 cm
c) 2.3 cm
d) 4 cm
Answer: d
Explanation: True length of line parallel to profile plane and making angle with horizontal can be of two values either from top view or front view but from side view the length will be given length. As here it is given front view L= 2/sin (30).

10. A line parallel to vertical plane is held at 35 degrees with horizontal plane and side view gives 3 cm of length. What is the true length of line?
a) 5.2 cm
b) 3.66 cm
c) 2.45 cm
d) 1.72 cm
Answer: a
Explanation: True length of line parallel to vertical plane and making angle with horizontal can be of two values either from top view or side view but from front view the length will be given length. As here it is given side view L= 3/sin (35).

11. A line parallel to profile plane is held at 25 degrees with vertical plane and side view gives 2 cm of length. What is the true length of line?
a) 4.7 cm
b) 2 cm
c) 2.2 cm
d) 0.84 cm
Answer: b
Explanation: True length of line parallel to profile plane and making angle with vertical can be of two values either from top view or front view but from side view the length will be given length. As here it is given side view the length will be true length.

12. A line parallel to profile plane is held at 85 degrees with vertical plane and top view gives 20 cm of length. What is the true length of line?
a) 1.7 cm
b) 229 cm
c) 20.07 cm
d) 19.9 cm
Answer: c
Explanation: True length of line parallel to profile plane and making angle with vertical plane can be of two values either from top view or front view but from side view the length will be given length. As here it is given top view L= 20/cos(5).

13. A line parallel to horizontal plane is held at 65 degrees with profile plane and front view gives 6 cm of length. What is the true length of line?
a) 5.43 cm
b) 14.19 cm
c) 2.5 cm

d) 6.62 cm

Answer: d

Explanation: True length of line parallel to horizontal plane and making angle with profile plane can be of two values either from front view or side view but from top view the length will be given length. As here it is given front view L= 6/sin (65).

Traces of a Line

1. When a line is inclined to a plane, produced if necessary. The point in which the line meets the plane is called its _____

a) meeting point

b) locus

c) complete end

d) trace

Answer: d

Explanation: When a line is inclined to a plane, it will meet that plane, produced if necessary. The point in which the line or line produced meets the plane is called its trace. Even for planes if extended meet the reference planes at its traces.

2. If a line is parallel to both the horizontal plane and vertical plane. It will have two traces.

a) True

b) False

Answer: b

Explanation: The given statement is false if a line is parallel to both horizontal plane and vertical plane the line will not meet those planes so the line will not have traces on those planes but it will have trace on profile plane.

3. If a line meets horizontal plane the point of intersection is called _____

a) horizontal trace

b) regular trace

c) parallel trace

d) general trace

Answer: a

Explanation: The point of intersection of a line with horizontal plane is called horizontal

trace, usually denoted by H.T. as this the point of intersection of a line with vertical plane is called vertical trace and denoted by V.T.

4. If a line meets vertical plane the point of intersection is called _____
a) vertical trace
b) straight trace
c) perpendicular trace
d) general trace
Answer: a
Explanation: The point of intersection of a line with vertical plane is called vertical trace and denoted by V.T. like this the point of intersection of a line with horizontal plane is called horizontal trace, usually denoted by H.T.

5. A line is perpendicular to horizontal plane. Its horizontal trace coincides with its _____ view.
a) front
b) top
c) side
d) isometric
Answer: b
Explanation: If a line is perpendicular to the horizontal plane then its horizontal trace coincides with its top view which is a point. It has no vertical trace because the line is parallel to vertical plane the line will not touch the vertical plane.

6. A line is perpendicular to vertical plane. Its vertical trace coincides with its _____ view.
a) front
b) top
c) side
d) isometric
Answer: a
Explanation: If a line is perpendicular to the vertical plane then its vertical trace coincides with its front view which is a point. It has no horizontal trace because the line is parallel to horizontal plane the line will not touch the horizontal plane.

7. If a line has one of its ends in the horizontal plane. Its horizontal trace coincides with the _____
a) front

b) top
c) side
d) isometric
Answer: b
Explanation: As the line cuts the horizontal plane the projection of that line on horizontal plane coincides from top view and so the horizontal trace which is the point formed by cutting the line with horizontal plane also coincides with the corresponding projection end.

8. If a line has one of its ends in the vertical plane. Its vertical trace coincides with the _____
a) front
b) top
c) side
d) isometric
Answer: a
Explanation: As the line cuts the vertical plane the projection of that line on vertical plane coincides from front view and so the vertical trace which is the point formed by cutting the line with vertical plane also coincides with the corresponding projection end.

9. If a line parallel to one plane then the line will not have trace on that plane.
a) True
b) False
Answer: a
Explanation: Trace is that the point of intersection of line with any plane then the point of intersection is called the trace of the line with respect to given plane. So a line which is going to intersect will not be parallel to it.

10. A line AB has its one say B end in horizontal plane and vertical plane then horizontal trace and vertical trace will coincide in _____line.
a) xy reference
b) vertical reference
c) above xy reference
d) below xy reference
Answer: a
Explanation: Vertical reference will be line formed by profile plane and vertical plane. And if trace is above or below the xy reference line it would meet vertical or horizontal plane at only once. So if single end is going to meet both planes it would definitely be on xy reference line.

11. A line AB is parallel to vertical plane and inclined to horizontal plane and held 5 cm apart from vertical plane. The expected trace will be placed at _____
a) above 5 cm from xy reference, on vertical plane
b) below 5 cm from xy reference, on horizontal plane
c) on the xy reference
d) above 5 cm from vertical reference, on vertical plane
Answer: b
Explanation: As the given line is parallel to vertical plane the trace will not be on the vertical plane. And also given the line is 5 cm apart from the vertical plane and also the line is parallel to vertical so the trace would lie below 5 cm from xy reference, on horizontal plane.

12. A line AB is placed in such a way that the distance from A and B to vertical plane are 5 and 10 cm and distances from A and B to horizontal plane are 5 and 10 cm each. The traces would present _____
a) one on above and other below reference line
b) below the reference line
c) on xy reference line
d) above the reference line
Answer: c
Explanation: As the corresponding distances from vertical plane and horizontal plane are same we can say the line may act as symmetry for both the vertical and horizontal plane so the traces would fall on xy reference line.

13. A line AB is placed in such a way that the distance from A and B to vertical plane are 5 and 10 cm and distances from A and B to horizontal plane are 4 and 8 cm each. The traces would present _____
a) one on above and other below reference line
b) below the reference line
c) on xy reference line
d) above the reference line
Answer: c
Explanation: As the corresponding distances from vertical plane and horizontal plane are in same ratio we can say the line may act as symmetry for both the vertical and horizontal plane so the traces would fall on xy reference line.

Basics of Planes

This set of Engineering Drawing Multiple Choice Questions & Answers (MCQs) focuses on “Basics of Planes”.

1. Oblique planes come under _____
a) planes perpendicular to both reference planes
b) planes perpendicular to one reference plane and inclined to other reference plane
c) planes inclined to both the reference planes
d) planes parallel to one reference plane and perpendicular to other reference plane

Answer: c

Explanation: Planes may be divided into two main types. i. Perpendicular planes and ii. Oblique planes, planes which are held inclined to both the reference planes are called oblique planes, the rest come under perpendicular planes.

2. The planes which are perpendicular to both the reference plane (horizontal and vertical) are visible clearly only if we watched from _____
a) front view
b) top view
c) side view
d) isometric view

Answer: c

Explanation: As the required plane is perpendicular to both horizontal plane and vertical plane the top view and front view gives a line in projections so only from side which is perpendicular to both the plane as the required plane the object will appear clearly isometric view also will not give vivid picture.

3. A plane is held parallel to horizontal plane in which view we can watch drawing on that plane?
a) Top view
b) Front view
c) Back view
d) Side view

Answer: a

Explanation: If a plane is parallel to one of the reference plane the projection parallel to plane gives the true shape and size as here plane is parallel to horizontal plane the actual shape is watched from top view.

4. A circle is placed at 20 degrees with vertical the view from top view will be _____

a) line
b) circle
c) ellipse
d) oval

Answer: c

Explanation: If a circle is parallel to one of the reference plane the projection parallel to plane gives the true shape and size but here plane is inclined so circle transformed to ellipse. If observer also inclined along with plane the circle will remain circle only.

5. A square is held 30 degrees with horizontal plane and turned 30 degrees with respect to vertical plane keeping earlier condition constant. The top view will be _____

a) line
b) square
c) rectangle
d) parallelogram

Answer: c

Explanation: If a square is parallel to one of the reference plane the projection parallel to plane gives the true shape and size as here plane is inclined so square transformed to rectangle and further it turned parallel to observer so no change in shape and size.

6. A square is held 30 degrees with horizontal plane and turned 30 degrees with respect to vertical plane keeping earlier condition constant. The front view will be _____

a) line
b) square
c) rectangle
d) parallelogram

Answer: d

Explanation: If a square is parallel to one of the reference plane the projection parallel to plane gives the true shape and size as here plane is inclined so square transformed to rectangle and further it turned inclined in other way which gives parallelogram shape for square.

7. A triangle is placed perpendicular to both the reference planes (horizontal and vertical plane) which of the following statement is true.

a) Front view-line, top view- triangle
b) Front view-triangle, top view- line
c) Front view –line, top view-line
d) Front view-triangle, side view- line

Answer: c

Explanation: The plane which is perpendicular to both the reference planes (horizontal and vertical plane) is called profile plane or picture plane. The planes parallel to these have top view and front view as straight line.

8. When a plane is perpendicular to both the reference planes, its traces are perpendicular to _____

a) xy reference line
b) lines on horizontal plane
c) lines on vertical plane
d) lines on given plane

Answer: a

Explanation: When a plane is perpendicular to both the reference planes, its traces are perpendicular to xy reference line and intersect at xy reference line even when the planes are inclined with both reference planes the traces intersect at xy line.

9. A plane perpendicular to vertical plane and inclined to horizontal plane then the vertical trace of that plane will be _____

a) parallel to horizontal plane
b) perpendicular to horizontal plane
c) parallel to xy reference line
d) inclined to horizontal plane

Answer: d

Explanation: When a plane is perpendicular to one of the reference planes and inclined to the other, its inclination is shown by the angle which its projection on the plane to which it is perpendicular, makes with xy. Its projection on the plane to which it is inclined, is smaller than the plane itself.

10. A plane parallel to vertical plane then which of the following is false statement.

a) vertical trace will not present
b) horizontal trace is parallel to xy
c) front view give true shape and size
d) top view give true shape and size

Answer: d

Explanation: When a plane is parallel to a reference plane, it has no trace on that plane. Its trace on the other reference plane, to which the earlier reference plane is perpendicular, is parallel to xy reference line.

11. When a plane is perpendicular to a reference plane, its projection on that plane shows its true shape and size.

a) True

b) False

Answer: b

Explanation: When a plane is perpendicular to a reference plane, its projection on that plane is a straight line. When a plane is parallel to a reference plane, its projection on that plane shows its true shape and size.

12. The traces of plane are not intersecting at xy reference line then the plane is _____

a) inclined to H.P and perpendicular to V.P

b) parallel to H.P and perpendicular to V.P

c) perpendicular to both reference planes

d) inclined to V.P and perpendicular to H.P

Answer: b

Explanation: When a plane has two traces, they, produced if necessary, intersect in xy except when both are parallel to xy reference line as in case of some oblique planes. And in those some specific are plane parallel to one reference and perpendicular to other.

Projection of Planes Parallel to one of the Reference Plane

1. An equilateral triangle of side 10 cm is held parallel to horizontal plane and base is parallel to xy reference line. The length of line from front view will be _____

a) 8.66 cm

b) 10 cm

c) 0 cm

d) 12.47 cm

Answer: b

Explanation: Just by visualizing we can get picture and then as the base is parallel to xy

reference plane the side view and front view will be a line and front view gives line of length equal to side of triangle given and side view gives the height of triangle.

2. A square of side 10 cm is held parallel to vertical plane and one diagonal is perpendicular to xy reference plane. The length of line in top view will be _____

a) 10 cm
b) 14.14 cm
c) 7.07 cm
d) 0 cm

Answer: b

Explanation: Given the square is parallel to vertical plane ad diagonal is perpendicular to xy reference plane the top view and side gives a line and both of same length which is equal to diagonal length $L= 2 \times \sqrt{(5^2+5^2)} = 14.14$ cm.

3. A hexagon is placed parallel to vertical plane which of the following projection is true?

a) Front view-line, top view- hexagon
b) Front view- hexagon, top view- line
c) Front view –line, top view-line
d) Top view- hexagon, side view- line

Answer: b

Explanation: Given a hexagon parallel to vertical plane so the plane containing hexagon in perpendicular to horizontal plane and profile plane. The top view and side view gives a line and front view gives the true shape and size of hexagon.

4. A pentagon is placed parallel to horizontal plane which of the following projection is true?

a) Front view-line, top view- pentagon
b) Front view- pentagon, top view- line
c) Front view –line, top view-line
d) Top view- line, side view- line

Answer: a

Explanation: Given a pentagon parallel to horizontal plane so the plane containing pentagon in perpendicular to vertical plane and profile plane. The front view and side view gives a line and top view gives the true shape and size of pentagon.

5. A rectangle is placed parallel to profile plane which of the following projection is true?
a) Front view-line, top view- rectangle
b) Front view- rectangle, top view- line
c) Front view –line, top view-line
d) Top view- rectangle, side view- line
Answer: c
Explanation: Given a rectangle parallel to profile plane so the plane containing rectangle in perpendicular to horizontal plane and vertical plane. The top view and front view gives a line and side view gives the true shape and size of hexagon.

6. A circle is placed parallel to vertical plane which of the following projection is false?
a) Front view-circle, top view- line
b) Length in top view and side view will be same
c) Circle is perpendicular to horizontal plane
d) The traces of plane containing this circle intersect at xy reference line
Answer: d
Explanation: Given a circle parallel to vertical plane so the plane containing circle in perpendicular to horizontal plane and profile plane. The top view and side view gives a line and front view gives the true shape and size of circle. The traces will intersect at line formed by intersection of profile plane and horizontal plane.

7. An ellipse is placed parallel to vertical plane which of the following projection is false?
a) Front view-ellipse, top view- line
b) Length in top view and side view will be same
c) Ellipse is perpendicular to horizontal plane
d) The traces of plane containing this circle will not intersect at xy reference line
Answer: b
Explanation: Given an ellipse parallel to vertical plane so the plane containing ellipse in perpendicular to horizontal plane and profile plane. The top view and side view gives a line and front view gives the true shape and size of hexagon. As the object is ellipse which has major and minor axis the views show different lengths.

8. While drawing projections if a triangle is parallel to horizontal plane, top should be drawn first and projections are drawn to it to get front view.
a) True

b) False

Answer: a

Explanation: Given a triangle parallel to horizontal plane so the front view and side view gives a line and top view gives the true shape and size of triangle so top view should be drawn first with specifications given and then projections to further gives the front view.

9. If a plane is parallel to one of the reference plane then the projection onto the other reference planes would be a line.

a) True

b) False

Answer: a

Explanation: If a plane is only parallel to vertical plane then it is perpendicular to horizontal plane and profile plane. The top view and side view gives a line and front view gives the true shape and size of plane.

10. An equilateral triangle of side 10 cm is held parallel to horizontal plane and base is parallel to xy reference line. The length of line from side view will be _____

a) 8.66 cm

b) 10 cm

c) 0 cm

d) 12.47 cm

Answer: a

Explanation: Just by visualizing we can get picture and then as the base is parallel to xy reference plane the side view and front view will be a line and front view gives line of length equal to side of triangle given and side view gives the height of triangle.

11. A square of side 10 cm is held parallel to vertical plane and one diagonal is making 45 degrees with xy reference plane. The length of line in top view will be _____

a) 10 cm

b) 14.14 cm

c) 7.07 cm

d) 0 cm

Answer: a

Explanation: Given the square is parallel to vertical plane ad diagonal is making 45 degrees with xy reference plane the top view and side gives a line and both of same length

which is equal to length of side of square because in square angle between the diagonal and side is 45 degrees.

12. The top view, front view and side view of a triangle parallel to vertical plane, circle parallel to profile plane and rectangle parallel to horizontal plane respectively are _____
a) line, circle, line
b) triangle, line, rectangle
c) triangle, line, line
d) line, line, line
Answer: d
Explanation: If a plane is parallel to vertical plane then the top view and side view gives a line and front view gives the true shape. If a plane is parallel to horizontal plane then the front view and side view gives a line and top view gives the true shape. If a plane is parallel to profile plane then the top view and front view gives a line and side view gives the true shape.

Projection of Planes Inclined to one of the Reference Plane & Perpendicular to other

1. When a plane is perpendicular to one plane and inclined to other reference plane then the projections are obtained in 2 stages.
a) True
b) False
Answer: a
Explanation: When a plane is inclined to a reference plane, its projections may be obtained in 2 stages. In the initial stage, the plane is assumed to be parallel to that reference plane to which it has to be made inclined. It is then titled to the required inclination in the second stage.

2. A Square is placed perpendicular to vertical plane and inclined to horizontal which of the following is true?
a) Front view-line, top view- square
b) Front view- line, top view- rectangle
c) Front view –line, top view-line
d) Top view-line, side view- rectangle
Answer: b

Explanation: When a plane is perpendicular to one of the reference planes and inclined to the other, its inclination is shown by an angle which its projection on the plane to which it is perpendicular, makes with xy. Its projection on the plane to which it is inclined, is smaller than the plane itself.

3. A circle is placed perpendicular to vertical plane and inclined to horizontal which of the following is true?
a) Front view-line, top view- circle
b) Front view- circle, top view- circle
c) Front view –line, top view-line
d) Top view- ellipse, side view- ellipse
Answer: d
Explanation: When a plane is perpendicular to one of the reference planes and inclined to the other, its inclination is shown by an angle which its projection on the plane to which it is perpendicular, makes with xy. Its projection on the plane to which it is inclined, is smaller than the plane itself.

4. A triangle is placed perpendicular to horizontal plane and inclined to vertical which of the following is true?
a) Front view-line, top view- triangle
b) Front view- triangle, top view- line
c) Front view –line, top view-line
d) Top view-line, side view- line
Answer: b
Explanation: When a plane is perpendicular to one of the reference planes and inclined to the other, its inclination is shown by an angle which its projection on the plane to which it is perpendicular, makes with xy. Its projection on the plane to which it is inclined, is smaller than the plane itself.

5. A triangle is placed perpendicular to horizontal plane and inclined to vertical which of the following is true. H.T is horizontal trace and V.T is vertical trace?
a) H.T- inclined to xy, V.T- inclined to xy
b) H.T- inclined to xy, V.T- perpendicular to xy
c) H.T-inclined to xy, V.T- parallel to xy
d) H.T-parallel to xy, V.T- perpendicular to xy
Answer: b
Explanation: When a plane is perpendicular to one of the reference planes and inclined to

the other, its inclination is shown by an angle which its projection on the plane to which it is perpendicular, makes with xy.

6. A square is placed perpendicular to vertical plane and inclined to horizontal plane which of the following is true. H.T is horizontal trace and V.T is vertical trace?
a) H.T- inclined to xy, V.T- perpendicular to xy
b) H.T- inclined to xy, V.T- perpendicular to xy
c) H.T- perpendicular to xy, V.T- inclined to xy
d) H.T- parallel to xy, V.T- perpendicular to xy
Answer: b
Explanation: When a plane is perpendicular to one of the reference planes and inclined to the other, its inclination is shown by an angle which its projection on the plane to which it is perpendicular, makes with xy.

7. If a square is placed on its base parallel to horizontal plane, and plane containing square is perpendicular to horizontal plane and inclined to vertical plane then the top view gives a line of length equal to side of square.
a) True
b) False
Answer: a
Explanation: As given conditions are simple there exist no complication and base is parallel to horizontal plane so the views may give line and rectangle but not parallelograms. And line of length equal to side of square.

8. If a plane is perpendicular to vertical and inclined to horizontal plane with 30 degrees then the vertical trace makes _____ degrees with xy reference.
a) 30 degrees
b) 60 degrees
c) 150 degrees
d) 90 degrees
Answer: a
Explanation: When a plane is perpendicular to one of the reference planes and inclined to the other, its inclination is shown by an angle which its projection on the plane to which it is perpendicular, makes with xy. And converse for traces.

9. If a plane is perpendicular to vertical and inclined to horizontal plane with 30 degrees then the horizontal trace makes _____ degrees with xy reference.

a) 30 degrees
b) 60 degrees
c) 150 degrees
d) 90 degrees
Answer: d
Explanation: When a plane is perpendicular to one of the reference planes and inclined to the other, its inclination is shown by an angle which its projection on the plane to which it is perpendicular, makes with xy. And converse for traces.

10. A plane is perpendicular to vertical plane and vertical trace of a plane is making 55 degrees with the xy plane. Which of the following is false?
a) The plane is inclined 55 degrees with the horizontal plane
b) Front view gives a line
c) Top view gives true shape of plane
d) Horizontal trace is perpendicular to xy plane
Answer: c
Explanation: When a plane is perpendicular to one of the reference planes and inclined to the other, its inclination is shown by an angle which its projection on the plane to which it is perpendicular, makes with xy. And converse for traces.

11. A rectangle is placed perpendicular to horizontal plane and inclined to profile plane. The traces would meet at _____
a) xy reference line
b) vertical reference line
c) the line formed by intersection of profile plane and horizontal plane
d) above the line formed by intersection of profile plane and horizontal plane
Answer: c
Explanation: Given a rectangle is perpendicular to horizontal plane and inclined to profile plane so the traces would meet on the line formed by intersection of profile plane and horizontal plane or the point of intersection of all planes.

12. A pentagon is placed perpendicular to horizontal plane and inclined to profile plane which of the following is true.
a) Front view-line, top view- pentagon
b) Front view- pentagon, top view- line
c) Front view –line, top view-line
d) Top view-line, side view- line
Answer: b

Explanation: When a plane is perpendicular to one of the reference planes and inclined to the other, its inclination is shown by an angle which its projection on the plane to which it is perpendicular, makes with xy. Its projection on the plane to which it is inclined, is smaller than the plane itself.

13. A hexagon is placed perpendicular to profile plane and inclined to horizontal plane which of the following is true.
a) Front view-line, top view- hexagon
b) Front view- hexagon, top view- line
c) Front view –line, top view-line
d) Top view-hexagon, side view- line
Answer: d
Explanation: When a plane is perpendicular to one of the reference planes and inclined to the other, its inclination is shown by an angle which its projection on the plane to which it is perpendicular, makes with xy. Its projection on the plane to which it is inclined, is smaller than the plane itself.

Projection of Oblique Plane

1. If a plane is inclined with both the reference plane then the plane come under _____
a) auxiliary plane
b) oblique plane
c) perpendicular plane
d) cross planes
Answer: b
Explanation: Sometimes every detail can’t be understood if the view falls on only reference planes so then auxiliary planes help in finding unknown measure there is no such rule it should incline to both references but oblique planes are inclined to both the reference planes.

2. If a plane is inclined to both the reference planes then the traces would meet at _____ line except the plane perpendicular to picture plane.
a) XY reference
b) Vertical reference
c) Above the XY reference plane
d) Below the XY reference plane

Answer: a

Explanation: If a plane is perpendicular to picture plane which perpendicular to both the reference planes the vertical trace and horizontal trace will not intersect on xy reference line but intersect on vertical reference line.

3. When a surface of the plane is inclined to the H.P and an edge is parallel to the H.P and inclined to V.P. The projections are drawn in 2 stages.

a) True

b) False

Answer: b

Explanation: Initially the pane is assumed to be parallel to the H.P and an edge perpendicular to the V.P. then tilted so as to make required angle with H.P. Finally the plane is made to rotate up to required angle with V.P.

4. A square is placed in between the reference planes in such a way that one diagonal is inclined to H.P and another diagonal inclined to V.T. Projections are drawn. The front views in 1, 2 and 3 stages are _____ _____ and _____ respectively.

a) line, line, parallelogram

b) line, parallelogram, line

c) square, line, parallelogram

d) square, rhombus, rhombus

Answer: a

Explanation: As initially the plane is assumed to be parallel to H.P the front view will be line and then the plane is tilted with respect to H.P to required angle the front view (line makes angle with H.P) remains line. Finally the plane is tilted with respect to V.P then parallelogram will form in front view.

5. A square is placed in between the reference planes in such a way that one diagonal is inclined to H.P and another diagonal inclined to V.T. Projections are drawn. The top views in 1, 2 and 3 stages are _____ _____ and _____ respectively.

a) line, line, parallelogram

b) line, parallelogram, line

c) square, line, parallelogram

d) square, rhombus, rhombus

Answer: d

Explanation: As initially the plane is assumed to be parallel to H.P the top view will be

square and then the plane is tilted with respect to H.P to required angle the top view will be square compressed to rhombus. Finally the plane is tilted with respect to V.P then rhombus will just turn w.r.t V.P.

6. A rectangular plane surface of size 60 x 30 cm is positioned in the first quadrant and is inclined at an angle of 60 degrees with the H.P and 30 degrees with the V.P. The front views while drawing projections in 1, 2 and 3 stages are _____ _____ and _____ respectively.

a) line, line, parallelogram
b) line, parallelogram, line
c) rectangle, square, square
d) rectangle, square, parallelogram

Answer: a

Explanation: As initially the plane is assumed to be parallel to H.P the front view will be line and then the plane is tilted with respect to H.P to required angle the front view (line makes angle with H.P) remains line. Finally the plane is tilted with respect to V.P then parallelogram will form in front view.

7. A rectangular plane surface of size 60 x 30 cm is positioned in the first quadrant and is inclined at an angle of 60 degrees with the H.P and 30 degrees with the V.P. The top views while drawing projections in 1, 2 and 3 stages are _____ _____ and _____ respectively.

a) line, line, parallelogram
b) line, parallelogram, line
c) rectangle, square, square
d) rectangle, square, parallelogram

Answer: c

Explanation: As initially the plane is assumed to be parallel to H.P the top view will be rectangle and then the plane is tilted with respect to H.P to 60 degrees angle the top view will be rectangle compressed to square (60 x cos (60)= 30). Finally the plane is tilted with respect to V.P then square will just turn w.r.t V.P.

8. An equilateral triangle is positioned in the first quadrant and is inclined at an angle of 30 degrees with the H.P and 30 degrees with the V.P. The front views while drawing projections in 1, 2 and 3 stages are _____ _____ and _____ respectively.

a) line, equilateral triangle, line
b) line, line, scalene triangle

c) equilateral triangle, isosceles triangle, isosceles triangle
d) equilateral triangle, isosceles triangle, scalene triangle
Answer: b
Explanation: As initially the plane is assumed to be parallel to H.P the front view will be line and then the plane is tilted with respect to H.P to required angle the front view (line makes angle with H.P) remains line. Finally the plane is tilted with respect to V.P then scalene triangle will form in front view.

9. An equilateral triangle is positioned in the first quadrant and is inclined at an angle of 30 degrees with the H.P and 30 degrees with the V.P. The top views while drawing projections in 1, 2 and 3 stages are _____ _____ and _____ respectively.
a) line, equilateral triangle, line
b) line, line, scalene triangle
c) equilateral triangle, isosceles triangle, isosceles triangle
d) equilateral triangle, isosceles triangle, scalene triangle
Answer: c
Explanation: As initially the plane is assumed to be parallel to H.P the top view will be equilateral triangle and then the plane is tilted with respect to H.P to required angle the top view will be equilateral triangle compressed to isosceles triangle. Finally the plane is tilted with respect to V.P then isosceles triangle will just turn w.r.t V.P.

10. When a surface of the plane is inclined to the V.P and an edge is parallel to the V.P and inclined to H.P. The projections are drawn in 3 stages.
a) True
b) False
Answer: a
Explanation: Initially the pane is assumed to be parallel to the V.P and an edge perpendicular to the H.P. then tilted so as to make required angle with V.P. Finally the plane is made to rotate up to required angle with H.P.

11. A rectangular plate of sides 60 x 30 cm has its shorter side in the V.P, inclined to 60 degrees with V.P and 30 degrees with the H.P. The front view while drawing projections in 1, 2 and 3 are _____ _____ and _____ respectively.
a) line, line, parallelogram
b) line, parallelogram, line
c) rectangle, square, square

d) rectangle, square, parallelogram

Answer: c

Explanation: As initially the plane is assumed to be parallel to V.P the front view will be rectangle and then the plane is tilted with respect to V.P to 60 degrees angle the top view will be rectangle compressed to square (60 x cos (60)= 30). Finally the plane is tilted with respect to H.P then square will just turn w.r.t H.P.

12. A rectangular plate of sides 60 x 30 cm has its shorter side in the V.P, inclined to 60 degrees with V.P and 30 degrees with the H.P. The top view while drawing projections in 1, 2 and 3 are _____ _____ and _____ respectively.

a) line, line, parallelogram

b) line, parallelogram, line

c) rectangle, square, square

d) rectangle, square, parallelogram

Answer: a

Explanation: As initially the plane is assumed to be parallel to V.P the top view will be line and then the plane is tilted with respect to V.P to required angle the top view (line makes angle with V.P) remains line. Finally the plane is tilted with respect to H.P then parallelogram will form in top view.

13. A circular surface plane is making 30 degrees with both H.P and V.P. The front view will be _____

a) line

b) circle

c) oval

d) ellipse

Answer: d

Explanation: While drawing projections in the 1st stage the front view and top view will be either line or circle and in 2nd stage the front and top view will be line and ellipse and in 3rdstage the front and top view will ellipse both.

Basics of Solids

1. The minimum number of orthographic view required to represent a solid on flat surface is _____

a) 1

b) 2
c) 3
d) 4
Answer: b
Explanation: A solid has 3 dimensions length, breadth and thickness. A single view represents any of the two dimensions of a solid and other represents, other set of two dimensions, so that we can understand whole geometry.

2. Match the following

	Polyhedron		Number of faces
1.	Triangular Prism	i.	6
2.	Tetrahedron	ii.	5
3.	Octahedron	iii.	4
4.	Cube	iv.	8

a) 1, i; 2, ii; 3, iii; 4, iv
b) 1, ii; 2, iii; 3, iv; 4, i
c) 1, ii; 2, iv; 3, i; 4, iii
d) 1, iv; 2, iii; 3, ii; 4, i
Answer: b
Explanation: A polyhedron is defined as a solid bounded by planes called faces. Prism is a polyhedron having two equal and similar faces (bases or ends), parallel to each other and joined by other faces which are rectangles.

3. Match the following

	Prisms		Number of edges

1.	Triangular	i.	18
2.	Square	ii.	15
3.	Pentagon	iii.	9
4.	Hexagonal	iv.	12

a) 1, i; 2, ii; 3, iii; 4, iv
b) 1, iii; 2, ii; 3, iv; 4, i
c) 1, iii; 2, iv; 3, ii; 4, i
d) 1, iv; 2, iii; 3, ii; 4, i

Answer: c

Explanation: Prism is a polyhedron having two equal and similar faces (bases or ends), parallel to each other and joined by other faces which are rectangles. So there exist 3 x number of sides of base of edges in prism.

4. The number of corners that exist in pyramids is 1+ number of sides of base.
a) True
b) False

Answer: a

Explanation: A pyramid is a polyhedron having a plane figure as a base and a number of triangular faces meeting at a point called vertex or apex. The imaginary lie joining the apex with the center of the base is its axis.

5. Match the following

	Prisms		Number of vertices
1.	Triangular	i.	12
2.	Square	ii.	10

3.	Pentagon	iii.	6
4.	Hexagonal	iv.	8

a) 1, i; 2, ii; 3, iii; 4, iv
b) 1, iii; 2, ii; 3, iv; 4, i
c) 1, iii; 2, iv; 3, ii; 4, i
d) 1, iv; 2, iii; 3, ii; 4, i

Answer: c

Explanation: Prism is a polyhedron which has two equal faces (bases or ends), parallel to each other and joined by other faces which are rectangles. So there exist 2 x number of sides of base of vertices in prism.

6. Solid of revolution gets same shapes in at least two in three orthographic views.

a) True
b) False

Answer: a

Explanation: Solids of revolutions are formed by revolving particular shaped plane surface about particular axis or about one of sides of plane surface so generally because of this any two orthographic views look similar.

7. If a right angled triangle is made to revolute about one of its perpendicular sides the solid formed is _____

a) cube
b) triangular prism
c) cone
d) cylinder

Answer: c

Explanation: A right circular cone is a solid generated by the revolution of a right angled triangle about one of its perpendicular sides which is fixed. It has one circular base and one vertex. Its axis joins the vertex to center of circle (base) to which it is perpendicular.

8. Match the following

	Polyhedron		Number of faces
1.	Triangular Prism	i.	8
2.	Tetrahedron	ii.	9
3.	Octahedron	iii.	6
4.	Cube	iv.	12

a) 1, i; 2, ii; 3, iii; 4, iv
b) 1, ii; 2, iii; 3, iv; 4, i
c) 1, ii; 2, iv; 3, i; 4, iii
d) 1, iv; 2, iii; 3, ii; 4, i

Answer: b

Explanation: A polyhedron is defined as a solid bounded by planes called faces. Prism is a polyhedron having two equal and similar faces (bases or ends), parallel to each other and joined by other faces which are rectangles.

9. Match the following

	Prisms		Number of vertices
1.	Triangular	i.	7
2.	Square	ii.	6
3.	Pentagon	iii.	5

4.	Hexagonal	iv.	4

a) 1, i; 2, ii; 3, iii; 4, iv
b) 1, iii; 2, ii; 3, iv; 4, i
c) 1, iii; 2, iv; 3, ii; 4, i
d) 1, iv; 2, iii; 3, ii; 4, i

Answer: d

Explanation: A pyramid is a polyhedron having a plane figure as a base and a number of triangular faces meeting at a point called vertex or apex. So there exists 1+ number of sides of base of vertices in pyramid. In pyramid the number of vertices is equal to number of faces.

10. Match the following

	Prisms		Number of vertices
1.	Triangular	i.	12
2.	Square	ii.	8
3.	Pentagon	iii.	6
4.	Hexagonal	iv.	10

a) 1, i; 2, ii; 3, iii; 4, iv
b) 1, iii; 2, ii; 3, iv; 4, i
c) 1, iii; 2, iv; 3, ii; 4, i
d) 1, iv; 2, iii; 3, ii; 4, i

Answer: b

Explanation: A pyramid is a polyhedron having a plane figure as a base and a number of triangular faces meeting at a point called vertex or apex. The imaginary lie joining the apex with the center of the base is its axis. So there exists 2 x number of sides of base of edges in pyramid.

11. When a pyramid or a cone is cut by a plane parallel to its base, thus removing the top portion, the remaining portion is called _____
a) cylinder
b) frustum
c) prism
d) polyhedron
Answer: b
Explanation: When a pyramid or a cone is cut by a plane parallel to its base, thus removing the top portion, the remaining portion is called its frustum. When a solid is cut by a plane inclined to the base it is said to be truncated.

12. Straight lines drawn from the apex to the circumference of the base-circle are all equal and are called _____
a) edges
b) connecting lines
c) projectors
d) generators
Answer: d
Explanation: In a cone the straight lines drawn from the apex to the circumference of the base-circle are all equal and are called generators of the cone. The length of the generator is the slant height of the cone.

13. The solid formed by 12 equal and regular pentagons as faces is called _____
a) plantonic solid
b) dodacahedron
c) Icosahedron
d) pyritohedron
Answer: b
Explanation: Plantonic solid is a regular convex polyhedron. Dodecahedron is one of the plantonic solid. Icosahedron is a solid which has twenty equal sized equilateral triangles as faces. Pyritohedron is the irregular dodecahedron.

Projection of Solids in Simple Position

1. If a solid is positioned that its axis is perpendicular to one of the reference plane. Which of the following is false?

a) Axis is parallel to other reference plane
b) Base is parallel to reference plane
c) Projection on that plane gives true shape of its base
d) Base is perpendicular to horizontal plane

Answer: d

Explanation: If solid's axis is perpendicular to H.P the base is parallel to H.P and projection on to the H.P gives the true shape of base and similar to V.P and P.P. But here in question it is not specified that given solid's axis is perpendicular to V.P.

2. If a solid's axis is perpendicular to one of the reference planes then the projection of solid on to the same plane gives the true shape and size of its _____

a) lateral geometry
b) base
c) cross-section
d) surface

Answer: b

Explanation: As in the planes, if the plane is parallel to one of the reference plane then projection of plane on to the same plane gives the true shape and size of the plane likewise the solid's base is parallel to reference plane the projection gives the true shape of the base.

3. When the axis of solid is perpendicular to H.P, the _____view should be drawn first and ____ view then projected from it.

a) front , top
b) top, side
c) side, front
d) top, front

Answer: d

Explanation: When the axis of solid is perpendicular to H.P it is indirectly saying that the base is parallel to the horizontal plane so the projection on to it gives true shape of base and then we can project and find the other dimensions.

4. When the axis of solid is perpendicular to V.P, the _____view should be drawn first and ____ view then projected from it.

a) front , top
b) top, side
c) side, front

d) top, front

Answer: a

Explanation: When the axis of solid is perpendicular to V.P it is indirectly saying that the base is parallel to the vertical plane so the projection on to it gives true shape of base and then we can project and find the other dimensions.

5. When the axis of solid is parallel to H.P &V.P, then _____view should be drawn first and ____ and _____view then projected from it.

a) front , top, side

b) top, side, front

c) side, front, top

d) top, front, side

Answer: c

Explanation: When the axis of solid is parallel to H.P, V.P then it is indirectly saying that it is perpendicular to picture plane so base is parallel to the profile plane so the projection on to it gives true shape of base and then we can projections of front and top can be drawn.

6. The front view, side view and top view of a regular square pyramid standing on horizontal plane base on horizontal plane.

a) triangle, triangle and square

b) square, triangle and triangle

c) square, triangle and square

d) triangle, square and triangle

Answer: a

Explanation: Given a square pyramid made to stand on horizontal plane on its base, in which position the pyramid may place like this the front view and side gives triangle in particular isosceles triangle as pyramid given is regular one and top view gives square.

7. The front view, side view and top view of a cylinder standing on horizontal plane base on horizontal plane.

a) circle, rectangle and rectangle

b) rectangle, rectangle and circle

c) rectangle, circle and rectangle

d) circle, triangle and triangle

Answer: b

Explanation: Given a cylinder made to stand on horizontal plane on its base, in which position the pyramid may place like this the front view and side gives rectangle and top view gives circle as the projection of top view is projection of base.

8. The side view, top view and front view of a regular hexagonal pyramid placed base parallel to profile plane.
a) Triangle, triangle and hexagon
b) hexagon, triangle and triangle
c) hexagon, triangle and hexagon
d) triangle, hexagon and triangle
Answer: b
Explanation: Given a regular hexagonal pyramid made to place on profile plane on its base, in which position the pyramid may place like this the top view and front gives triangle in particular isosceles triangle as pyramid given is regular one and side view gives hexagon.

9. The side view, top view and front view of a regular cone placed base parallel to profile plane.
a) Triangle, triangle and circle
b) circle, triangle and triangle
c) rectangle, triangle and circle
d) triangle, circle and triangle
Answer: b
Explanation: Given a regular cone made to place parallel to profile plane on its base, in which position the cone may place like this the front view and top gives triangle in particular isosceles triangle as cone given is regular one and side view gives square.

10. The side view, top view and front view of a regular pentagonal prism placed axis perpendicular to vertical plane.
a) rectangle, rectangle and pentagon
b) pentagon, rectangle and rectangle
c) pentagon, rectangle and pentagon
d) rectangle, pentagon and rectangle
Answer: a
Explanation: Given a regular pentagonal prism made to place its axis perpendicular to vertical plane so its base is parallel to vertical plane, in which position the pyramid may place like this the top view and side gives rectangle and front view gives square.

11. Square pyramid, cylinder, triangular prism, cone are placed one next to other in between the reference planes in different positions given below match the following.

	Position of solids		Front View
1.	Square pyramid- axis perpendicular to V.P	i.	Rectangle
2.	Cylinder- base parallel to profile plane	ii.	Circle
3.	Triangular prism – axis perpendicular to H.P	iii.	Square
4.	Cone- base parallel to V.P	iv.	Triangle

a) 1, i; 2, ii; 3, iii; 4, iv
b) 1, iv; 2, iii; 3, ii; 4, i
c) 1, ii; 2, iv; 3, iii; 4, i
d) 1, iii; 2, i; 3, iv; 4, ii

Answer: d

Explanation: If base of solid is parallel to one of the reference planes then its axis perpendicular to that plane and vice versa. Cone is formed by revolving triangle about one of its perpendicular side of triangle. Cylinder is formed by revolving rectangle about one of its sides.

12. Pentagonal pyramid, tetrahedron, cuboid and cone are placed one next to other in between the reference planes in different positions given below match the following.

	Position of solids		Front View
1.	Pentagonal pyramid- axis perpendicular to H.P	i.	Smallest base
2.	Tetrahedron- base parallel to vertical plane	ii.	Pentagon

3.	Cuboid – smallest side parallel to H.P	iii.	Triangle
4.	Cone- base parallel to P.P (profile plane)	iv.	Pentagon

a) 1, i; 2, ii; 3, iii; 4, iv
b) 1, iv; 2, iii; 3, i; 4, ii
c) 1, ii; 2, iv; 3, iii; 4, i
d) 1, iii; 2, i; 3, iv; 4, ii
Answer: b
Explanation: If base of solid is parallel to one of the reference planes then its axis perpendicular to that plane and vise versa. Profile plane is perpendicular to both horizontal and vertical plane. Tetrahedron is solid formed by 4 equal triangular planes.

13. Square prism, hexagonal pyramid, cube, sphere are placed one next to other in between the reference planes in different positions given below match the following.

	Position of solids		Front View
1.	Square prism- axis perpendicular to V.P	i.	Circle
2.	Hexagonal pyramid- base parallel to H.P	ii.	Rectangle
3.	Triangular prism – axis perpendicular to P.P	iii.	Triangle
4.	Sphere	iv.	Triangle

a) 1, i; 2, ii; 3, iii; 4, iv
b) 1, ii; 2, iii; 3, ii; 4, i
c) 1, ii; 2, iv; 3, iii; 4, i
d) 1, iii; 2, i; 3, iv; 4, ii
Answer: c

Explanation: If base of solid is parallel to one of the reference planes then its axis perpendicular to that plane and vise versa. Sphere gives all view as circle. Square prism is similar to cuboid. Prism is a polyhedron having two equal and similar faces called its bases.

Projections of Solids with Axis Inclined to Vertical Plane and Parallel to Horizontal Plane

1. When a solid is placed such that axis is inclined with the V.P and parallel to the H.P. Its projections are drawn in _____ stages.
a) 1
b) 4
c) 2
d) 3
Answer: c
Explanation: In the initial stage, the axis is kept perpendicular to the V.P and parallel to H.P and projections are drawn and then turning the axis to given angle of rotation with V.P and then again projections are based on previous vertices and edges.

2. A hexagonal pyramid first placed in such a way its axis is perpendicular to H.P and one edge AB parallel to V.P and then next this is turned about its axis so the base AB is now making some angle with V.P. The top view for previous and later one will be having same shape.
a) True
b) False
Answer: a
Explanation: For given positions of solid the solid is just rotated around itself and given the axis is perpendicular to H.P so the top view gives the true shape and size of its base but the base is just rotated to its given angle shape will not change.

3. A regular cone first placed in such a way its axis is perpendicular to V.P and next this is tilted such that its base is making some acute angle with V.P. The top view for previous and later one will be.
a) Triangle, triangle
b) irregular shape of circle and triangle, triangle
c) triangle, irregular shape of circle and triangle
d) circle, triangle

Answer: a

Explanation: For given positions of solid the solid is just tilted to some angle with V.P and previously given the axis is perpendicular to V.P so the top view gives the triangle and next with some given angle shape will not change.

4. A regular cone first placed in such a way its axis is perpendicular to V.P and next this is tilted such that its base is making some acute angle with V.P. The front view for previous and later one will be having same shape.

a) True

b) False

Answer: b

Explanation: For given positions of solid the solid is just tilted to some angle with V.P and previously given the axis is perpendicular to V.P so the front view gives the circle and next with some given angle shape will change to some irregular shape of circle and triangle.

5. A regular pentagon prism first placed in such a way its axis is perpendicular to V.P and one edge is parallel to H.P and next this is tilted such that its axis is making some acute angle with V.P. The front view for previous and later one will be _____

a) pentagon, pentagon

b) rectangle, pentagon

c) pentagon, irregular hexagon

d) irregular hexagon, pentagon

Answer: c

Explanation: For given positions of solid the solid is made acute angle with V.P and previously given the axis is perpendicular to V.P so the front view gives the pentagon and next with some given angle shape will change to irregular hexagon.

6. A cylinder first placed in such a way its axis is perpendicular to V.P and next this is tilted such that its axis is making some acute angle with V.P. The front view for previous and later one will be _____

a) circle, rectangle with circular ends

b) rectangle, rectangle

c) rectangle with circular ends, rectangle

d) circle, rectangle

Answer: a

Explanation: For given positions of solid the solid is made acute angle with V.P and

previously given the axis is perpendicular to V.P so the front view gives the circle and next with some given angle shape will change to rectangle with circular ends.

7. A cylinder first placed in such a way its axis is perpendicular to V.P and next this is tilted such that its axis is making some acute angle with V.P. The top view for previous and later one will be _____

a) circle, rectangle with circular ends
b) rectangle, rectangle
c) rectangle with circular ends, rectangle
d) circle, rectangle

Answer: b

Explanation: For given positions of solid the solid is made acute angle with V.P and previously given the axis is perpendicular to V.P so the top view gives the rectangle and next with some given angle shape will not change but just tilt to given angle.

8. A triangular pyramid is placed such that its axis is perpendicular to V.P and one of its base's edges is parallel to H.P the front view and top view will be _____

a) Triangle of base, triangle due to slanting side
b) Triangle due to slanting side, triangle of base
c) Triangle of base, rhombus
d) Rhombus, triangle of base

Answer: a

Explanation: Given a triangular pyramid which means the projection to its base gives triangle shape and other orthographic views give triangle. Here given is pyramid whose axis is perpendicular to V.P so its front view will be triangle of its base and top view will be another different triangle.

9. A square pyramid is placed such that its axis is inclined to V.P and one of its base's edges is parallel to H.P the front view and top view will be _____

a) Square, Isosceles triangle
b) Irregular pentagon, square
c) Irregular pentagon, isosceles triangle
d) Pentagon, equilateral triangle

Answer: c

Explanation: Given a square pyramid which means the projection to its base gives square shape and other orthographic views give triangle. Here given is pyramid whose axis is

inclined to V.P so its front view will be irregular pentagon and top view will be isosceles triangle.

10. A square prism is placed such that its axis is inclined to V.P and one of its base's edges is parallel to H.P the front view and top view will be _____

a) Square, irregular polygon
b) Irregular polygon, rectangle
c) Rectangle, irregular polygon
d) Pentagon, square

Answer: b

Explanation: Given a square prism which means the projection to its base gives square shape and other orthographic views give rectangle. Here given is prism whose axis is inclined to V.P so its top view will be rectangle and front view will be irregular polygon.

11. A regular cone having its axis parallel to H.P and perpendicular to V.P at first but then the cone's axis keeping parallel to H.P and rotated such that its new axis is perpendicular to previous axis. The front view of the previous and later one is _____

a) Circle, triangle
b) Circle, triangle with circular base
c) Triangle, triangle
d) Circle, circle

Answer: a

Explanation: Given a regular cone which means the projection to its base gives circle shape and other orthographic views give triangle. But here given is inclination it may give irregular shape in its front view if the angle is acute angle but here given is 90 degrees so we get triangle.

12. A regular cone having its axis parallel to H.P and perpendicular to V.P at first but then the cone's axis keeping parallel to H.P and rotated such that its new axis is perpendicular to previous axis. The top view of the previous and later one is _____

a) Circle, triangle
b) Circle, triangle with circular base
c) Triangle, triangle
d) Circle, circle

Answer: c

Explanation: Given a regular cone which means the projection to its base gives circle shape and other orthographic views give triangle. But here given is inclination it may change shape in its front view but in top view it just totally rotated as per given angle.

13. A tetrahedron is made to place on V.P that is with its axis perpendicular to it and one of the edges of base parallel to H.P and then the tetrahedron is made to rotate w.r.t to V.P up to an acute angle. The top view of previous and later one is _____

a) isosceles triangle, isosceles triangle
b) equilateral triangle, isosceles triangle
c) equilateral triangle, square
d) square, irregular polygon of 4 sides

Answer: a

Explanation: As normal a tetrahedron gives equilateral triangle for project to its base and isosceles triangle for other view when placed without inclination but here inclination is given but given view is top view so the shape will not change but rotate to given angle.

Projection of Solids with Axis Inclined to Horizontal Plane and Parallel to Vertical Plane

1. When a solid is placed such that axis is inclined with the H.P and parallel to the V.P. Its projections are drawn in _____ stages.

a) 1
b) 4
c) 2
d) 3

Answer: c

Explanation: In the initial stage, the axis is kept perpendicular to the H.P and parallel to V.P and projections are drawn and then turning the axis to given angle of rotation with H.P and then again projections are based on previous vertices and edges.

2. A hexagonal pyramid first placed in such a way its axis is perpendicular to V.P and one edge AB parallel to H.P and then next this is turned about its axis so the base AB is now making some angle with H.P. The top view for previous and later one will be having different shapes.

a) True
b) False

Answer: b

Explanation: For given positions of solid the solid is just rotated around itself and given the axis is perpendicular to V.P so the top view gives the true shape and size of its base but the base is just rotated to its given angle shape will not change.

3. A regular cone first placed in such a way its axis is perpendicular to H.P and next this is tilted such that its base is making some acute angle with H.P. The top view for previous and later one will be _____

a) triangle, triangle

b) irregular shape of circle and triangle, triangle

c) circle, irregular shape of circle and triangle

d) circle, triangle

Answer: c

Explanation: For given positions of solid the solid is just tilted to some angle with H.P and previously given the axis is perpendicular to H.P so the top view gives the triangle and next with some given angle shape will change to irregular shape of circle and triangle.

4. A regular cone first placed in such a way its axis is perpendicular to H.P and next this is tilted such that its base is making some acute angle with H.P. The front view for previous and later one will be having same shape.

a) True

b) False

Answer: a

Explanation: For given positions of solid the solid is just tilted to some angle with H.P and previously given the axis is perpendicular to H.P so the front view gives the triangle and next with some given angle shape will not change but just rotate.

5. A regular pentagon prism first placed in such a way its axis is perpendicular to H.P and one edge is parallel to V.P and next this is tilted such that its axis is making some acute angle with H.P. The front view for previous and later one will be _____

a) pentagon, rectangle

b) rectangle, pentagon

c) rectangle, rectangle

d) irregular hexagon, pentagon

Answer: c

Explanation: For given positions of solid the solid is made acute angle with H.P and

previously given the axis is perpendicular to H.P so the front view gives the rectangle and next with some given angle shape will rotate totally.

6. A cylinder first placed in such a way its axis is perpendicular to H.P and next this is tilted such that its axis is making some acute angle with H.P. The top view for previous and later one will be _____
a) circle, rectangle with circular ends
b) rectangle, rectangle
c) rectangle with circular ends, rectangle
d) circle, rectangle
Answer: a
Explanation: For given positions of solid the solid is made acute angle with H.P and previously given the axis is perpendicular to H.P so the front view gives the circle and next with some given angle shape will change to rectangle with circular ends.

7. A cylinder first placed in such a way its axis is perpendicular to H.P and next this is tilted such that its axis is making some acute angle with H.P. The front view for previous and later one will be _____
a) circle, rectangle with circular ends
b) rectangle, rectangle
c) rectangle with circular ends, rectangle
d) circle, rectangle
Answer: b
Explanation: For given positions of solid the solid is made acute angle with V.P and previously given the axis is perpendicular to V.P so the top view gives the rectangle and next with some given angle shape will not change but just tilt to given angle.

8. A triangular pyramid is placed such that its axis is perpendicular to H.P and one of its base's edges is parallel to H.P the front view and top view will be _____
a) Triangle of base, triangle due to slanting side
b) Triangle due to slanting side, triangle of base
c) Triangle of base, rhombus
d) Rhombus, triangle of base
Answer: b
Explanation: Given a triangular pyramid which means the projection to its base gives triangle of base and other orthographic views give triangle due to slanting sides. Here

given is pyramid whose axis is perpendicular to H.P so its front view will be triangle due to sides and top view will be triangle of base.

9. A square pyramid is placed such that its axis is inclined to H.P and one of its base's edges is parallel to V.P the front view and top view will be _____

a) Square, Isosceles triangle
b) Irregular pentagon, square
c) Isosceles triangle, irregular pentagon
d) Pentagon, equilateral triangle

Answer: c

Explanation: Given a square pyramid which means the projection to its base gives square shape and other orthographic views give triangle. Here given is pyramid whose axis is inclined to H.P so its front view will be isosceles triangle and top view will be square.

10. A square prism is placed such that its axis is inclined to H.P and one of its base's edges is parallel to V.P the front view and top view will be _____

a) square, irregular polygon
b) irregular polygon, square
c) square, rectangle
d) rectangle, irregular polygon

Answer: d

Explanation: Given a square prism which means the projection to its base gives square shape and other orthographic views give rectangle. Here given is prism whose axis is inclined to H.P so its front view will be rectangle and top view will be irregular polygon.

11. A regular cone having its axis parallel to V.P and perpendicular to H.P at first but then the cone's axis keeping parallel to V.P and rotated such that its new axis is perpendicular to previous axis. The front view of the previous and later one is _____

a) circle, triangle
b) circle, triangle with circular base
c) triangle, triangle
d) circle, circle

Answer: c

Explanation: Given a regular cone which means the projection to its base gives circle shape and other orthographic views give triangle. But here given is inclination it may give

irregular shape in its top view if the angle give is acute but given angle is 90 degrees so it gives perfect shapes.

12. A regular cone having its axis parallel to V.P and perpendicular to H.P at first but then the cone's axis keeping parallel to V.P and rotated such that its new axis is perpendicular to previous axis. The top view of the previous and later one is _____

a) circle, triangle
b) circle, triangle with circular base
c) triangle, triangle
d) circle, circle

Answer: a

Explanation: Given a regular cone which means the projection to its base gives circle shape and other orthographic views give triangle. But here given is inclination of 90 degrees so previous ones will be circle and later one will be triangle.

13. A tetrahedron is made to place on H.P that is with its axis perpendicular to it and one of the edges of base parallel to V.P and then the tetrahedron is made to rotate w.r.t to H.P up to an acute angle. The top view of previous and later one is _____

a) isosceles triangle, Isosceles triangle
b) equilateral triangle, isosceles triangle
c) equilateral triangle, square
d) square, irregular polygon of 4 sides

Answer: b

Explanation: As normal a tetrahedron gives equilateral triangle for project to its base and isosceles triangle for other view when placed without inclination but here inclination is given but given view is top view so the shape will change to isosceles triangle.

Projection of Solids with Axes Inclined to both Horizontal and Vertical Plane

1. When a solid is placed such that axis is inclined with both the H.P and V.P. Its projections are drawn in _____ stages.

a) 1
b) 4
c) 2

d) 3

Answer: d

Explanation: The stages are i) keeping in simple position, ii) Axis inclined to one plane and parallel to the other, iii) Final position. The 2nd and 3rd positions may be obtained either by the alteration of the positions of the solid i.e. view or reference lines.

2. The front views of 1st, 2nd and final stages of square prism, has its axis inclined at 45 degrees with H.P and has an edge of its base on H.P and inclined 30 degrees with V.P while drawing orthographic projections are _____

a) Rectangle, rectangle, hexagon

b) Square, rectangle, rectangle

c) Rectangle, rectangle, octagon

d) Square, rectangle, hexagon

Answer: a

Explanation: As the 1st stage is to keep the solid in simple position and given is front view it is rectangle and then rotated to an angle of 45 degrees with H.P which again gives rectangle and then rotating 30 degrees with V.P which gives an irregular hexagon.

3. The top views of 1st, 2nd and final stages of square prism, has its axis inclined at 45 degrees with H.P and has an edge of its base on H.P and inclined 30 degrees with V.P while drawing orthographic projections are _____

a) Rectangle, rectangle, hexagon

b) Square, rectangle, rectangle

c) Rectangle, rectangle, octagon

d) Square, rectangle, hexagon

Answer: b

Explanation: As the 1st stage is to keep the solid in simple position and given is top view it is square and then rotated to an angle of 45 degrees with H.P which gives rectangle and then rotating 30 degrees with V.P which gives again rectangle.

4. The top views of 1st, 2nd and final stages of regular cone, has its axis inclined at 30 degrees with H.P and 45 degrees with V.P while drawing orthographic projections are _____

a) Circle, triangle, triangle

b) Circle, triangle with base as ellipse, triangle with base as ellipse

c) Triangle, triangle, triangle with base as ellipse

d) Triangle, triangle, triangle

Answer: b

Explanation: As the 1st stage is to keep the solid in simple position and given is top view it is circle and then rotated to an angle of 30 degrees with H.P which gives triangle with base as ellipse and then rotating 45 degrees with V.P which gives again triangle with base as ellipse.

5. The front views of 1st, 2nd and final stages of regular cone, has its axis inclined at 30 degrees with H.P and 45 degrees with V.P while drawing orthographic projections are _____

a) Circle, triangle, triangle
b) Circle, triangle with base as ellipse, triangle with base as ellipse
c) Triangle, triangle, triangle with base as ellipse
d) Triangle, triangle, triangle

Answer: c

Explanation: As the 1st stage is to keep the solid in simple position and given is front view it is triangle and then rotated to an angle of 30 degrees with H.P which again gives triangle and then rotating 45 degrees with V.P which gives triangle with base as ellipse.

6. The front views of 1st, 2nd and final stages of a pentagonal pyramid, has one of its triangular faces in the V.P and edge of the base contained by that face makes an angle of 30 degrees with the H.P while drawing orthographic projections are _____

a) Pentagon, irregular pentagon, irregular pentagon
b) Triangle, irregular pentagon, irregular pentagon
c) Triangle, triangle, irregular pentagon
d) Pentagon, triangle, irregular pentagon

Answer: a

Explanation: As the 1st stage is to keep the solid in simple position for given conditions the solid's base should be placed on V.P so front view gives pentagon and then rotated so as to one of the face touch the V.P now the view will become irregular pentagon and then adjust so that edge of base on V.P makes 30 degrees with H.P so it show irregular pentagon from front view.

7. The top views of 1st, 2nd and final stages of a pentagonal pyramid, has one of its triangular faces in the V.P and edge of the base contained by that face makes an angle of 30 degrees with the H.P while drawing orthographic projections are _____

a) Pentagon, irregular pentagon, irregular pentagon
b) Triangle, irregular pentagon, irregular pentagon

c) Triangle, triangle, irregular pentagon
d) Pentagon, triangle, irregular pentagon
Answer: c
Explanation: As the 1st stage is to keep the solid in simple position for given conditions the solid's base should be placed on V.P so top view gives triangle and then rotated so as to one of the face touch the V.P now the view will remain triangle and then adjust so that edge of base on V.P makes 30 degrees with H.P so it show irregular pentagon from top.

8. A cube is resting on H.P on one of its corners with a solid diagonal perpendicular to the V.P. What are the front views of 1st, 2nd, 3rd stages while drawing orthographic projections?
a) Rectangle, rectangle, regular hexagon
b) Square, irregular hexagon, irregular hexagon
c) Rectangle, rectangle, irregular hexagon
d) Square, regular hexagon, regular hexagon
Answer: a
Explanation: As in the 1st stage the cube is to placed in the position occurred when the diagonal of base perpendicular to V.P so front view gives rectangle and then rotated so as to keep one of the corners only on H.P so the front view will be rectangle then if we make diagonal perpendicular to V.P the front view will be regular hexagon.

9. A cube is resting on H.P on one of its corners with a solid diagonal perpendicular to the V.P. What are the top views of 1st, 2nd, 3rd stages while drawing orthographic projections?
a) Rectangle, rectangle, regular hexagon
b) Square, irregular hexagon, irregular hexagon
c) Rectangle, rectangle, irregular hexagon
d) Square, regular hexagon, regular hexagon
Answer: b
Explanation: As in the 1st stage the cube is to be placed in the position occurred when the diagonal of base perpendicular to V.P so top view gives square and then rotated so as to keep one of the corners only on H.P so the top view will be irregular hexagon then if we make diagonal perpendicular to V.P the top view will be irregular hexagon.

10. A pentagonal prism is resting on H.P on one of its corners and from top view the solid's axis is making 30 degrees with the xy reference line. What are the top views of the 1st, 2nd, 3rd stages of orthographic drawing?
a) Rectangle, rectangle, heptagon

b) Pentagon, heptagon, heptagon
c) Rectangle, heptagon, rectangle
d) Pentagon, rectangle, heptagon
Answer: b
Explanation: As in the 1st stage the pentagonal prism is to be placed in simple position the axis perpendicular to V.P so top view gives pentagon and then rotated so as to keep one of the corners only on H.P so the top view will be irregular heptagon then adjusting the axis so as to make 30 degrees with xy reference line so top view remain same.

11. A pentagonal prism is resting on H.P on one of its corners and from top view the solid's axis is making 30 degrees with the xy reference line. What are the front views of the 1st, 2nd, 3rd stages of orthographic drawing?
a) Rectangle, rectangle, heptagon
b) Pentagon, heptagon, heptagon
c) Rectangle, heptagon, rectangle
d) Pentagon, rectangle, heptagon
Answer: a
Explanation: As in the 1st stage the pentagonal prism is to be placed in simple position the axis perpendicular to V.P so front view gives rectangle and then rotated so as to keep one of the corners only on H.P so the front view will remain same then from projections of top view the front is drawn so a irregular heptagon will form.

12. A pentagonal pyramid is placed on H.P on one of its base's edge and the triangular surface containing the edge on which it is resting is making 45 degrees with H.P. Draw orthographic views and what are the top views of 1st, 2nd, 3rd stages?
a) Triangle, triangle, irregular pentagon
b) Pentagon, irregular polygon of 4 sides, irregular polygon of 4 sides
c) Triangle, triangle, irregular polygon of 4 sides
d) Pentagon, irregular pentagon, irregular pentagon
Answer: b
Explanation: In the 1st stage the solid's axis is perpendicular to H.P and one base's edge is perpendicular to V.P. so the top view will be pentagon and then made to rest on only one edge so top view will be irregular polygon of 4 sides and then adjusted to a given angle so top view will be same.

13. A pentagonal pyramid is placed on H.P on one of its base's edge and the triangular surface containing the edge on which it is resting is making 45 degrees

with H.P. Draw orthographic views and what are the front views of 1st, 2ndrd stages?
a) Triangle, triangle, irregular pentagon
b) Pentagon, irregular polygon of 4 sides, irregular polygon of 4 sides
c) Triangle, triangle, irregular polygon of 4 sides
d) Pentagon, irregular pentagon, irregular pentagon
Answer: a
Explanation: In the 1st stage the solid's axis is perpendicular to H.P and one base's edge is perpendicular to V.P. so the front view will be triangle and then made to rest on only one edge so front view will remain same and then adjusted to a given angle so front view will be pentagon.

Projection of Spheres

1. _____ surface is formed when a sphere is cut by a plane.
a) Ellipse
b) Parabola
c) Circle
d) Hyperbola
Answer: c
Explanation: Sphere is a closed solid object which is formed by rotating semicircle about its flat side. Sphere gives top view, front view, side views as circle whose radius is equal to radius of sphere.

2. When a hemisphere is placed on the ground on its flat face, its front view is a _____
a) semi circle
b) circle
c) ellipse
d) irregular one
Answer: a
Explanation: Hemisphere is solid formed by cutting the sphere at its middle. The flat surface of hemisphere will have section of circle with radius equal to radius of sphere. Here the hemisphere is placed on H.P on its flat surface so it gives semi circle from front view.

3. When a hemisphere is placed on the ground on its flat face, its top view is a _____

a) semi circle
b) circle
c) ellipse
d) irregular one

Answer: b

Explanation: Hemisphere is solid formed by cutting the sphere at its middle. The flat surface of hemisphere will have section of circle with radius equal to radius of sphere. Here the hemisphere is placed on H.P on its flat surface so it gives circle from top view.

4. When the flat face of hemisphere is inclined to the H.P or the ground and is perpendicular to the V.P, it is seen as _____(partly hidden) in the top view.
a) semi circle
b) circle
c) ellipse
d) irregular one

Answer: c

Explanation: The flat surface of hemisphere will have section of circle with radius equal to radius of sphere. Here the hemisphere is placed on H.P so that its flat surface is inclined to H.P so it gives semi circle from front view and ellipse from top view.

5. When a hemisphere is placed on H.P such that the flat surface is perpendicular to V.P and inclined with horizontal then the front view will be _____
a) semi circle
b) circle
c) ellipse
d) irregular one

Answer: a

Explanation: The flat surface of hemisphere will have section of circle with radius equal to radius of sphere. Here the hemisphere is placed on H.P so that its flat surface is inclined to H.P so it gives semi circle from front view and ellipse from top view.

6. When two spheres of same radius are placed on H.P both are touching each other and the line joining the centers is perpendicular to V.P. The front view will be.
a) Single circle
b) Two circles
c) Concentric circles

d) Intersecting circles

Answer: a

Explanation: Given two spheres of same radius are placed on H.P touching each other so as the spheres are placed on H.P the line joining the centers is parallel to H.P and given it is perpendicular to V.P so they both align in one line which gives single circle from front view.

7. When two spheres of same radius are placed on H.P both are touching each other and the line joining the centers is perpendicular to V.P. The top view will be _____

a) single circle
b) two circles
c) concentric circles
d) intersecting circles

Answer: b

Explanation: Given two spheres of same radius are placed on H.P touching each other so as the spheres are placed on H.P the line joining the centers is parallel to H.P and given it is perpendicular to V.P so they both align in one line which gives two circles from top view.

8. When two spheres of same radius are placed on H.P both are touching each other and the line joining the centers is making 45 degrees to V.P. The front view will be _____

a) single circle
b) two circles
c) concentric circles
d) intersecting circles

Answer: d

Explanation: Given two spheres of same radius are placed on H.P touching each other so as the spheres are placed on H.P the line joining the centers is parallel to H.P and given it is making 45 degrees with V.P so they both align in one line which gives intersecting circles from front view.

9. When two spheres of same radius are placed on H.P both are touching each other and the line joining the centers is making 45 degrees to V.P. The top view will be _____

a) single circle
b) two circles
c) concentric circles

d) intersecting circles

Answer: d

Explanation: Given two spheres of same radius are placed on H.P touching each other so as the spheres are placed on H.P the line joining the centers is parallel to H.P and given it is making 45 degrees with V.P so they both align in one line which gives two circles in top view.

10. When two spheres of different radius are placed on H.P both are touching each other and the line joining the centers is perpendicular to V.P. The front view will be _____

a) single circle
b) two circles
c) concentric circles
d) intersecting circles

Answer: c

Explanation: Given two spheres of different radius are placed on H.P touching each other, the line joining the centers is perpendicular to V.P so they both align in one line but due to difference in radius it gives concentric circles from front view.

11. When two spheres of different radius are placed on H.P both are touching each other and the line joining the centers is perpendicular to V.P. The top view will be _____

a) single circle
b) two circles
c) concentric circles
d) intersecting circles

Answer: b

Explanation: Given two spheres of different radius are placed on H.P touching each other, the line joining the centers is perpendicular to V.P so they both align in one line which gives two circles with different radius from top view.

12. Three spheres of same radius are placed on H.P such that the line joining centers is parallel to H.P and each one touching other two. The front view will be _____

a) three circles
b) two circles
c) concentric circles
d) intersecting circles

Answer: d

Explanation: Given three spheres of same radius are placed on H.P each touching other two, the line joining centers of spheres gives equilateral triangle. From front view the spheres seem to be intersecting circles.

13. Three spheres of same radius are placed on H.P such that the line joining centers is parallel to H.P and each one touching other two. The top view will be _____

a) three circles
b) two circles
c) concentric circles
d) intersecting circles

Answer: a

Explanation: Given three spheres of same radius are placed on H.P each touching other two, the line joining centers of spheres gives equilateral triangle. From front view the spheres seem to be intersecting circles but from top three circles will be seen.

Basics of Section of Solids

1. To understand some of the hidden geometry of components an imaginary plane is used to cut the object which is called _____

a) auxiliary plane
b) picture plane
c) section plane
d) additional plane

Answer: c

Explanation: To understand some of the hidden geometry of components an imaginary plane is used to cut the object which is called section plane or cutting plane. The new imaginary face generated on the object is called the section.

2. Which of the following is not the purpose of using cutting (section) plane?

a) Interpretation of object
b) Visualizing of object
c) Cutting the objects
d) Invisible features

Answer: c

Explanation: Section plane or cutting plane is an imaginary plane which is used to cut the

object to visualize the geometry which is hidden inside the object and interpret it which plays an important role in designing many machine parts.

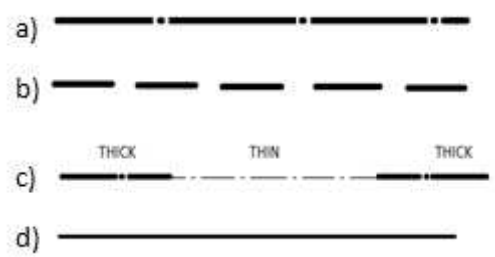
3. To find the true shape of the section, it must be projected on a plane parallel to the _____

a) Profile plane
b) Vertical plane
c) Auxiliary plane
d) Section plane

Answer: d

Explanation: As we know true shape and size is obtained only when a object is projected on to the plane parallel to it. Likewise as section always be plane surface to know its true shape it should be projected on to plane parallel to section plane only.

4. The type of line used to represent the cutting plane in drawing is.



Answer: c

Explanation: Continuous thick line is used for visible out-lines, dashed lines are used for line showing permissible surface treatment, long-dashed dotted lines are used for indication of surfaces for which a special requirement applies.

5. A section plane is parallel to V.P the top view gives _____ which is _____ to xy line.

a) true shape, parallel
b) straight line, parallel
c) straight line, perpendicular
d) true shape, perpendicular

Answer: b

Explanation: The projection of section plane on the plane to which it is perpendicular gives a straight line which is parallel, perpendicular, inclined as due to section if it is parallel, perpendicular, inclined to reference planes.

6. The projection of a section plane, on the plane to which it is perpendicular is a straight line.
a) True
b) False
Answer: a
Explanation: The projection of a section plane, on the plane to which it is perpendicular is a straight line. The projection of a section on the reference plane to which the section plane is perpendicular will be a straight line coinciding with the trace of the section plane of it.

7. The projection of section surface on the other plane to which it is inclined is called auxiliary section.
a) True
b) False
Answer: b
Explanation: No it is not auxiliary plane but apparent section. This is obtained by projecting on the other plane, the points at which the trace of the section plane intersects the edges of the solid and drawing lines joining these points in proper sequence.

8. The section plane is perpendicular to H.P and inclined to V.P the front view of section if section is a line. It _____ xy line.
a) is perpendicular to
b) is parallel to
c) is inclined to V.P
d) crosses
Answer: b
Explanation: The projection of section plane on the plane to which it is perpendicular gives a straight line. It is given the section is line and also from front view the section lies parallel to xy reference line.

9. The section plane is perpendicular to H.P and inclined to V.P the top view of section if section is a line. It _____ xy line.
a) is perpendicular to
b) is parallel to
c) is inclined to V.P
d) crosses
Answer: c
Explanation: The projection of section plane on the plane to which it is perpendicular gives

a straight line. Here it is given section plane is inclined with V.P so top view gives a line inclined to xy reference line.

10. A section is perpendicular to both the reference planes the true shape and size is obtained by taking projection of section on to _____ plane.
a) horizontal
b) vertical
c) profile
d) auxiliary
Answer: c
Explanation: Given the section is perpendicular to both horizontal and vertical plane that is it is parallel to profile plane which is otherwise called as picture plane. Always remember the true shape and size will be trace if projections are drawn on to the plane parallel to section plane.

11. A section is parallel to horizontal plane the true shape and size is obtained by taking projection of section on to _____ plane.
a) horizontal
b) vertical
c) profile
d) auxiliary
Answer: a
Explanation: Always remember the true shape and size will be trace if projections are drawn on to the plane parallel to section plane. So here as the section is parallel to horizontal plane the projection is to be taken on horizontal plane.

12. A section is parallel to vertical plane the true shape and size is obtained by taking projection of section on to _____ plane.
a) horizontal
b) vertical
c) profile
d) auxiliary
Answer: b
Explanation: Always remember the true shape and size will be trace if projections are drawn on to the plane parallel to section plane. So here as the section is parallel to vertical plane the projection is to be taken on vertical plane.

Sections of Prisms

1. A regular triangular prism is resting on H.P and section plane is parallel to H.P and cutting the prism the section would be a _____
a) triangle
b) rectangle
c) trapezium
d) parallelogram
Answer: b
Explanation: Prisms are obtained by extruding required shape up to some appreciable length so there exist same cross-section along the length perpendicular to axis. If the cutting plane parallel to axis we get rectangle.

2. A cube is rested on H.P on one of its base such that base's diagonal is perpendicular to V.P and section plane is parallel to V.P the section will be a _____
a) triangle
b) rectangle
c) trapezium
d) parallelogram
Answer: b
Explanation: Prisms are obtained by extruding required shape up to some appreciable length so there exist same cross-section along the length perpendicular to axis. If the cutting plane parallel to axis we get rectangle.

3. A cube is rested on H.P on one of its base such that base's diagonal is perpendicular to V.P and section plane is making 45 degrees with both H.P and V.P and section plane is not intersecting more than 3 edges the section will be a _____
a) triangle
b) rectangle
c) trapezium
d) parallelogram
Answer: a
Explanation: Prisms are obtained by extruding required shape up to some appreciable length so there will be same cross-section along the length perpendicular to axis. If the

cutting plane is parallel to axis we get rectangle if inclined to axis the section depends on the position where it is cutting.

4. A cube is rested on H.P on one of its base such that base's diagonal is perpendicular to V.P and section plane is making 45 degrees with V.P and perpendicular to H.P the section will be a _____
a) triangle
b) rectangle
c) trapezium
d) parallelogram
Answer: b
Explanation: Prisms are obtained by extruding required shape up to some appreciable length so there exist same cross-section along the length perpendicular to axis. If the cutting plane parallel to axis we get rectangle.

5. A cube is placed on H.P on its base and vertical face is making 30 degrees with V.P, section plane is perpendicular to V.P the section will give a shape of a _____
a) triangle
b) rectangle
c) trapezium
d) parallelogram
Answer: c
Explanation: Prisms are obtained by extruding required shape up to some appreciable length so there will be same cross-section along the length perpendicular to axis. If the cutting plane is parallel to axis we get rectangle if inclined to axis the section depends on the position where it is cutting.

6. A square prism has its base on H.P and its faces equally inclined to V.P is cut at most critical place by a plane which is perpendicular to V.P and inclined 60 degrees with H.P the section will have shape like a _____
a) irregular pentagon
b) rectangle
c) trapezium
d) parallelogram
Answer: a
Explanation: Prisms are obtained by extruding required shape up to some appreciable length so there will be same cross-section along the length perpendicular to axis. If the

cutting plane is parallel to axis we get rectangle if inclined to axis the section depends on the position where it is cutting.

7. A triangular prism resting on one of its longest faces on H.P and axis of prism is parallel to V.P, the section plane is perpendicular to both V.P and H.P the section will be a _____

a) triangle
b) rectangle
c) trapezium
d) parallelogram

Answer: a

Explanation: Prisms are obtained by extruding required shape up to some appreciable length so there exist same cross-section along the length perpendicular to axis. If the cutting plane parallel to axis we get rectangle.

8. A pentagonal prism resting on one of its longest faces on H.P and axis of prism is parallel to V.P, the section plane is perpendicular to both V.P and H.P the section will be a ____

a) pentagon
b) irregular pentagon
c) rectangle
d) trapezium

Answer: a

Explanation: Prisms are obtained by extruding required shape up to some appreciable length so there exist same cross-section along the length perpendicular to axis. If the cutting plane parallel to axis we get rectangle.

9. A pentagonal prism resting on one of its longest faces on H.P and axis of prism is parallel to V.P, the section plane is parallel to both V.P/ H.P the section will be a _____

a) pentagon
b) irregular pentagon
c) rectangle
d) trapezium

Answer: c

Explanation: Prisms are obtained by extruding required shape up to some appreciable length so there exist same cross-section along the length perpendicular to axis. If the cutting plane parallel to axis we get rectangle.

10. A pentagonal prism resting on one of its longest faces on H.P and axis of prism is parallel to V.P, the section plane is perpendicular to V.P and inclined H.P the section will be a _____

a) pentagon

b) irregular pentagon

c) rectangle

d) trapezium

Answer: b

Explanation: Prisms are obtained by extruding required shape up to some appreciable length so there will be same cross-section along the length perpendicular to axis. If the cutting plane is parallel to axis we get rectangle if inclined to axis the section depends on the position where it is cutting.

11. A hexagonal prism is resting on H.P on one of its longest faces, axis is perpendicular to V.P the section plane is perpendicular to H.P and inclined to V.P and cutting solid at approximately middle. The section will be like a _____

a) hexagon

b) irregular hexagon

c) rectangle

d) trapezium

Answer: b

Explanation: Prisms are obtained by extruding required shape up to some appreciable length so there will be same cross-section along the length perpendicular to axis. If the cutting plane is parallel to axis we get rectangle if inclined to axis the section depends on the position where it is cutting.

12. A hexagonal prism is resting on H.P on one of its longest faces, axis is perpendicular to V.P the section plane is parallel to V.P and perpendicular to H.P. The section will be like a _____

a) hexagon

b) irregular hexagon

c) rectangle

d) trapezium

Answer: a

Explanation: Prisms are obtained by extruding required shape up to some appreciable length so there exist same cross-section along the length perpendicular to axis. If the cutting plane parallel to axis we get rectangle.

13. Given below are the sections of different prisms. Match the following.

	Position of section plane		Section
1.	Plane perpendicular to axis of triangular prism	i.	Rectangle
2.	Plane perpendicular to axis of pentagonal prism	ii.	Rectangle
3.	Plane inclined to axis of square prism	iii.	Pentagon
4.	Plane parallel to axis of cuboid	iv.	Triangle

a) 1, iv; 2, iii; 3, i; 4, ii
b) 1, iv; 2, ii; 3, iii; 4, i
c) 1, ii; 2, iv; 3, i; 4, iii
d) 1, ii; 2, iii; 3, i; 4, iv

Answer: a

Explanation: Prisms are obtained by extruding required shape up to some appreciable length so there exist same cross-section along the length perpendicular to axis. If the cutting plane parallel to axis we get rectangle.

Sections of Pyramids

1. A square pyramid is placed on V.P with square as base on V.P the cutting plane is parallel to H.P and also parallel to one edge of base, the section will be _____

a) triangle
b) rectangle
c) square
d) trapezium

Answer: d

Explanation: If a pyramid is cut by a plane parallel to axis and also parallel to any edge of

base then the section formed will be trapezium if the section plane not parallel to edge of base then the section will be triangle.

2. A square pyramid is placed on V.P with square as base on V.P the cutting plane is parallel to V.P, the section will be _____

a) triangle
b) rectangle
c) square
d) pentagon

Answer: c

Explanation: If a pyramid is cut by a plane perpendicular to its axis section gives the base shape or parallel to axis and also parallel to any edge of base then the section formed will be trapezium if the section plane not parallel to edge of base then the section will be triangle.

3. A pentagon pyramid is placed on V.P with square as base on V.P the cutting plane is parallel to H.P and parallel to edge of base, the section will be _____

a) triangle
b) rectangle
c) trapezium
d) pentagon

Answer: c

Explanation: If a pyramid is cut by a plane parallel to axis and also parallel to any edge of base then the section formed will be trapezium if the section plane not parallel to edge of base then the section will be triangle.

4. A pentagon pyramid is placed on V.P with square as base on V.P the cutting plane is perpendicular to H.P and inclined to V.P and the section is cutting the whole cross-section, the section will be _____

a) triangle
b) trapezium
c) irregular square
d) irregular pentagon

Answer: d

Explanation: Given a regular pentagonal pyramid it may of any size having any distances in between them if a section plane cutting the solid inclined to its base and completely cutting the solid the section formed will be irregular base shape.

5. A pentagon pyramid is placed on V.P with square as base on V.P the cutting plane is perpendicular to H.P and inclined to V.P and the section is cutting not more than 3 edges, the section will be _____

a) triangle
b) trapezium
c) irregular square
d) irregular pentagon

Answer: a

Explanation: : If a pyramid is cut by a plane perpendicular to its axis section gives the base shape or parallel to axis and also parallel to any edge of base then the section formed will be trapezium if the section plane not parallel to edge of base then the section will be triangle.

6. A square pyramid is placed on H.P on its square base and section plane is perpendicular to V.P and inclined to H.P cutting given solid in such a way that the perpendicular distance from the ends of section to axis is same. The section will be _____

a) square
b) triangle
c) irregular pentagon
d) rhombus

Answer: d

Explanation: Given a square pyramid it may of any size having any distances in between them if a section plane cutting the solid coincides with base edge and cutting pyramid gives a irregular square and similar to other based pyramids also.

7. A square pyramid is placed on H.P on its square base and section plane is perpendicular to V.P and parallel to H.P and cutting the solid. The section will be _____

a) square
b) triangle
c) irregular pentagon
d) rhombus

Answer: a

Explanation: If a pyramid is cut by a plane perpendicular to its axis section gives the base shape or parallel to axis and also parallel to any edge of base then the section formed will

be trapezium if the section plane not parallel to edge of base then the section will be triangle.

8. A square pyramid is placed on H.P on its square base and section plane is parallel to V.P and not parallel to edge of base is cutting the solid. The section will be _____

a) square
b) triangle
c) irregular pentagon
d) trapezium

Answer: b

Explanation: If a pyramid is cut by a plane parallel to axis and also parallel to any edge of base then the section formed will be trapezium if the section plane not parallel to edge of base then the section will be triangle.

9. A regular pentagonal pyramid of base side equal to 5 cm is resting on H.P on its pentagon face and section plane is parallel to axis and parallel to edge of base and plane is 2 cm away from axis. The section will be _____

a) triangle
b) trapezium
c) rectangle
d) pentagon

Answer: b

Explanation: If a pyramid is cut by a plane parallel to axis and also parallel to any edge of base then the section formed will be trapezium if the section plane not parallel to edge of base then the section will be triangle.

10. A regular pentagonal pyramid of base side equal to 5 cm is resting on H.P on its pentagon face and section plane is perpendicular to axis. The section will be _____

a) triangle
b) trapezium
c) rectangle
d) pentagon

Answer: d

Explanation: If a pyramid is cut by a plane perpendicular to its axis section gives the base shape or parallel to axis and also parallel to any edge of base then the section formed will

be trapezium if the section plane not parallel to edge of base then the section will be triangle.

11. A regular octagonal pyramid of base side equal to 6 cm is resting on its octagon face on ground and section plane is parallel to axis and parallel to one of edges of base is held at a distance of 2 cm away from axis the section will be _____

a) triangle
b) trapezium
c) rectangle
d) octagon

Answer: b

Explanation: If a pyramid is cut by a plane parallel to axis and also parallel to any edge of base then the section formed will be trapezium if the section plane not parallel to edge of base then the section will be triangle.

12. A regular octagonal pyramid of base side equal to 6 cm is resting on its octagon face on ground and section plane is parallel to axis and not parallel to any of the edges of base is held at a distance of 4 cm away from axis the section will be _____

a) triangle
b) trapezium
c) rectangle
d) octagon

Answer: a

Explanation: If a pyramid is cut by a plane parallel to axis and also parallel to any edge of base then the section formed will be trapezium if the section plane not parallel to edge of base then the section will be triangle.

13. A regular octagonal pyramid of base side equal to 6 cm is resting on its octagon face on ground and the section is coinciding with the edge of base and cutting solid with an angle with base equal to 45 degrees the section will be _____

a) Triangle
b) Trapezium
c) Irregular Octagon
d) Octagon

Answer: c

Explanation: Given a regular octagonal pyramid it may of any size having any distances in between them if a section plane cutting the solid coincides with base edge and cutting pyramid gives a irregular octagon and similar to other based pyramids also.

Sections of Cylinders

1. A cylinder is placed on H.P on its base and section plane is parallel to V.P cutting the solid the section gives _____
a) parabola
b) circle
c) rectangle
d) ellipse
Answer: c
Explanation: Cylinder is formed by rotating the rectangle about one of its sides which is said to axis further. So if the cutting plane is parallel to axis the section formed is rectangle and if plane is perpendicular to axis it gives circle.

2. A cylinder is placed on H.P on its base and section plane is parallel to H.P cutting the solid the section gives _____
a) parabola
b) circle
c) rectangle
d) ellipse
Answer: b
Explanation: Cylinder is formed by rotating the rectangle about one of its sides which is said to axis further. So if the cutting plane is parallel to axis the section formed is rectangle and if plane is perpendicular to axis it gives circle.

3. A cylinder is placed on H.P on its base and section plane is inclined to V.P and perpendicular to H.P cutting the solid the section gives _____
a) parabola
b) circle
c) rectangle
d) ellipse
Answer: c
Explanation: Cylinder is formed by rotating the rectangle about one of its sides which is

said to axis further. So if the cutting plane is parallel to axis the section formed is rectangle and if plane is perpendicular to axis it gives circle.

4. A cylinder is placed on H.P on its base and section plane is inclined to H.P and perpendicular to V.P cutting only less than half of the generators of the solid the section gives _____

a) parabola
b) circle
c) rectangle
d) ellipse

Answer: a

Explanation: If a cylinder is been cut by plane which is inclined to base or axis if it cuts all the generator the section formed will be ellipse and if the plane cuts less than half of generators the section formed will be parabola.

5. A cylinder is placed on V.P on its base and section plane is inclined to V.P and perpendicular to H.P cutting all the generators of the solid the section gives _____

a) parabola
b) circle
c) rectangle
d) ellipse

Answer: d

Explanation: : If a cylinder is been cut by plane which is inclined to base or axis if it cuts all the generator the section formed will be ellipse and if the plane cuts less than half of generators the section formed will be parabola.

6. A cylinder is placed on V.P on its base and section plane is inclined to H.P and perpendicular to V.P cutting the solid the section gives _____

a) parabola
b) circle
c) rectangle
d) ellipse

Answer: c

Explanation: Cylinder is formed by rotating the rectangle about one of its sides which is said to axis further. So if the cutting plane is parallel to axis the section formed is rectangle and if plane is perpendicular to axis it gives circle.

7. A cylinder is been cut by a plane parallel to its base the section will be _____

a) parabola
b) circle
c) rectangle
d) ellipse

Answer: b

Explanation: Cylinder is formed by rotating the rectangle about one of its sides which is said to axis further. So if the cutting plane is parallel to axis the section formed is rectangle and if plane is perpendicular to axis it gives circle.

8. A cylinder is been cut by a plane parallel to axis the section will be _____

a) parabola
b) circle
c) rectangle
d) ellipse

Answer: c

Explanation: Cylinder is formed by rotating the rectangle about one of its sides which is said to axis further. So if the cutting plane is parallel to axis the section formed is rectangle and if plane is perpendicular to axis it gives circle.

9. A cylinder is been cut completely by a plane inclined to base then the section will be_____

a) parabola
b) circle
c) rectangle
d) ellipse

Answer: d

Explanation: If a cylinder is been cut by plane which is inclined to base or axis if it cuts all the generator the section formed will be ellipse and if the plane cuts less than half of generators the section formed will be parabola.

10. A cylinder is kept in such a way its axis is parallel to both the reference planes and cut completely by a section plane is perpendicular to V.P and inclined to H.P then the section will be _____

a) parabola
b) circle
c) rectangle

d) ellipse

Answer: d

Explanation: Given a cylinder is placed on profile plane or picture plane and is been cut by a cutting plane inclined to axis as per conditions that is cutting all generators which definitely give ellipse as section.

11. A cutting plane cut the cylinder into half diagonally touching both the bases at corners the section and side view of 1 part of cylinder is _____

a) ellipse, circle

b) ellipse, rectangle

c) ellipse, triangle

d) closed figure formed by 2 parallel line bounded by 2 similar arcs, triangle

Answer: c

Explanation: Given a cylinder is been cut diagonally from one corner of 1st base to other corner of 2nd base as we can imagine it is just cutting a plane inclined to axis that is cutting all generators which definitely give ellipse as section and side view will be triangle, top view will be circle.

12. A cylinder is placed on V.P and the section plane is parallel to H.P cutting the solid into two equal parts the front view of the 1st part of cylinder will be _____

a) circle

b) ellipse

c) rectangle

d) semi-circle

Answer: d

Explanation: Given the cylinder is placed on V.P on its base and the section plane is parallel to H.P cutting the solid into two equal parts. In this case the side view, front view shows the section plane as line cutting the cylinder into 2 halves and show rectangle and semicircle.

13. A cylinder is placed on V.P on its base and the section plane is parallel to H.P cutting the solid into two equal parts the top view of the 1st part of cylinder will be _____

a) rectangle of width equal to half of diameter of cylinder

b) rectangle of width equal to diameter of cylinder

c) circle of diameter equal to that of cylinder

d) semicircle with diameter equal to that of cylinder

Answer: b

Explanation: Given the cylinder is placed on V.P on its base and the section plane is parallel to H.P cutting the solid into two equal parts. In this case the side view, front view shows the section plane as line cutting the cylinder into 2 halves and show rectangle and semicircle but top view shows the rectangle of width equal to diameter of cylinder.

Sections of Cones

1. A regular cone is placed on V.P on its base a section plane is parallel to H.P and section plane is 2cm away from the axis the section will be _____

a) ellipse

b) hyperbola

c) circle

d) triangle

Answer: b

Explanation: If a cone made to cut by a plane parallel to its axis and some distance away from it the section formed is hyperbola. If the section plane is perpendicular to axis the section is circle. If section plane passes through apex the section formed is triangle.

2. A regular cone is placed such that axis is perpendicular to H.P and the section plane is inclined to axis and parallel to one of the generator then the section will be _____

a) ellipse

b) hyperbola

c) parabola

d) triangle

Answer: c

Explanation: If a regular cone is been cut by plane which is inclined to axis of cone and cutting all generators then the section formed will be ellipse and if section plane is inclined with axis with angle less than half of the angle between the slanting ends then section formed is parabola.

3. A regular cone is placed such that axis is parallel to both reference planes the section plane perpendicular to both reference planes and cuts the cone the section will be like _____

a) ellipse

b) hyperbola

c) circle
d) triangle
Answer: c
Explanation: If a cone made to cut by a plane parallel to its axis and some distance away from it the section formed is hyperbola. If the section plane is perpendicular to axis the section is circle. If section plane passes through apex the section formed is triangle.

4. A regular cone is placed on H.P and section plane is parallel to axis cutting the cone at the middle then the section will be _____
a) ellipse
b) hyperbola
c) circle
d) triangle
Answer: d
Explanation: If a cone made to cut by a plane parallel to its axis and some distance away from it the section formed is hyperbola. If the section plane is perpendicular to axis the section is circle. If section plane passes through apex the section formed is triangle.

5. A regular cone is been cut by a cutting plane which passes through the apex of cone and making some angle with axis less than half of angle between the slanting ends the section will be like _____
a) ellipse
b) hyperbola
c) circle
d) triangle
Answer: d
Explanation: If a cone made to cut by a plane parallel to its axis and some distance away from it the section formed is hyperbola. If the section plane is perpendicular to axis the section is circle. If section plane passes through apex the section formed is triangle.

6. A regular cone is resting on V.P with axis perpendicular to it a plane is cutting the cone such that it is perpendicular to H.P and inclined to V.P cutting cone at all generators the section formed is _____
a) ellipse
b) hyperbola
c) circle
d) triangle
Answer: a

Explanation: If a regular cone is been cut by plane which is inclined to axis of cone and cutting all generators then the section formed will be ellipse. If section plane is inclined with axis with angle less than half of the angle between the slanting ends then section formed is parabola.

7. A regular cone is resting on H.P on its base. A section plane is perpendicular to H.P and V.P cutting the cone such that the plane is not having axis of cone in it. The section would be _____

a) Ellipse
b) Hyperbola
c) Parabola
d) Triangle

Answer: c

Explanation: Given the section plane is perpendicular to H.P and V.P and axis of cone perpendicular to H.P. So if a regular cone is been cut by plane which is parallel to its axis and plane is not coinciding with the axis then section formed will be parabola.

8. A regular cone is been cut by a plane which is perpendicular to axis of cone the section will be like _____

a) ellipse
b) hyperbola
c) circle
d) triangle

Answer: c

Explanation: If a cone made to cut by a plane parallel to its axis and some distance away from it the section formed is hyperbola. If the section plane is perpendicular to axis the section is circle. If section plane passes through apex the section formed is triangle.

9. A regular cone is been cut by a plane which is parallel to the axis of cone the section formed will be like _____

a) ellipse
b) hyperbola
c) circle
d) parabola

Answer: b

Explanation: If a cone made to cut by a plane parallel to its axis and some distance away from it the section formed is hyperbola. If the section plane is perpendicular to axis the section is circle. If section plane passes through apex the section formed is triangle.

10. A regular cone is been cut by a plane which is parallel to the axis of cone, the section formed will be like _____

a) ellipse
b) triangle
c) circle
d) parabola

Answer: b

Explanation: If a cone made to cut by a plane parallel to its axis and some distance away from it the section formed is hyperbola. If the section plane is perpendicular to axis the section is circle. If section plane passes through apex the section formed is triangle.

11. A regular cone is been cut by a plane which is inclined to axis of cone and cuts all the generators the section formed be like _____

a) ellipse
b) hyperbola
c) circle
d) parabola

Answer: a

Explanation: If a regular cone is been cut by plane which is inclined to axis of cone and cutting all generators then the section formed will be ellipse and if section plane is inclined with axis with angle less than half of the angle between the slanting ends then section formed is parabola.

12. Given are some shapes of sections of a regular cone. Match the following.

	Positions of the cutting plane		True shape of section
1.	Inclined to axis cutting all generators	i.	Circle
2.	Parallel to axis	ii.	Ellipse
3.	Perpendicular to axis	iii.	Triangle

4.	Passing through the axis or the apex	iv.	Rectangular hyperbola

a) 1, iv; 2, iii; 3, i; 4, ii
b) 1, ii; 2, iv; 3, iii; 4, i
c) 1, ii; 2, iv; 3, i; 4, iii
d) 1, ii; 2, iii; 3, i; 4, iv

Answer: c

Explanation: Generators are the imaginary line drawn from base to apex of the curves. If the plane is inclined to and on one side of the axis the section is Hyperbola and if the plane is parallel to the generator the section formed is parabola.

Sections of Spheres

1. A sphere is placed on H.P and section plane is parallel to H.P the section is circle and if the section plane is parallel to V.P the section is again circle.
a) True
b) False

Answer: a

Explanation: When a sphere is cut by a plane, the true shape of the section is always a circle. But here asked are views so it will be lines or ellipse according to section plane however the section plane will lay section will be circle.

2. If a sphere is made to cut by a plane which is inclined to V.P when circle is on H.P the section formed will be ellipse.
a) True
b) False

Answer: b

Explanation: No, when a sphere is cut by a plane, the true shape of the section is always a circle. But here asked are views so it will be lines or ellipse according to section plane however the section plane will lay section will be circle.

3. A sphere is on H.P and a section plane is perpendicular to both the reference planes is cutting the sphere such that the section divides the sphere to ¼ th and ¾ th part the front view and side view will be _____
a) circle, line
b) ellipse, circle

c) line, ellipse
d) line, circle
Answer: d
Explanation: When a sphere is cut by a plane, the true shape of the section is always a circle. But here asked are views so it will be lines or ellipse according to section plane however the section plane will lay section will be circle.

4. A sphere is placed on V.P the section plane perpendicular to H.P and inclined to V.P cutting the sphere section formed and front view will be _____
a) circle, line
b) circle, circle
c) ellipse, circle
d) circle, ellipse
Answer: d
Explanation: When a sphere is cut by a plane, the true shape of the section is always a circle. But here asked are views so it will be lines or ellipse according to section plane however the section plane will lay section will be circle.

5. A sphere is cut by a plane at some distance from the longest diameter of it the section formed will be

_____
a) ellipse
b) circle
c) line
d) oval
Answer: b
Explanation: When a sphere is cut by a plane, the true shape of the section is always a circle. But here asked are views so it will be lines or ellipse according to section plane here the views of minor parts give segment.

6. A hemi sphere is placed on H.P on its base a section plane which is perpendicular to H.P and inclined to V.P and cutting the hemisphere the section will be _____
a) circle
b) ellipse
c) sector
d) segment
Answer: d

Explanation: Hemisphere is the half sphere. When a hemisphere is made to cut by a plane parallel to base the section formed will be circle. If the plane is inclined to base the section formed will be segment.

7. A hemi sphere is placed on H.P on its base a section plane which is parallel H.P and cutting the hemisphere section will be _____

a) circle
b) ellipse
c) sector
d) segment

Answer: a

Explanation: Hemisphere is the half sphere. When a hemisphere is made to cut by a plane parallel to base the section formed will be circle. If the plane is inclined to base the section formed will be segment.

8. A sphere is cut be section placed which is parallel to H.P the top view and front view of section will be _____

a) circle, line
b) line, circle
c) ellipse, line
d) line, ellipse

Answer: a

Explanation: When a sphere is cut by a plane, the true shape of the section is always a circle. But here asked are views so it will be lines or ellipse according to section plane as here the plane is parallel to H.P the top view will be circle and front view will be line.

9. A sphere is cut by plane which is perpendicular to V.P and inclined to H.P the top view and section will be _____

a) line, circle
b) line, ellipse
c) ellipse, circle
d) circle, ellipse

Answer: c

Explanation: When a sphere is cut by a plane, the true shape of the section is always a circle. But here asked are views so it will be lines or ellipse according to section plane however the section plane will lay section will be circle.

10. A sphere is cut by plane which is perpendicular to V.P and inclined to H.P the top view and front view of minor part will be _____
a) circle, sector
b) line, circle
c) ellipse, segment
d) ellipse, sector
Answer: c
Explanation: When a sphere is cut by a plane, the true shape of the section is always a circle. But here asked are views so it will be lines or ellipse according to section plane and also here asked views for minor part so segment will be front view in this condition.

11. A sphere is cut by a plane at the middle the plane is perpendicular to both reference planes the top view and front view will be _____
a) line, circle
b) circle, line
c) line, line
d) circle, circle
Answer: c
Explanation: Given the plane is perpendicular to both the reference planes so the plane is parallel to picture plane so the section would also be parallel to picture plane as the section is 2D figure the other view will give line obviously.

12. A sphere is cut by a plane which is inclined to both reference planes the top view and front view of section will be _____
a) line, line
b) circle, circle
c) ellipse, circle
d) ellipse, ellipse
Answer: d
Explanation: When a sphere is cut by a plane, the true shape of the section is always a circle. But here it is asked view so they will be definitely ellipse since the section plane is inclined to both the reference planes.

Development of Surfaces

1. Which method of development is employed in case of prisms?
a) Parallel-line development

b) Approximation method
c) Triangulation development
d) Radial-line development
Answer: a
Explanation: Parallel-line method is employed in case of prisms and cylinders in which stretch out-line principle is used. Radial-line development is used for pyramids and cones in which the true length of the slant edge or the generator is used as radius.

2. Which method of development is employed in case of cones?
a) Parallel-line development
b) Approximation method
c) Triangulation development
d) Radial-line development
Answer: d
Explanation: Parallel-line method is employed in case of prisms and cylinders in which stretch out-line principle is used. Radial-line development is used for pyramids and cones in which the true length of the slant edge or the generator is used as radius.

3. Which method of development is employed in case of double curved objects?
a) Parallel-line development
b) Approximation method
c) Triangulation development
d) Radial-line development
Answer: b
Explanation: Approximation method is used to develop objects of double curved or warped surfaces as sphere, paraboloid, ellipsoid, hyperboloid and helicoid. Triangulation method is used for transition pieces. This is simply a method of dividing a surface into number of triangles and transferring them into the development.

4. Which method is used to develop transition pieces?
a) Parallel-line development
b) Approximation method
c) Triangulation development
d) Radial-line development
Answer: c
Explanation: Approximation method is used to develop objects of double curved or warped surfaces as sphere, paraboloid, ellipsoid, hyperboloid and helicoid. Triangulation method is

used for transition pieces. This is simply a method of dividing a surface into number of triangles and transferring them into the development.

5. Which method of development is employed in case of sphere, ellipsoid?
a) Parallel-line development
b) Approximation method
c) Triangulation development
d) Radial-line development
Answer: b
Explanation: Approximation method is used to develop objects of double curved or warped surfaces as sphere, paraboloid, ellipsoid, hyperboloid and helicoid. Triangulation method is used for transition pieces. This is simply a method of dividing a surface into number of triangles and transferring them into the development.

6. Developments of the lateral surface of a prism consist of the same number of _____ in contact as the number of the sides of base of the prism.
a) squares
b) rectangles
c) triangles
d) parallelograms
Answer: b
Explanation: Developments of the lateral surface of a prism consist of the same number of rectangles in contact as the number of the sides of base of the prism. One side of the rectangle is equal to the length of the axis and the other side equal to the length of the side of the base.

7. The development of the lateral surface of a cylinder is a rectangle having one side equal to the _____ of its base-circle and the other equal to its length.
a) circumference
b) area
c) diameter
d) radius
Answer: a
Explanation: The development of the lateral surface of a cylinder is a rectangle having one side equal to the circumference of its base-circle and the other equal to its length. Length is the distance between the two bases.

8. The development of lateral surface of a pyramid consists of a number of equal _____triangle in contact.
a) equilateral
b) isosceles
c) scalene
d) right angled
Answer: b
Explanation: The development of lateral surface of a pyramid consists of a number of equal isosceles triangles in contact. The base and sides of each triangle are respectively equal to the edge of the base and slant edge of the pyramid.

9. The development of the curved surface of a cone is a _____ of a _____
a) sector, circle
b) segment, circle
c) segment, ellipse
d) arc, parabola
Answer: a
Explanation: The development of the curved surface of a cone is a sector of a circle, the radius and the length of the arc of which are respectively equal to the slant height and the circumference of the base-circle of the cone.

10. The development of the surface of a cube consists of ____ equal squares, the length of the side of the squares being equal to the length of the edge of the cube.
a) 4
b) 6
c) 12
d) 8
Answer: b
Explanation: The development of the surface of a cube consists of 6 equal squares, the length of the side of the squares being equal to the length of the edge of the cube. It is 6 squares because the cube is bounded by equal squares and only 6 faces are there.

11. A zone is portion of the sphere enclosed between two planes parallel to the axis.
a) True
b) False

Answer: b

Explanation: A zone is portion of the sphere enclosed between two planes perpendicular to the axis. A lune is the portion between the two planes which contain the axis of the sphere. A sphere is approximately developed by these two methods.

12. Which method of development is employed in case of pyramids?

a) Parallel-line development

b) Approximation method

c) Triangulation development

d) Radial-line development

Answer: d

Explanation: Parallel-line is employed in case of prisms and cylinders in which stretch out-line principle is used. Radial-line development is used for pyramids in which the actual length of the slant edge or the generator is used as radius.

Intersection of Surfaces

1. The surfaces of which intersect one another in lines which are called line of intersection.

a) True

b) False

Answer: a

Explanation: In engineering practice, objects constructed may have constituent parts, the surfaces of which intersect one another in line which are called line of intersection. A dome fitted on a boiler is one such example. The surface of the dome extends up to the line of intersection only.

2. The plane surfaces intersect in a _____,the line of intersection between two curved surfaces is _____ and between a plane surface and curved surfaces is a _____

a) straight line, curve, curve

b) straight line, straight line, curve

c) straight line, curve, straight line

d) curve, curve, curve

Answer: a

Explanation: The plane surfaces (faces of prisms and pyramids) intersect in a straight line.

The line of intersection between two curved surfaces (of cylinders and cones) or between a plane surface and curved surfaces is a curve.

3. Drawing straight lines on both the surfaces of solids and then pointing the points where they intersect and drawing lines which forms the line of intersection this process of finding the line of intersection is termed as _____ method.
a) assumption
b) line
c) removing material
d) cutting- plane
Answer: b
Explanation: A number of lines are drawn on the lateral surface of one of the solids and in the region of the line of intersection. Points of intersection of these lines with the surface of the other solid are then located. These points will obviously lie on the required line of intersection.

4. Selecting of particular plane in a series of planes drawn cutting the solid either parallel, perpendicular or oblique which cut the surface of one of the solids in straight lines and that of the other in straight lines or circles. This is called _____method.
a) assumption
b) line
c) removing material
d) cutting- plane
Answer: d
Explanation: The two solids are assumed to be cut by a series of cutting planes. The cutting planes may be vertical, edgewise or oblique. The cutting planes are so selected as to cut the surface of one of the solids in straight lines and that of the other in straight lines or circle.

5. When a solid completely penetrates another solid, there will be two lines of intersection. These lines are called_____
a) line of interpenetration
b) concyclic curves of lines
c) hidden lines
d) inside line
Answer: a
Explanation: When a solid completely penetrates another solid, there will be two lines of

intersection. These lines are called lines of interpenetration. The portion of the penetrating solid which lies hidden within the other solid is shown by dotted lines.

6. The line of intersection formed is straight line while two solids are intersecting the solids may be _____
a) prism, cylinder
b) prism, cone
c) pyramid, cone
d) prism, pyramid
Answer: d
Explanation: If any of the solid in two of intersecting solids is having curves surface that is cylinder, cone, sphere etc the line of intersection will give curve only but not straight line for getting line of intersection straight line both the solids should not have curved surfaces.

7. The line of intersection formed is straight line while two solids intersect the solids may be _____
a) cube, cylinder
b) pentagonal prism, cone
c) triangular pyramid, cone
d) triangular prism, square pyramid
Answer: d
Explanation: If any of the solid in two of intersecting solids is having curves surface that is cylinder, cone, sphere etc the line of intersection will give curve only but not straight line for getting line of intersection straight line both the solids should not have curved surfaces.

8. The line of intersection formed is curve while two solids intersect the solids may be _____
a) cube, triangular prism
b) pentagonal prism, cone
c) triangular pyramid, cube
d) triangular prism, square pyramid
Answer: b
Explanation: If any of the solid in two of intersecting solids is having curves surface that is cylinder, cone, sphere etc the line of intersection will give curve only but not straight line for getting line of intersection straight line both the solids should not have curved surfaces.

9. The line of intersection formed is curve while two solids intersect the solids may be _____

a) cone, cylinder
b) cube, prism
c) pyramid, cube
d) pyramid, cuboid

Answer: a

Explanation: If any of the solid in two of intersecting solids is having curves surface that is cylinder, cone, sphere etc the line of intersection will give curve only but not straight line for getting line of intersection straight line both the solids should not have curved surfaces.

10. A prism and cylinder got intersected at 90 degrees the line of intersection will be _____ and parallel to axis of _____

a) straight line, prism
b) curve, prism
c) straight line, cylinder
d) curve, cylinder

Answer: b

Explanation: As here a prism and cylinder are intersected in which the prism has plane surface and cylinder has curved surface and we know the curved surface is perpendicular to axis of cylinder and also given the solids intersect at 90 degrees so the curve formed will be parallel to axis of prism.

11. A prism and cone got intersected at 90 degrees the line of intersection will be _____ and parallel to axis of _____

a) straight line, prism
b) curve, prism
c) straight line, cone
d) curve, cone

Answer: b

Explanation: As here a prism and cone are intersected in which the prism has plane surface and cone has curved surface and we know the curved surface is perpendicular to axis of cone and also given the solids intersect at 90 degrees so the curve formed will be parallel to axis of prism.

12. The line of intersection formed is straight line while two solids are intersecting the solids may be _____

a) cube, cylinder
b) prism, cone
c) pyramid, cuboid

d) cube, cone

Answer: c

Explanation: If any of the solid in two of intersecting solids is having curves surface that is cylinder, cone, sphere etc the line of intersection will give curve only but not straight line for getting line of intersection straight line both the solids should not have curved surfaces.

13. The line of intersection formed is curve while two solids are intersecting the solids may be _____

a) cylinder, sphere

b) prism, prism

c) cuboid, cube

d) prism, pyramid

Answer: a

Explanation: If any of the solid in two of intersecting solids is having curves surface that is cylinder, cone, sphere etc the line of intersection will give curve only but not straight line for getting line of intersection straight line both the solids should not have curved surfaces.

Isometric Axes, Lines and Planes

1. The angle between the isometric axes is _____

a) 180 degrees

b) 60 degrees

c) 90 degrees

d) 120 degrees

Answer: d

Explanation: Isometric projection is a type of projection in which the three dimensions of a solid are not only shown in one view, but also their actual sizes can be measured directly from it. So it is needed that there exist equal angle between the axes for easy measurement so 360/3=120 degrees is chosen.

2. The value of the ratio of isometric length to true length is _____

a) 0.141

b) 0.372

c) 0.815

d) 0.642

Answer: c

Explanation: If we represent a cube in isometric view the diagonal of upper face of cube is

equal to the true length of the diagonal. From it by drawing actual square around it and then calculating it gives (1/cos 30)/ (1/cos 45) =isometric /true =0.815.

3. The length in isometric drawing of line is 20 cm. What is the true length of it?
a) 24.53 cm
b) 15.46 cm
c) 19.31 cm
d) 23.09 cm
Answer: a
Explanation: The ratio of isometric length to true length is 0.815 so here it is given isometric length of 20 cm. 0.815 = 20 cm / true length => true length = 20 cm /0.815 = 24.53 cm. Every time the true length is more than isometric length.

4. The true length of edge of cube is 15 cm what will be the isometric length?
a) 17.78 cm
b) 14.48 cm
c) 12.99 cm
d) 12.22 cm
Answer: d
Explanation: The ratio of isometric length to true length is 0.815 so here it is given true length of 15 cm. 0.815 = isometric length / 15 cm => isometric length = 15 cm x 0.815 = 12.22 cm. Every time the true length is more than isometric length.

5. The lines parallel to isometric axes are called _____ lines.
a) parallel
b) auxiliary
c) isometric
d) oblique
Answer: c
Explanation: The angle between the isometric axes is 120 degrees if any line is parallel to it then those are called isometric lines. Auxiliary lines may make any angle with horizontal and oblique is not related here.

6. The planes parallel to any of the two isometric lines are called _____ planes.
a) parallel
b) auxiliary
c) isometric

d) oblique

Answer: c

Explanation: The planes on which the faces of cube lie if it is placed in isometric view can be consider as the isometric planes which are parallel to two axes of isometric view which are x, y, z axes of isometric view.

7. Isometric view of cube is drawn the angle between the edge of cube and horizontal will be_____

a) 15 degrees

b) 120 degrees

c) 45 degrees

d) 30 degrees

Answer: d

Explanation: Isometric view of cube is drawn the angle between the edge of cube and horizontal will be 30 degrees because as the angle between the base and axis lower to will be 90 degrees the angle between the axes is 120 degrees. 120-90 = 60 degrees.

8. Isometric view of cube is drawn the angle between the edge of cube and vertical will be_____

a) 15 degrees

b) 120 degrees

c) 60 degrees

d) 30 degrees

Answer: c

Explanation: Isometric view of cube is drawn the angle between the edge of cube and vertical will be 60 degrees because the angle between the edge and horizontal is 30 and so angle between vertical and horizontal is 90. 90 – 30 = 60 degrees.

9. The true length of line is 40 cm and isometric view of it is drawn the length would decrease to _____

a) 28.28 cm

b) 32.6 cm

c) 34.6 c

d) 38.63 cm

Answer: b

Explanation: The ratio of isometric length to true length is 0.815 so here it is given true length of 40 cm. 0.815 = isometric length / 40 cm => isometric length = 40 cm x 0.815 = 32.6 cm. Every time the true length is more than isometric length.

10. The true length of the line is 30 cm and isometric view is drawn. How much length is reduced?
a) 24.45 cm
b) 25.98 cm
c) 4.01 cm
d) 5.55 cm
Answer: d
Explanation: The ratio of isometric length to true length is 0.815 so here it is given true length of 30 cm. 0.815 = isometric length / 30 cm => isometric length = 30 cm x 0.815 = 24.45 cm. 30 cm – 24.45 cm =5.55 cm.

11. The objects we see in nature will be in Isometric view.
a) True
b) False
Answer: b
Explanation: The objects we watch in our surrounds are not isometric view they are perspective view. Isometric view is imaginary view in which lines of sight are perpendicular to picture plane and are parallel to each other.

12. Isometric view of cube is drawn the angle between the adjacent edges is _____
a) 90 degrees, 120 degrees
b) 60 degrees, 120 degrees
c) 120 degrees, 120 degrees
d) 90 degrees, 30 degrees
Answer: b
Explanation: Given is a cube in which the adjacent angle are all equal and equal to 90 degrees and if isometric view is drawn then it show front faces with angles bet between them as 120 degrees and if take angles between the back and front faces we get the 60 degrees.

13. Isometric view of cube is drawn and faces of cube are seen as _____
a) square
b) rectangle
c) rhombus
d) parallelogram
Answer: c
Explanation: It is given isometric view of cube is drawn and it show regular hexagon in

which any of the faces represent rhombus which have diagonals cutting each other at 90 degrees any other adjacent edges have angles between them as 60 and 120 degrees.

Isometric Drawings

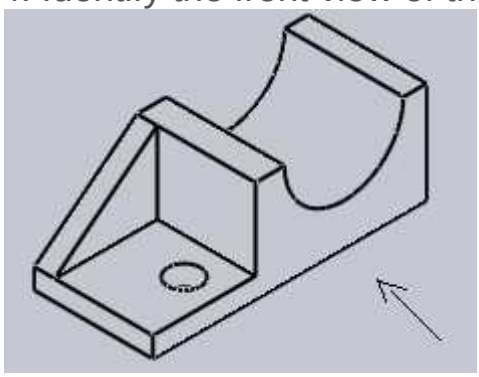
1. If isometric projection of an object is drawn with true lengths the shape would be same and size is how much larger than actual isometric projection?
a) 25%
b) 29.5%
c) 22.5%
d) 33.3%
Answer: c
Explanation: If the foreshortening of the isometric lines in an isometric projection is disregarded and instead, the true lengths are marked, the view obtained will be exactly of the same shape but larger in proportion than that obtained by the use of the isometric scale.

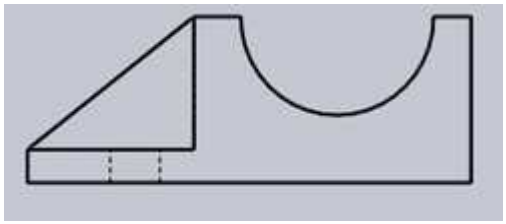
2. If an isometric projection is drawn with true measurements but not with isometric scale then the drawings are called _____
a) Isometric projection
b) Isometric view
c) Isometric perception
d) Orthographic view
Answer: b
Explanation: Due to the ease in construction and the advantage of measuring the dimensions directly from the drawing, it has become a general practice to use the true scale instead of the isometric scale.

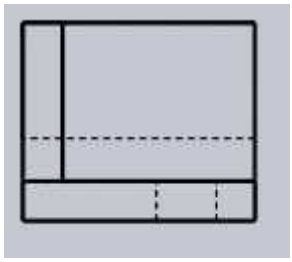
3. If an isometric drawing is made use of isometric scale then the drawings are called _____
a) Isometric projection
b) Isometric view
c) Isometric perception
d) Orthographic view
Answer: a
Explanation: To avoid confusion, the view drawn with the true scale is called isometric

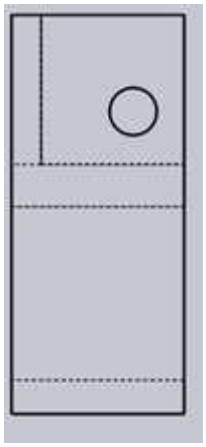
drawing or isometric view, while that drawn with the use of isometric scale is called isometric projection.

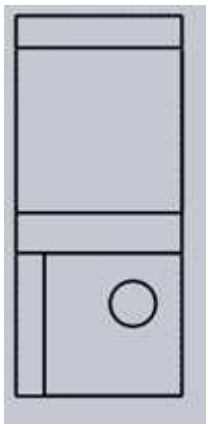
4. Identify the front view of the below isometric view.



a) 

b) 

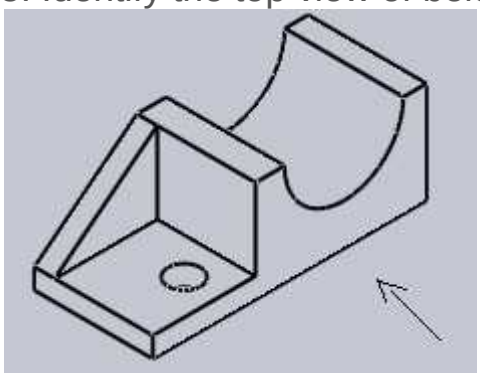
c) 

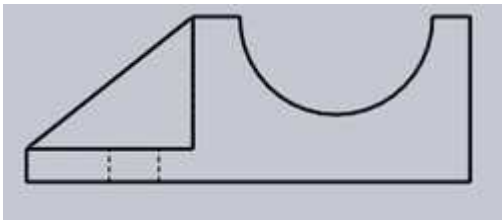
d) 

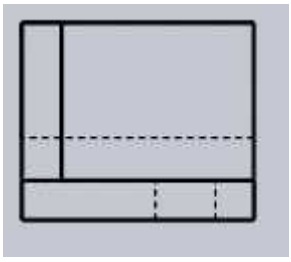
Answer: a

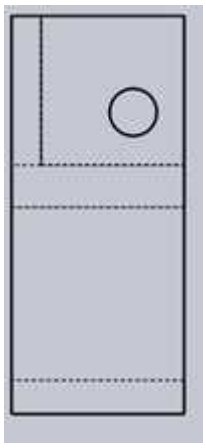
Explanation: Here the isometric view of some example picture is given. Arrow in question represents the line of sight in case of front view from that we can get other view. Front view is asked which can be watched along the arrow.

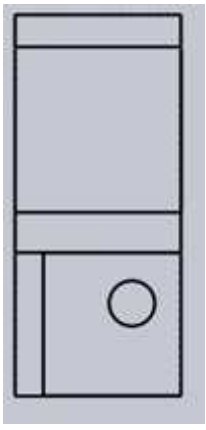
5. Identify the top view of below isometric view.



a) 

b) 

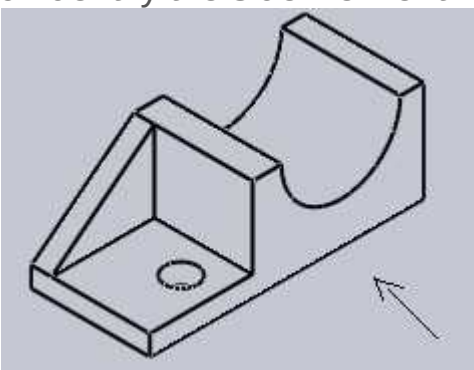
c) 

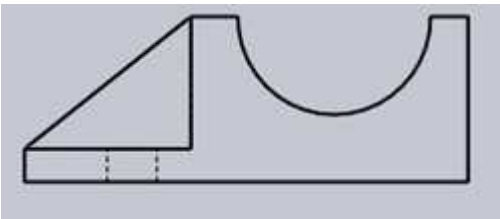
d) 

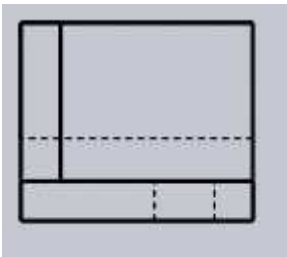
Answer: d

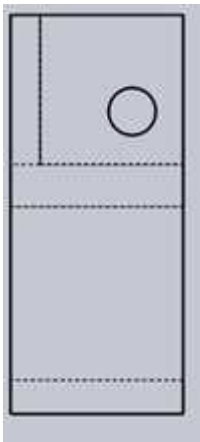
Explanation: Here the isometric view of some example picture is given. Arrow in question represents the line of sight in case of front view from that we can get other view. Top view is asked so considering the arrow we can find top view.

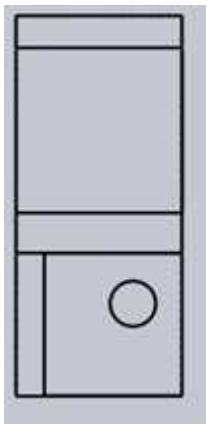
6. Identify the side view of the below isometric view.



a) 

b) 

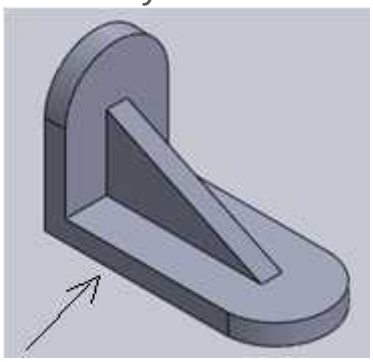
c) 

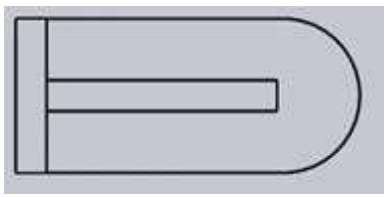
d) 

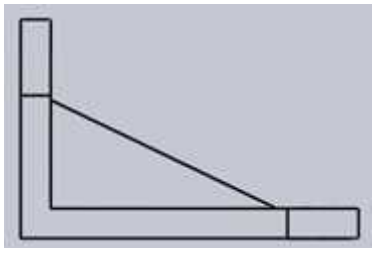
Answer: b

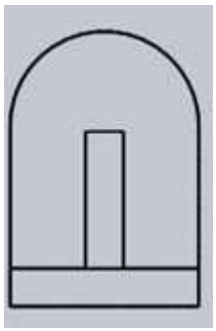
Explanation: Here the isometric view of some example picture is given. Arrow in question represents the line of sight in case of front view from that we can get other view. Side is watched from left side or right side of arrow placed.

7. Identify the side view of the below isometric view.



a) 

b) 

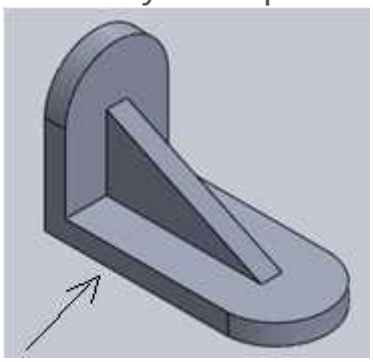
c) 

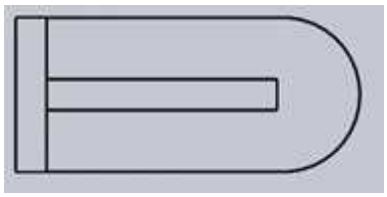
d) 

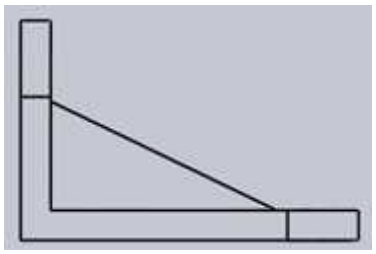
Answer: c

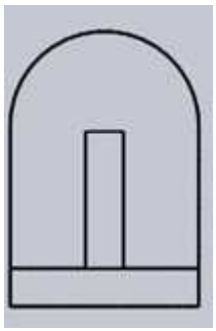
Explanation: Here the isometric view of some example picture is given. Arrow in question represents the line of sight in case of front view from that we can get other view. Side is watched from left side or right side of arrow placed.

8. Identify the top view of the below isometric view.



a) 

b) 

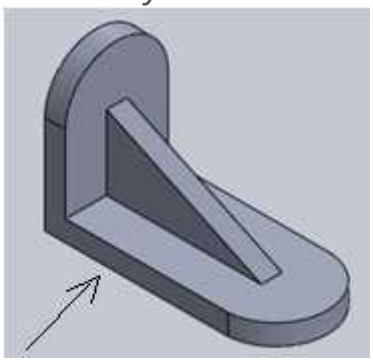
c) 

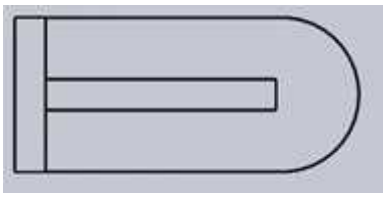
d) 

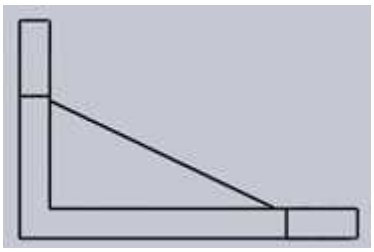
Answer: a

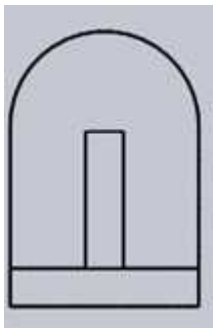
Explanation: Here the isometric view of some example picture is given. Arrow in question represents the line of sight in case of front view from that we can get other view. Top view is asked so considering the arrow we can find top view.

9. Identify the front view of the below isometric view.



a) 

b) 

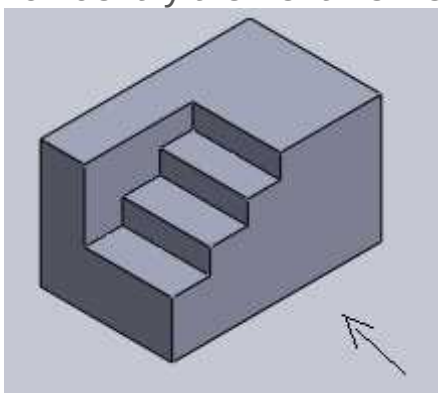
c) 

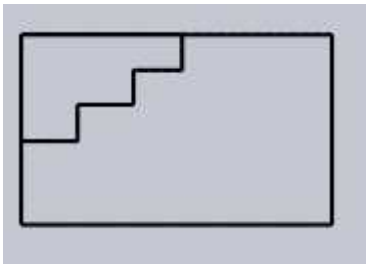
d) 

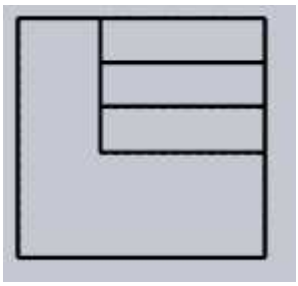
Answer: b

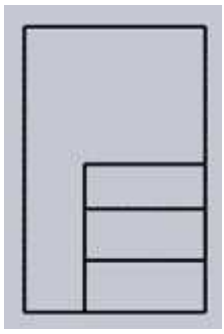
Explanation: Here the isometric view of some example picture is given. Arrow in question represents the line of sight in case of front view from that we can get other view. Front view is asked which can be watched along the arrow.

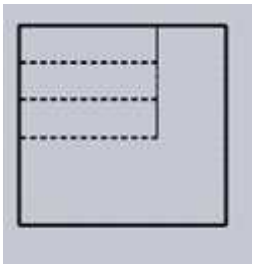
10. Identify the front view of the below isometric view.



a) 

b) 

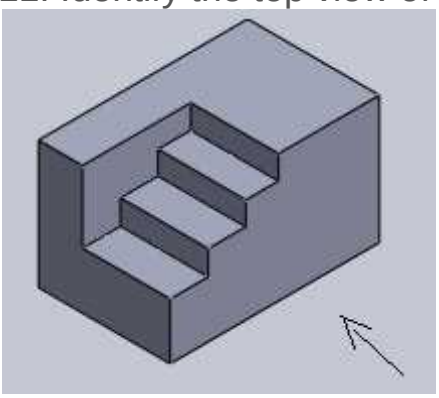
c) 

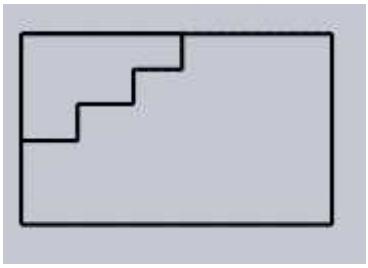
d) 

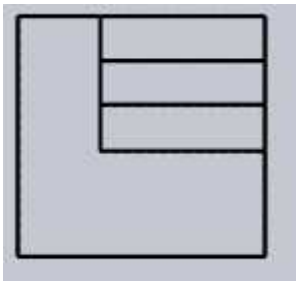
Answer: a

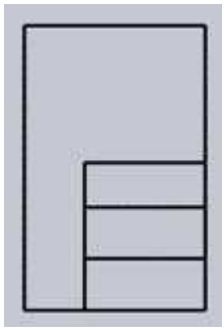
Explanation: Here the isometric view of some example picture is given. Arrow in question represents the line of sight in case of front view from that we can get other view. Front view is asked which can be watched along the arrow.

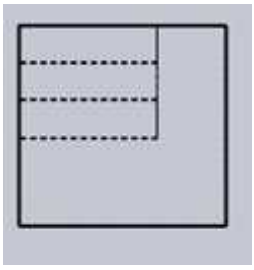
11. Identify the top view of the below isometric view.



a) 

b) 

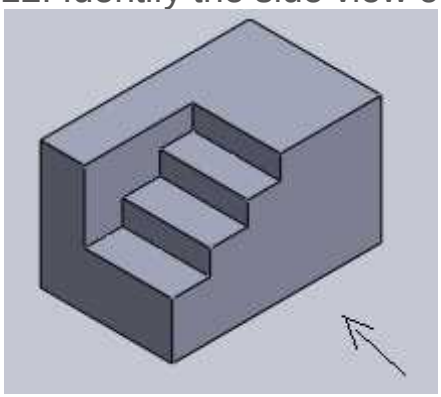
c) 

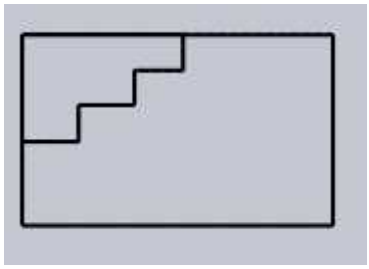
d) 

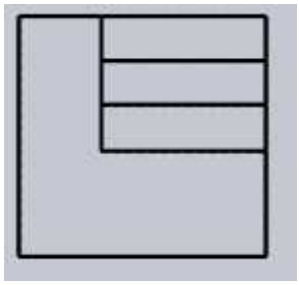
Answer: c

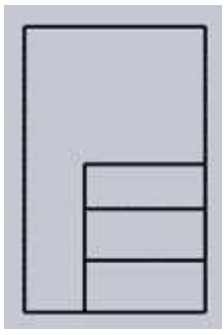
Explanation: Here the isometric view of some example picture is given. Arrow in question represents the line of sight in case of front view from that we can get other view. Top view is asked so considering the arrow we can find top view.

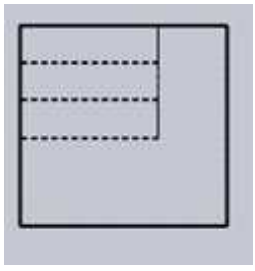
12. Identify the side view of the below isometric view.



a) 

b) 

c) 

d) 

Answer: b
Explanation: Here the isometric view of some example picture is given. Arrow in question represents the line of sight in case of front view from that we can get other view. Side is watched from left side or right side of arrow placed.

Isometric Drawing of Planes or Plane Figures

1. Front view of the square is given and has to draw its isometric view which angle the base has to make with horizontal?
a) 90 degrees
b) 15 degrees
c) 30 degrees
d) 60 degrees
Answer: c
Explanation: While drawing the isometric view of any figure made of lines the base always makes 30 degrees with horizontal and so in square and another parallel line also makes 30 degrees with horizontal and other sides will be perpendicular to horizontal.

2. Front view of the square is given and has to draw its isometric view which angle the vertical edge has to make with horizontal?
a) 90 degrees
b) 15 degrees
c) 30 degrees
d) 60 degrees
Answer: a
Explanation: In isometric view vertical lines exist and make 90 degrees with the horizontal so if the front view of a square is given and drawn to isometric view the angle between the vertical edge and horizontal is 90 degrees.

3. Top view of a square is given and has to draw its isometric view which angle the base has to make with horizontal?
a) 90 degrees
b) 15 degrees
c) 30 degrees
d) 60 degrees
Answer: c
Explanation: While drawing the isometric view of any figure made of lines the base always

makes 30 degrees with horizontal and so in square and another parallel line also makes 30 degrees with horizontal and other sides will be perpendicular to horizontal.

4. Top view of a square is given and has to draw its isometric view which angle the vertical edge has to make with horizontal?
a) 90 degrees
b) 15 degrees
c) 30 degrees
d) 60 degrees
Answer: c
Explanation: In isometric view vertical lines exist and make 90 degrees with the horizontal so if the top view of a square is given and drawn to isometric view the angle between the vertical edge and horizontal is 90 degrees.

5. Front view of triangle is given and isometric view is to be drawn which of the following is correct procedure in drawing isometric view .
a) turning the triangle such that base is making 30 degrees with horizontal
b) by increasing or decreasing angles at required proportions
c) drawing parallel to isometric axes
d) drawing rectangle with base and height of triangle and the drawing rectangle parallel to isometric axes and pointing triangle in it
Answer: d
Explanation: The surface of the triangle is vertical and the base is horizontal so base will be drawn parallel to a slopping axis. The two sides of the triangle are inclined. Hence they will not be drawn parallel to any isometric axis.

6. When a square is drawn to an isometric view it will give rectangle.
a) True
b) False
Answer: b
Explanation: Whatever the polygon when we are drawing it in isometric views the base will make 30 degrees and other sides will tends to show up like we are watching from some particular point as in perspective view in 1 dimension.

7. When a rectangle is drawn to an isometric view it will give parallelogram.
a) True
b) False
Answer: a

Explanation: Whatever the polygon when we are drawing it in isometric views the base will make 30 degrees and other sides will tends to show up like we are watching from some particular point as in perspective view in 1 dimension.

8. Isometric view of equilateral triangle will be _____
a) equilateral triangle
b) scalene triangle
c) isosceles triangle
d) right angled triangle
Answer: b
Explanation: Whatever the polygon when we are drawing it in isometric views the base will make 30 degrees and other sides will tends to show up like we are watching from some particular point as in perspective view in 1 dimension.

9. Isometric view of isosceles triangle will be ____
a) equilateral triangle
b) scalene triangle
c) isosceles triangle
d) right angled triangle
Answer: b
Explanation: Whatever the polygon when we are drawing it in isometric views the base will make 30 degrees and other sides will tends to show up like we are watching from some particular point as in perspective view in 1 dimension.

10. Isometric view of right angled triangle will be _____
a) equilateral triangle
b) scalene triangle
c) isosceles triangle
d) right angled triangle
Answer: b
Explanation: Whatever the quadrilateral when we are drawing it in isometric views the base will make 30 degrees and other sides will tends to show up like we are watching from some particular point as in perspective view in 1 dimension.

11. Isometric view of rhombus will become _____
a) parallelogram
b) rhombus
c) rectangle

d) square

Answer: a

Explanation: Whatever the quadrilateral when we are drawing it in isometric views the base will make 30 degrees and other sides will tends to show up like we are watching from some particular point as in perspective view in 1 dimension.

12. Isometric view of rectangle will become _____

a) parallelogram

b) rhombus

c) rectangle

d) square

Answer: a

Explanation: Whatever the quadrilateral when we are drawing it in isometric views the base will make 30 degrees and other sides will tends to show up like we are watching from some particular point as in perspective view in 1 dimension.

13. Front view of circle is given and isometric view is to be drawn which of the following is correct procedure in drawing isometric view ?

a) turning the circle such that line on diameter is making 30 degrees with horizontal

b) by increasing or decreasing angles between two perpendicular line on diameter at required proportions

c) drawing line in diameter parallel to isometric axes

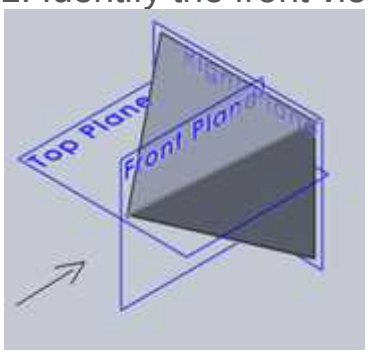
d) enclosing circle in a square and aligning square to isometric axes and pointing four points on circle touching the square and joining by smooth curve.

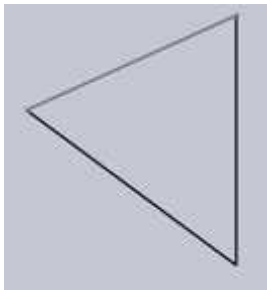
Answer: d

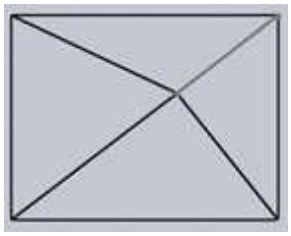
Explanation: Circle will be circle even if we rotate it in angle with that plane. So to represent circle in isometric view it should be enclosed in square and then aligning square to isometric axes and pointing points touching the square and drawing smooth curve.

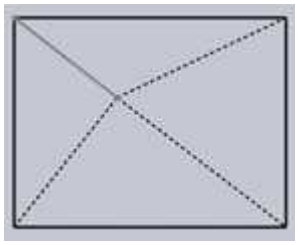
Isometric Drawing of Prisms and Pyramids

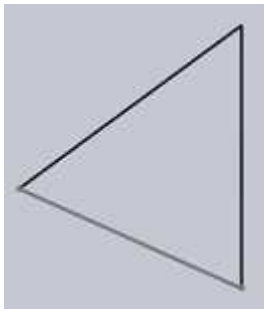
1. Identify the front view from the isometric view for the below given pyramid.



a) 

b) 

c) 

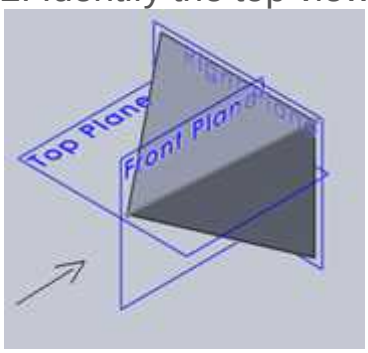
d) 

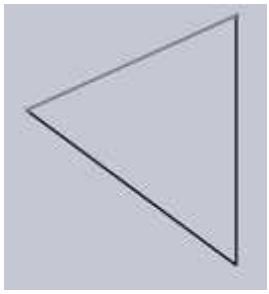
Answer: b

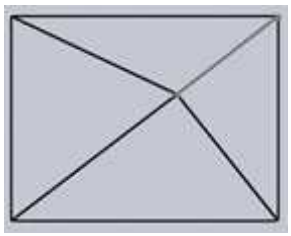
Explanation: The isometric view should be drawn according to the given views and in such

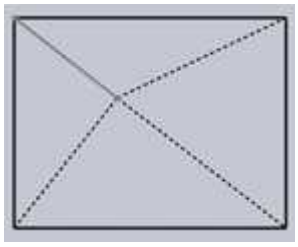
a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front is taking and dotted lines represent hidden edges and lines.

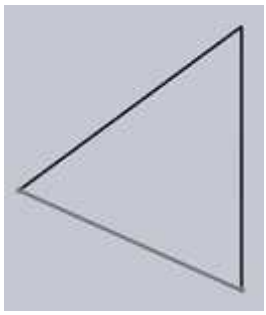
2. Identify the top view from the isometric view for the below given pyramid.



a) 

b) 

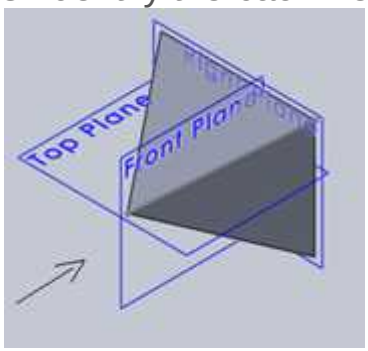
c) 

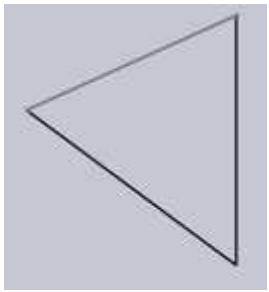
d) 

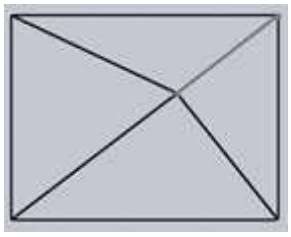
Answer: d

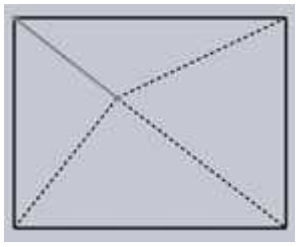
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front is taking and dotted lines represent hidden edges and lines.

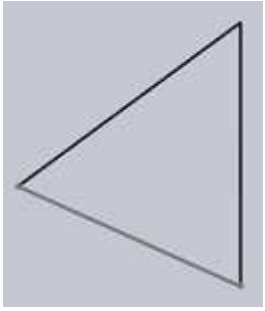
3. Identify the back view from the isometric view of the following pyramid.



a) 

b) 

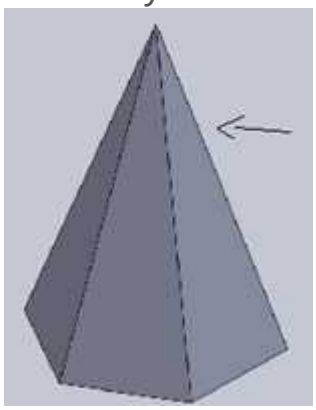
c) 

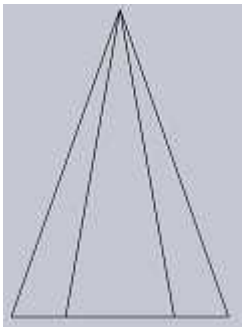
d) 

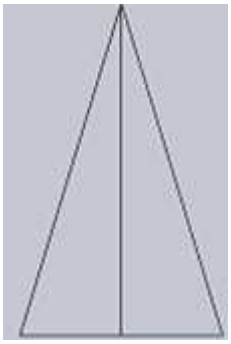
Answer: c

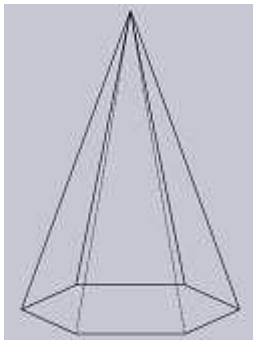
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front is taking and dotted lines represent hidden edges and lines.

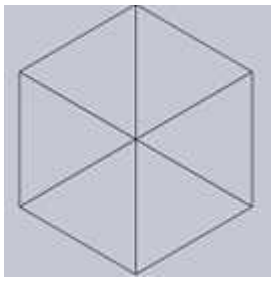
4. Identify the front view of the below given pyramid.



a) 

b) 

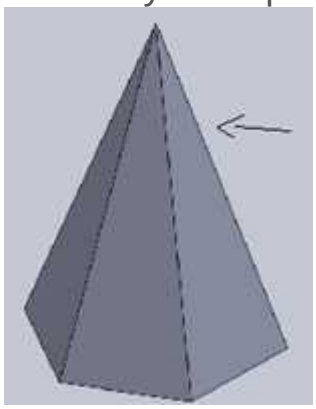
c) 

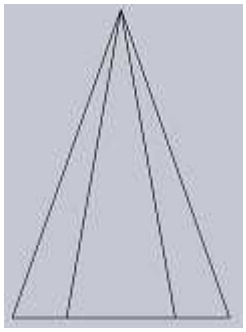
d) 

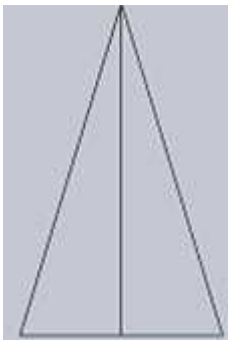
Answer: a

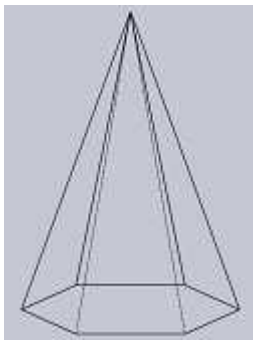
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front is taking and dotted lines represent hidden edges and lines.

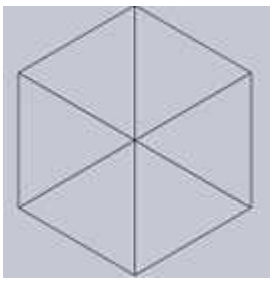
5. Identify the top view of the below given pyramid.



a) 

b) 

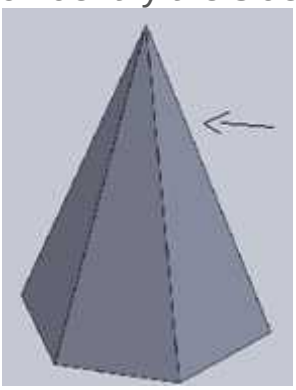
c) 

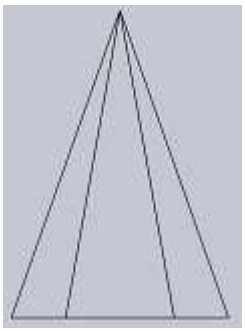
d) 

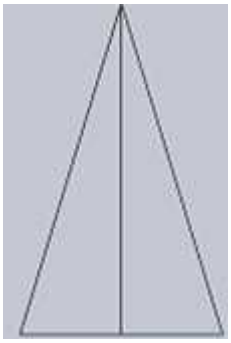
Answer: d

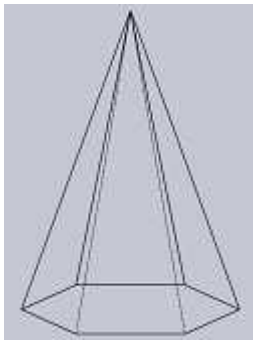
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front is taking and dotted lines represent hidden edges and lines.

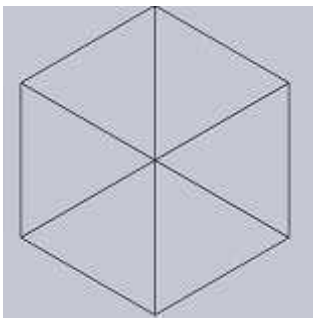
6. Identify the side view of for the below given pyramid.



a) 

b) 

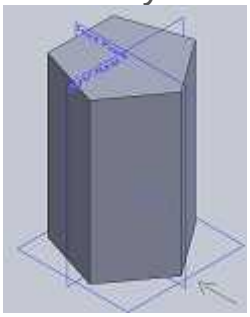
c) 

d) 

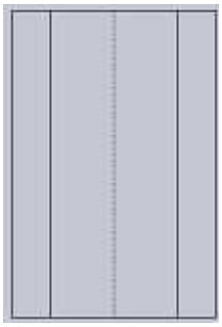
Answer: b

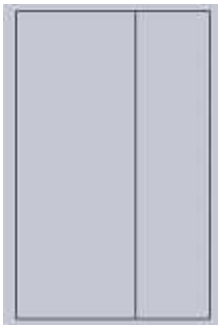
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front is taking and dotted lines represent hidden edges and lines.

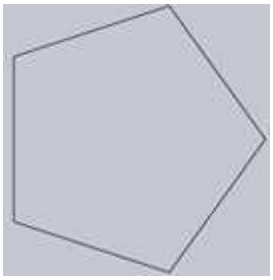
7. Identify the front view of this solid which is in isometric view.



a) 

b) 

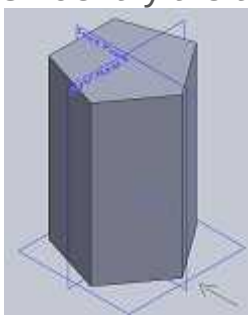
c) 

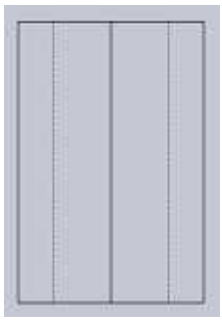
d) 

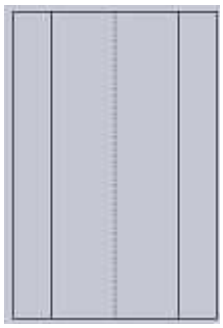
Answer: a

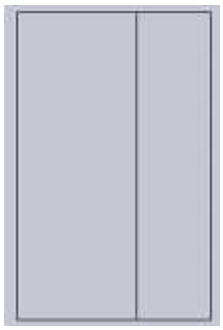
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front is taking and dotted lines represent hidden edges and lines.

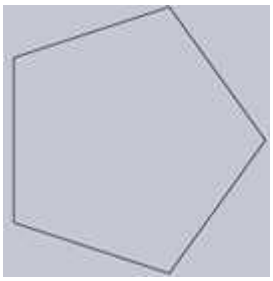
8. Identify the top view of below given solid which is in isometric view.



a) 

b) 

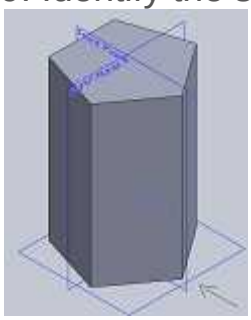
c) 

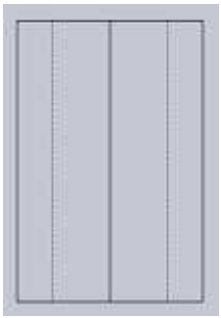
d) 

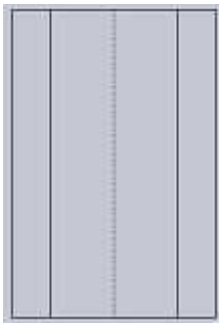
Answer: d

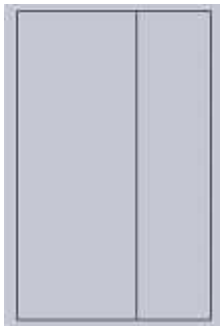
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front is taking and dotted lines represent hidden edges and lines.

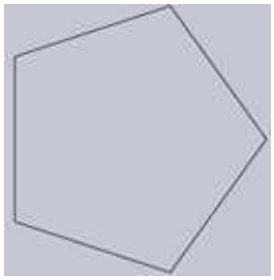
9. Identify the side view of the below given solid which is in isometric view.



a) 

b) 

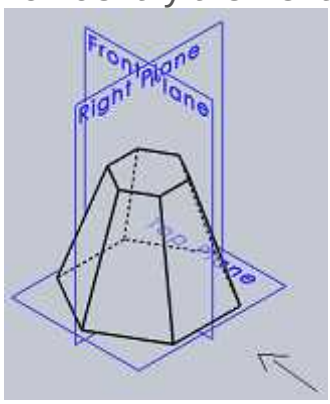
c) 

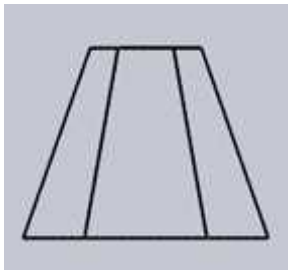
d) 

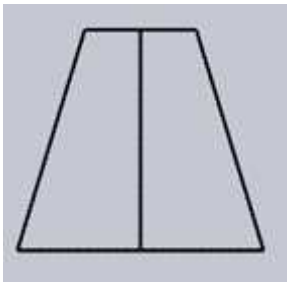
Answer: c

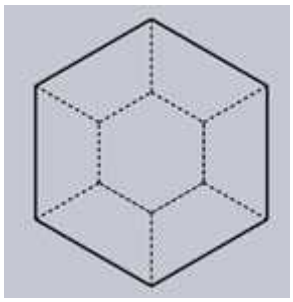
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front is taking and dotted lines represent hidden edges and lines.

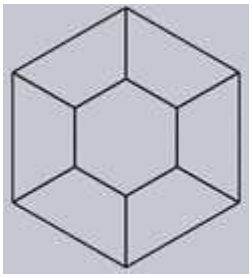
10. Identify the front view from the isometric view for the below given figure.



a) 

b) 

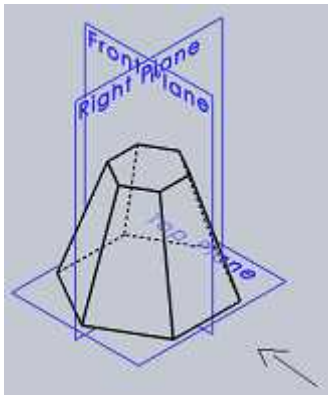
c) 

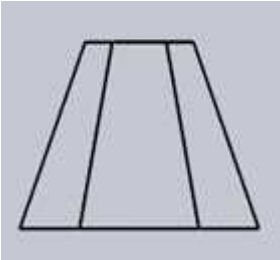
d) 

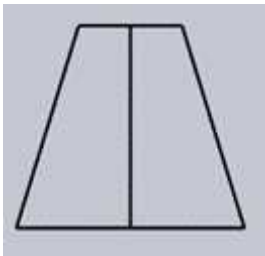
Answer: a

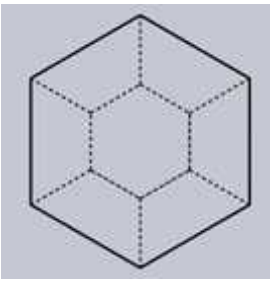
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front is taking and dotted lines represent hidden edges and lines.

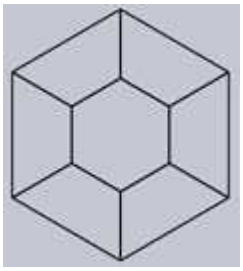
11. Identify the side view from the isometric view for the below given figure.



a) 

b) 

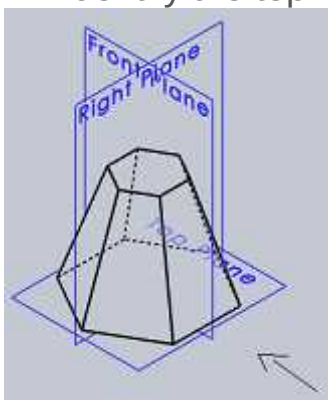
c) 

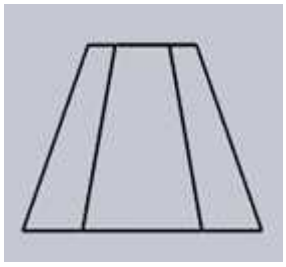
d) 

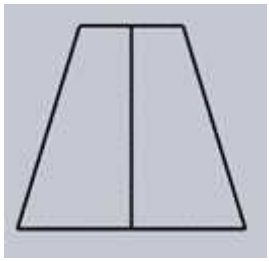
Answer: b

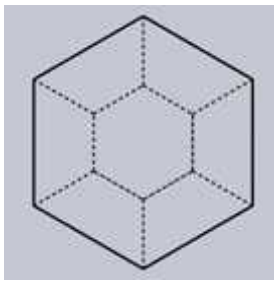
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front is taking and dotted lines represent hidden edges and lines.

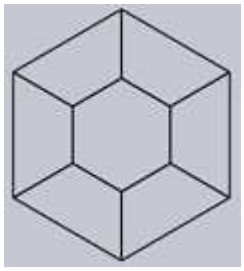
12. Identify the top view from the isometric view for the below given figure.



a) 

b) 

c) 

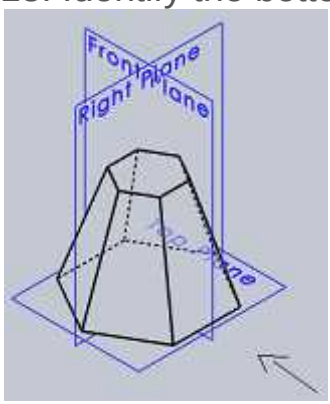
d) 

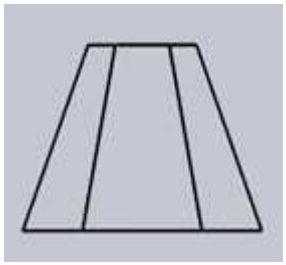
Answer: d

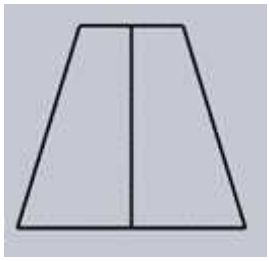
Explanation: The isometric view should be drawn according to the given views and in such

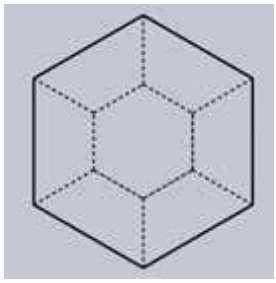
a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front is taking and dotted lines represent hidden edges and lines.

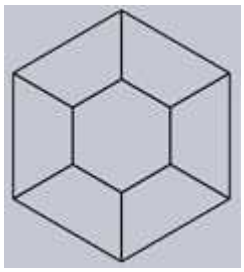
13. Identify the bottom view from the isometric view for the below given figure.



a) 

b) 

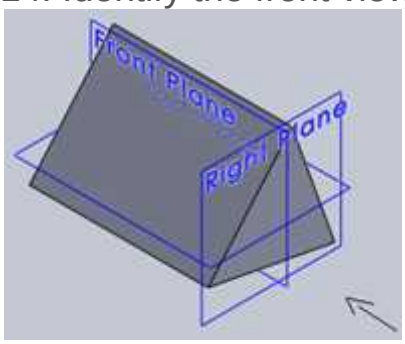
c) 

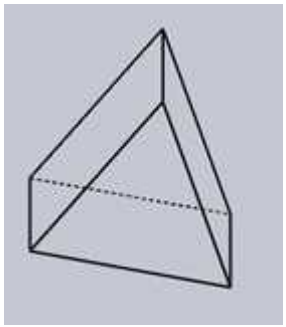
d) 

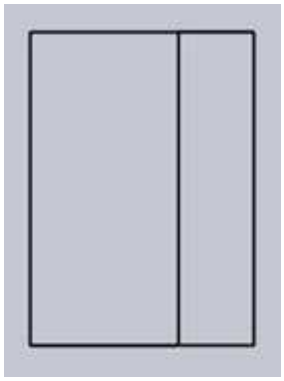
Answer: c

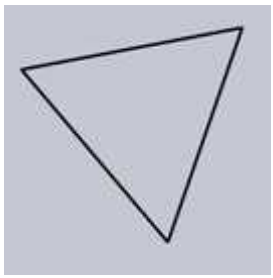
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front is taking and dotted lines represent hidden edges and lines.

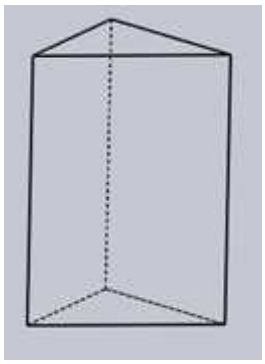
14. Identify the front view from the isometric view for the below given prism.



a) 

b) 

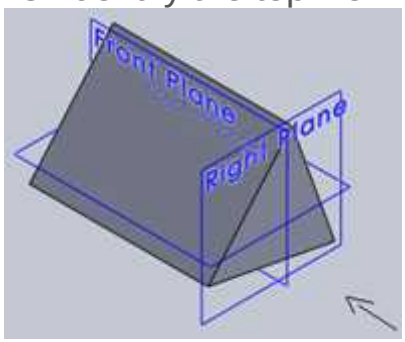
c) 

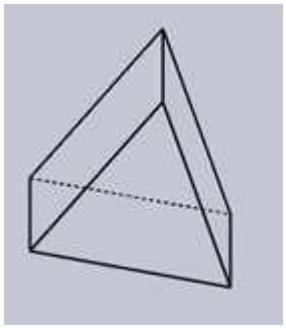
d) 

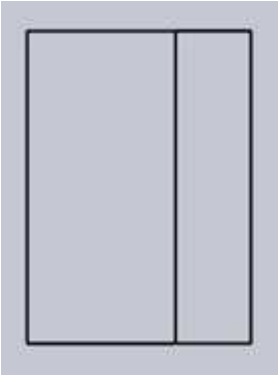
Answer: c

Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front is taking and dotted lines represent hidden edges and lines.

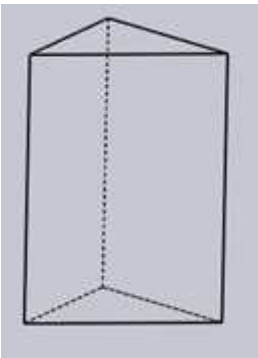
15. Identify the top view from the isometric view of following prism.



a) 

b) 

c) 

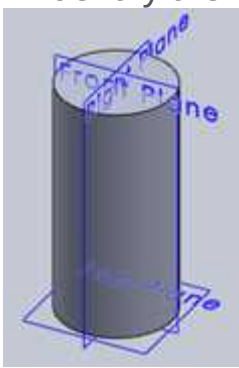
d) 

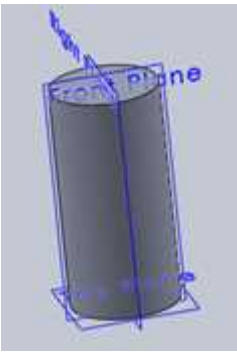
Answer: b

Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front is taking and dotted lines represent hidden edges and lines.

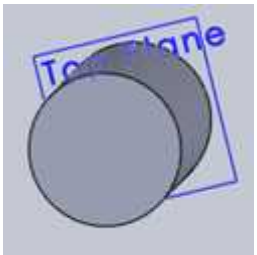
Isometric Drawing of Cylinders

1. Identify the front view from the below given cylinder.



a) 

b) 

c) 

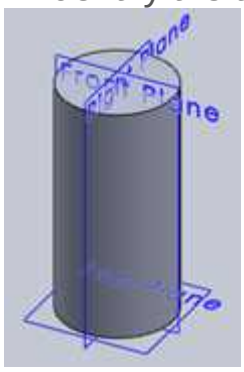
d) 

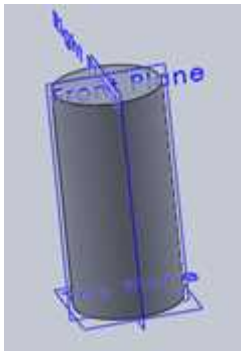
Answer: b

Explanation: The isometric view should be drawn according to the given views and in such

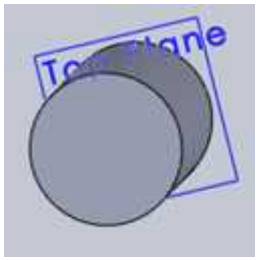
a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

2. Identify the top view from the below given cylinder.



a) 

b) 

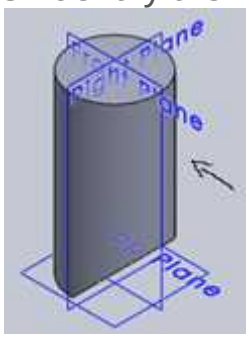
c) 

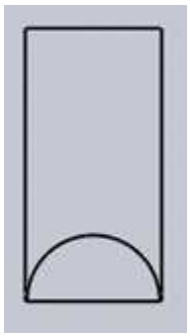
d) 

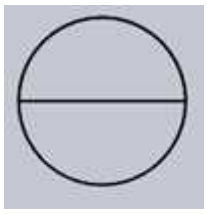
Answer: d

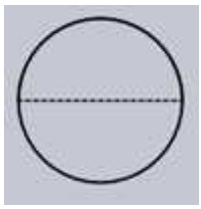
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

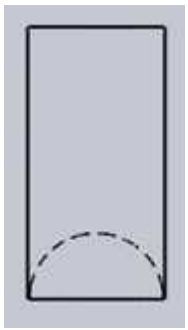
3. Identify the front view for the below given cylinder.



a) 

b) 

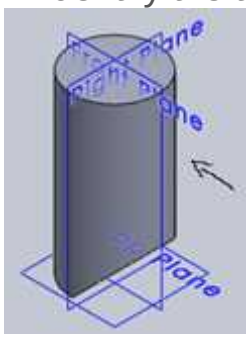
c) 

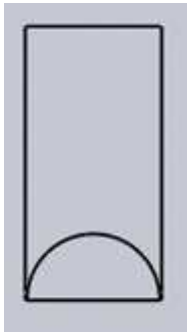
d) 

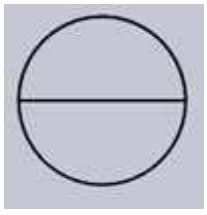
Answer: a

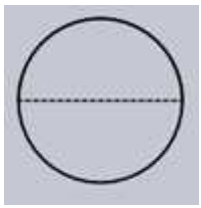
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

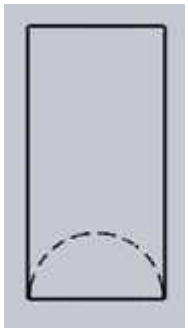
4. Identify the top view from the following cylinder.



a) 

b) 

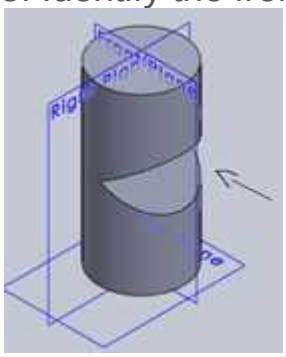
c) 

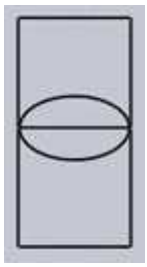
d) 

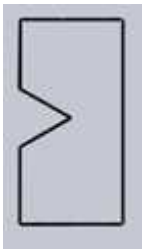
Answer: c

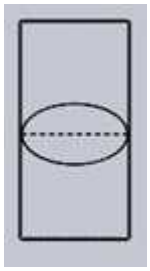
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

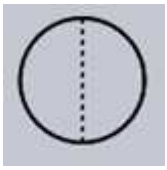
5. Identify the front view from the following cylinder.



a) 

b) 

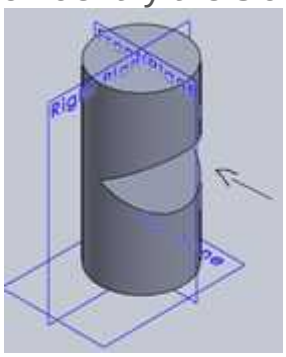
c) 

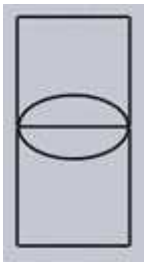
d) 

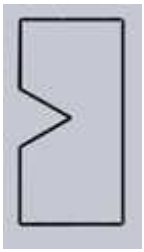
Answer: a

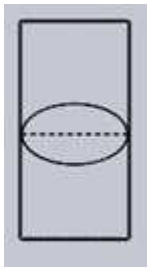
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

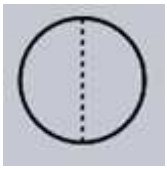
6. Identify the side view for the below given cylinder.



a) 

b) 

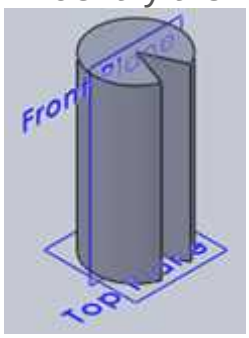
c) 

d) 

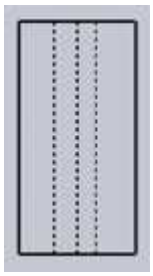
Answer: b

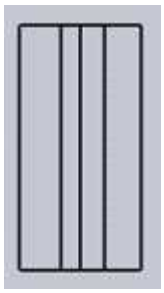
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

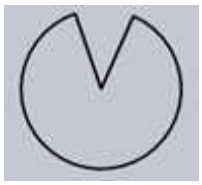
7. Identify the front view for the below given cylinder.



a) 

b) 

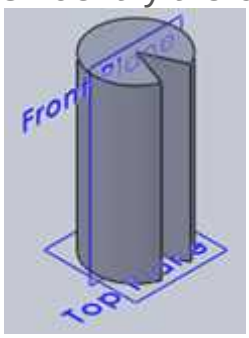
c) 

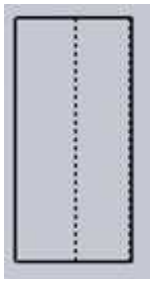
d) 

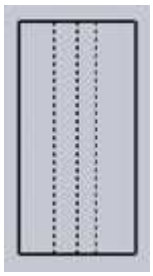
Answer: c

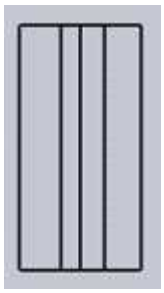
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

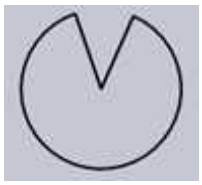
8. Identify the back view for the below given cylinder.



a) 

b) 

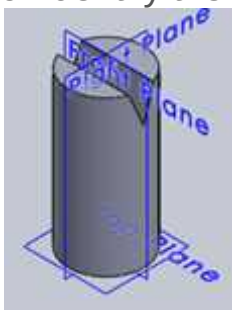
c) 

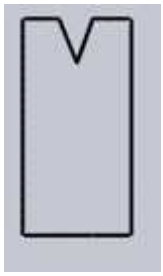
d) 

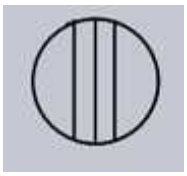
Answer: b

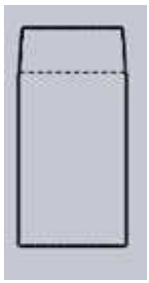
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

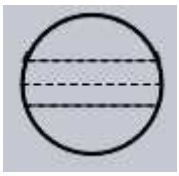
9. Identify the bottom view from the following cylinder.



a) 

b) 

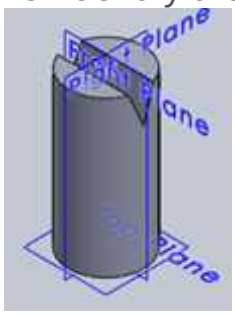
c) 

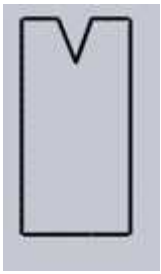
d) 

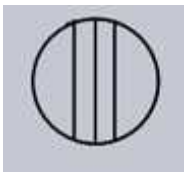
Answer: d

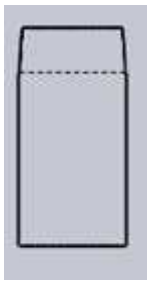
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

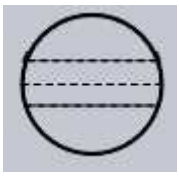
10. Identify the top view for the below cylinder.



a) 

b) 

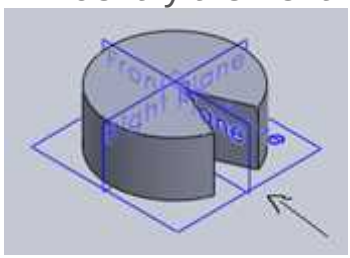
c) 

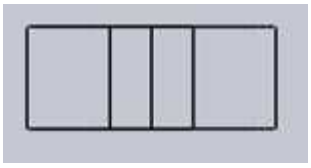
d) 

Answer: b

Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

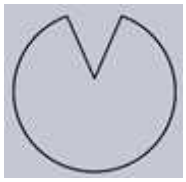
11. Identify the front view for the below given cylinder.



a) 

b) 

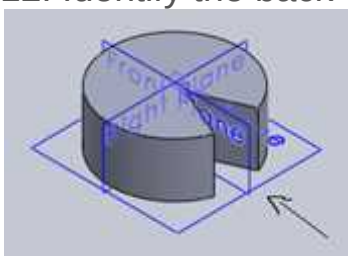
c) 

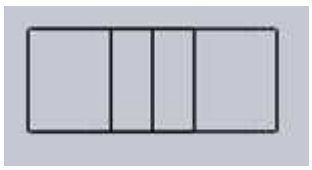
d) 

Answer: a

Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

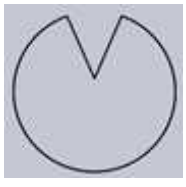
12. Identify the back view for the below given cylinder.



a) 

b) 

c) 

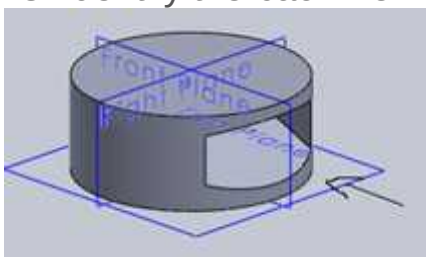
d) 

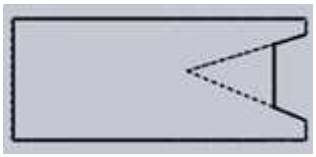
Answer: c

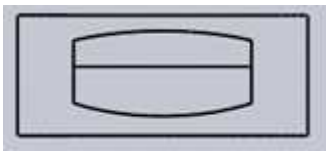
Explanation: The isometric view should be drawn according to the given views and in such

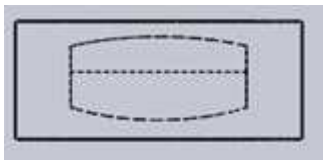
a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

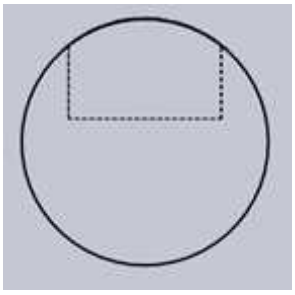
13. Identify the back view for the below cylinder.



a) 

b) 

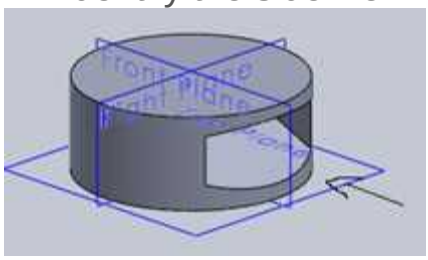
c) 

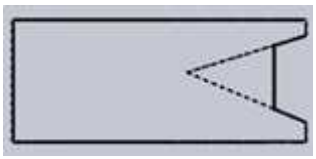
d) 

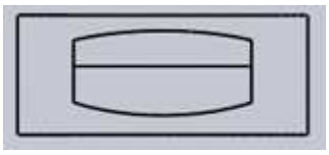
Answer: c

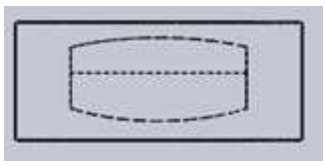
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

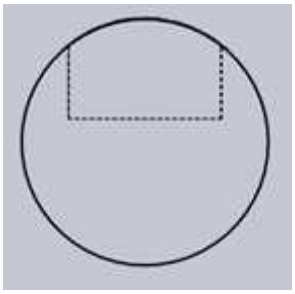
14. Identify the side view for the below given cylinder.



a) 

b) 

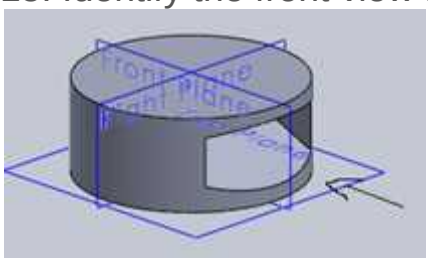
c) 

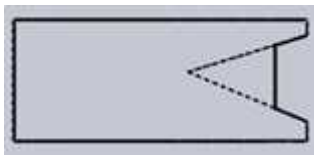
d) 

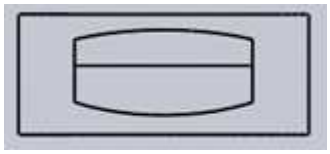
Answer: a

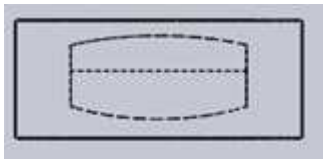
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

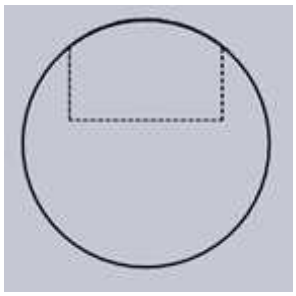
15. Identify the front view for the below given cylinder.



a) 

b) 

c) 

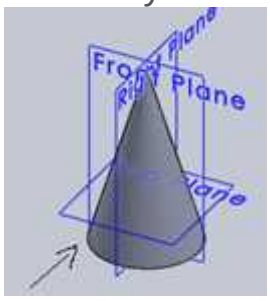
d) 

Answer: b

Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

Isometric Drawing of Cones

1. Identify the front view of the below given cone.



a) 

b) 

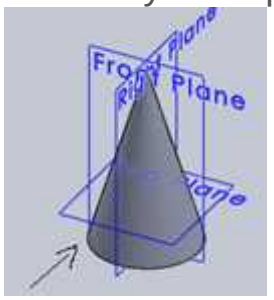
c) 

d) 

Answer: c

Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

2. Identify the top view for the below given cone.



a) 

b) 

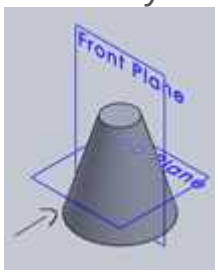
c) 

d) 

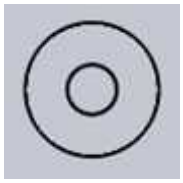
Answer: b

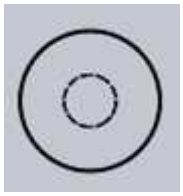
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

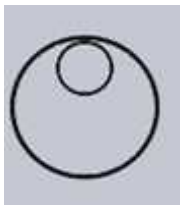
3. Identify the top view for the below given cone.



a) 

b) 

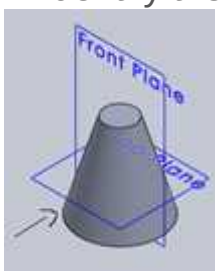
c) 

d) 

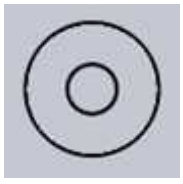
Answer: b

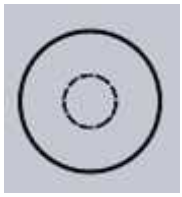
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

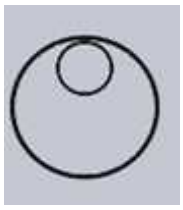
4. Identify the bottom view for the below given cone.



a) 

b) 

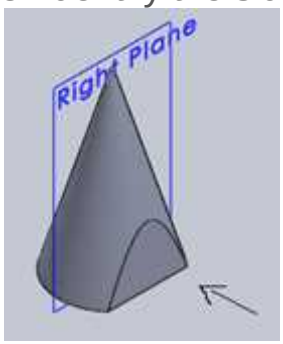
c) 

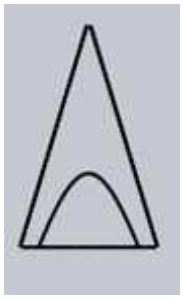
d) 

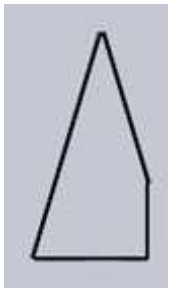
Answer: c

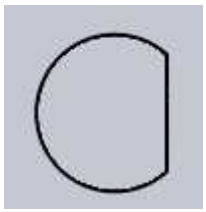
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

5. Identify the side view for the below given cone.



a) 

b) 

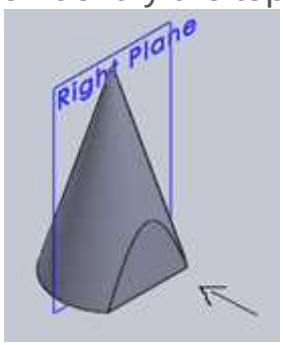
c) 

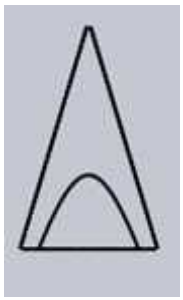
d) 

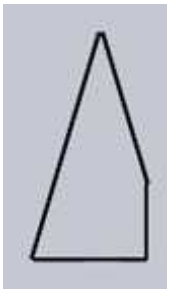
Answer: b

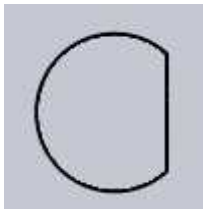
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

6. Identify the top view for the below given cone.



a) 

b) 

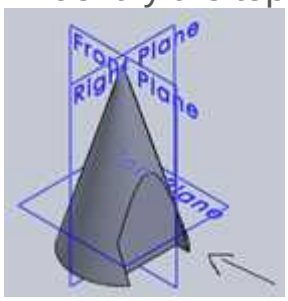
c) 

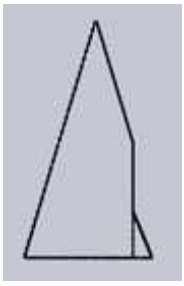
d) 

Answer: c

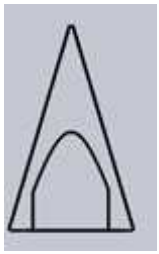
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

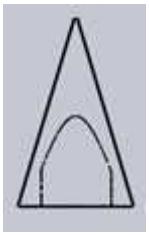
7. Identify the top view for the below given cone.



a) 

b) 

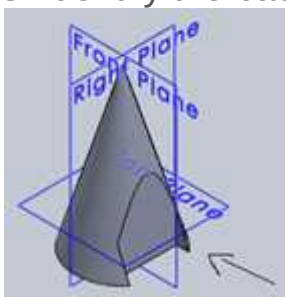
c) 

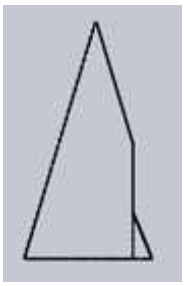
d) 

Answer: b

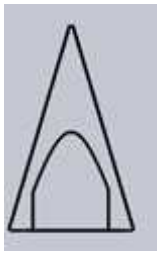
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

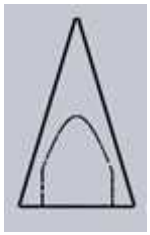
8. Identify the back view for the below given cone.



a) 

b) 

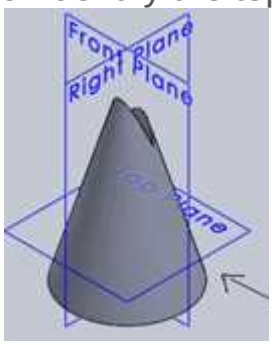
c) 

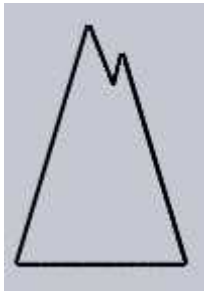
d) 

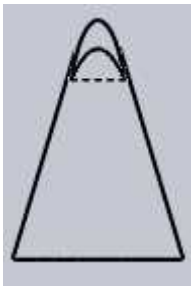
Answer: d

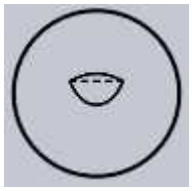
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

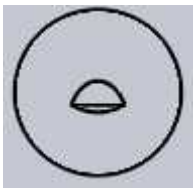
9. Identify the top view for the below given cone.



a) 

b) 

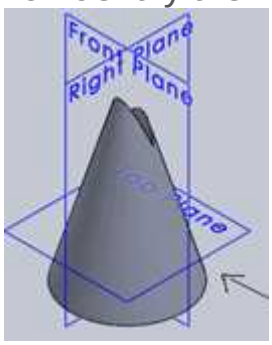
c) 

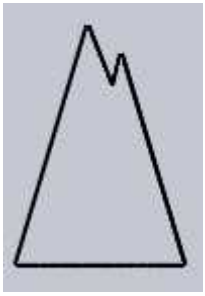
d) 

Answer: d

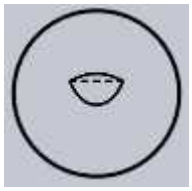
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

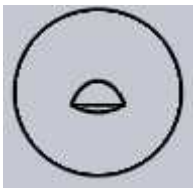
10. Identify the front view for the below given cone.



a) 

b) 

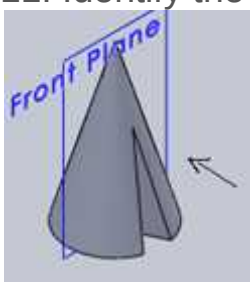
c) 

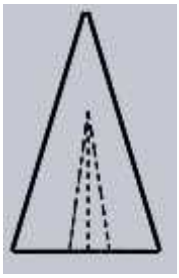
d) 

Answer: a

Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

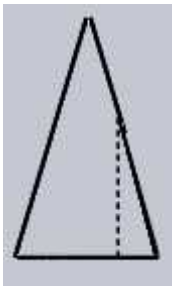
11. Identify the top view for the below given cone.



a) 

b) 

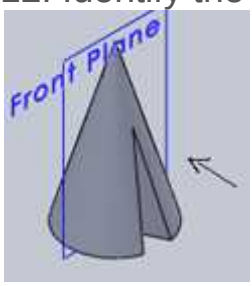
c) 

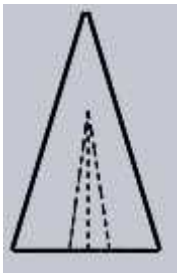
d) 

Answer: c

Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

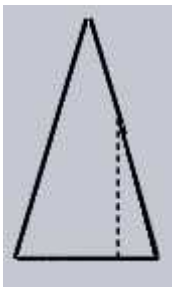
12. Identify the front view of the following cone.



a) 

b) 

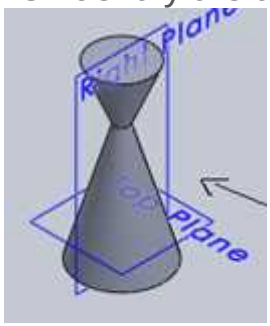
c) 

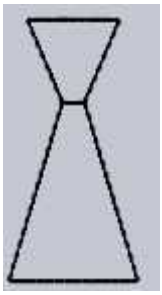
d) 

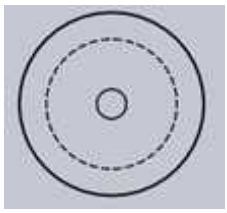
Answer: b

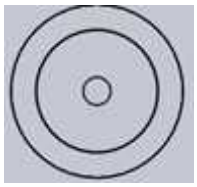
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

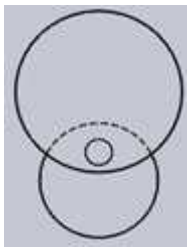
13. Identify the top view for the below given cone.



a) 

b) 

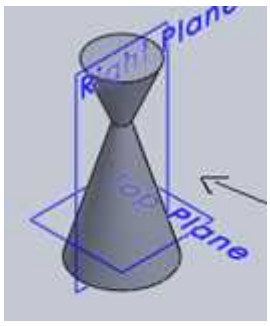
c) 

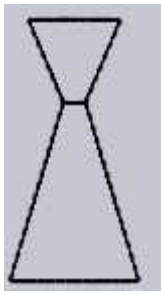
d) 

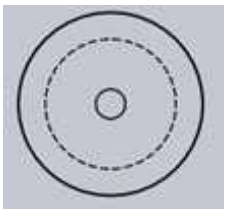
Answer: c

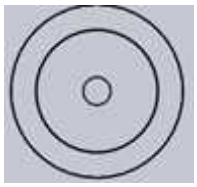
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

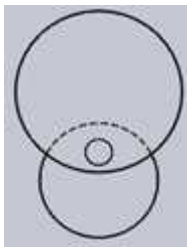
14. Identify the bottom view for the below given cone.



a) 

b) 

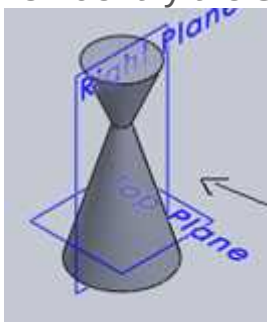
c) 

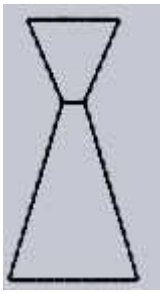
d) 

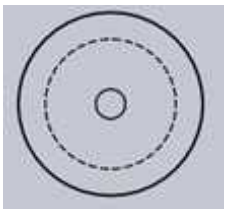
Answer: b

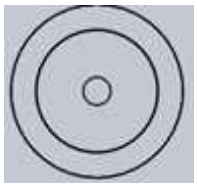
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

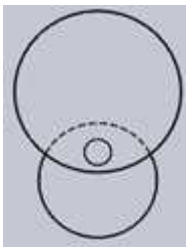
15. Identify the side view for the below given cone.



a) 

b) 

c) 

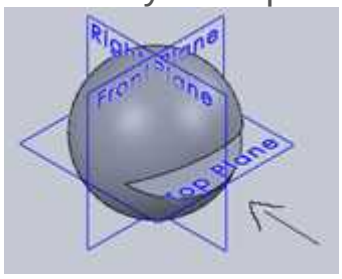
d) 

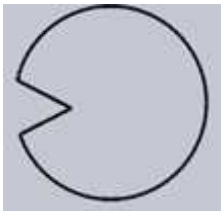
Answer: a

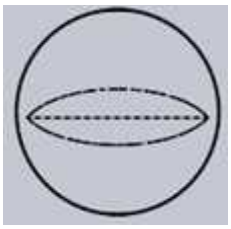
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

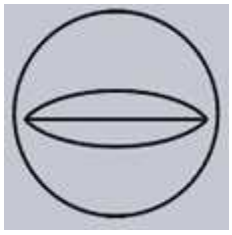
Isometric Drawing of Spheres

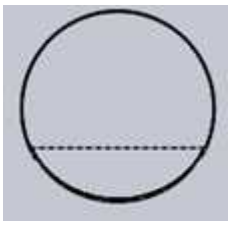
1. Identify the top view for the below given sphere.



a) 

b) 

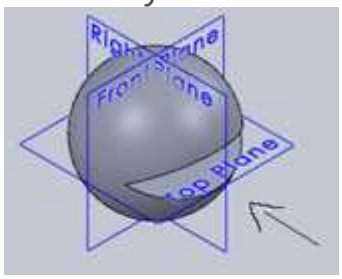
c) 

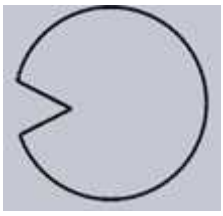
d) 

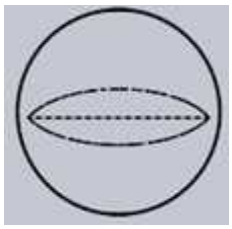
Answer: d

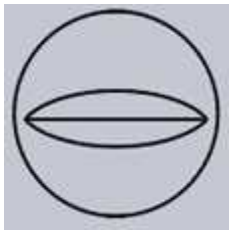
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

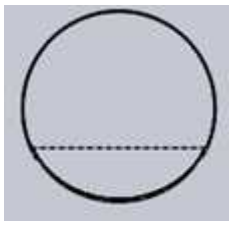
2. Identify the side view for the below given sphere.



a) 

b) 

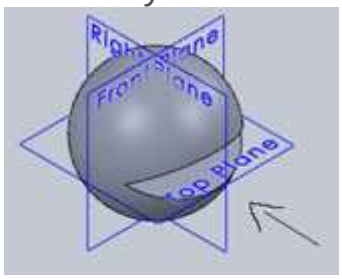
c) 

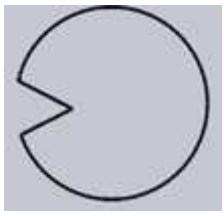
d) 

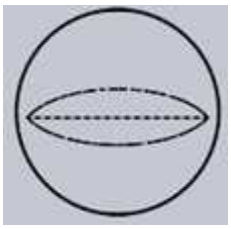
Answer: a

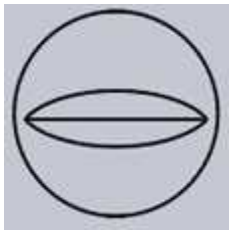
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

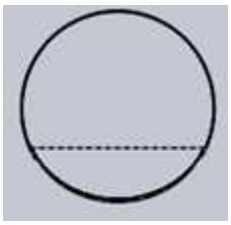
3. Identify the front view for the below given sphere.



a) 

b) 

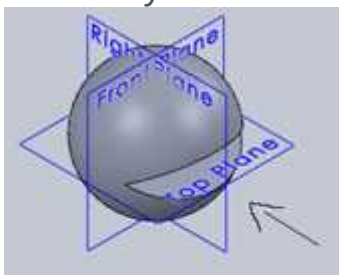
c) 

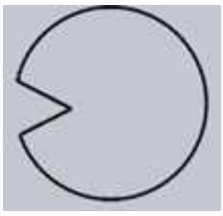
d) 

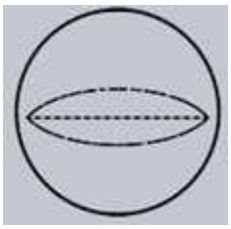
Answer: c

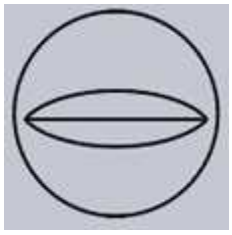
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

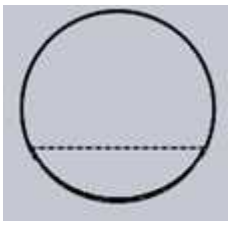
4. Identify the back view for the below given sphere.



a) 

b) 

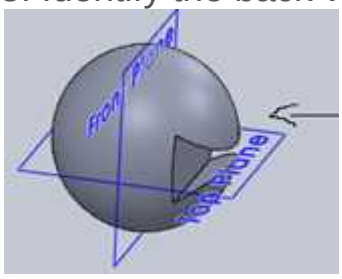
c) 

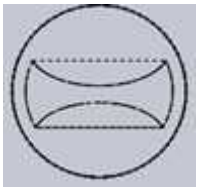
d) 

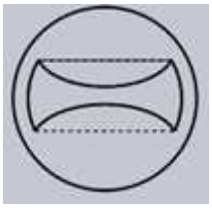
Answer: b

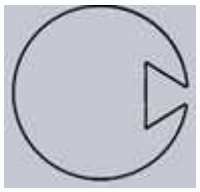
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

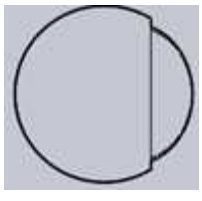
5. Identify the back view from the following sphere.



a) 

b) 

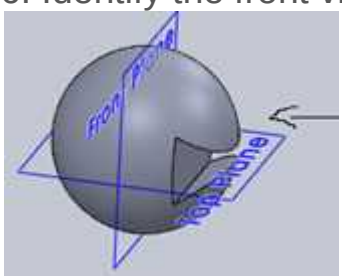
c) 

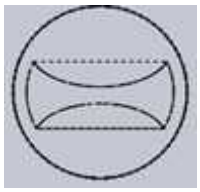
d) 

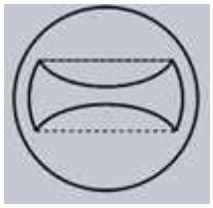
Answer: a

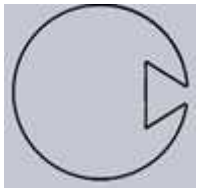
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

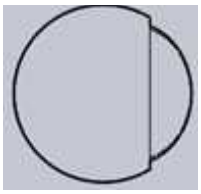
6. Identify the front view for the below given sphere.



a) 

b) 

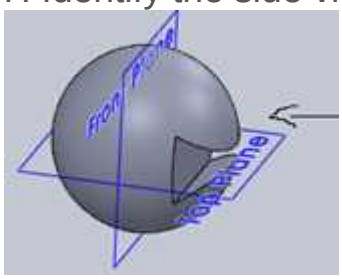
c) 

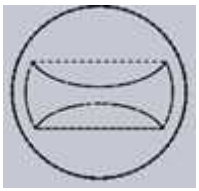
d) 

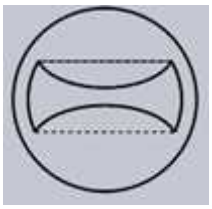
Answer: b

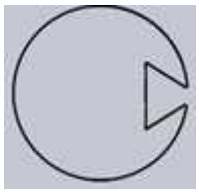
Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

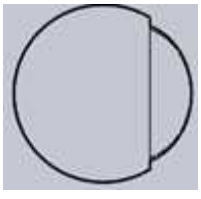
7. Identify the side view for the below given sphere.



a) 

b) 

c) 

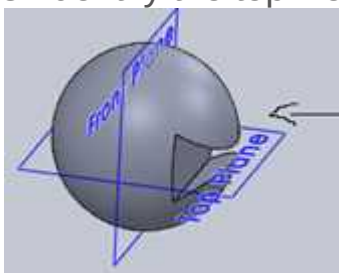
d) 

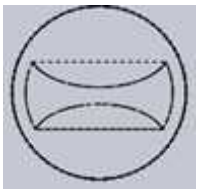
Answer: c

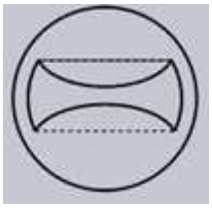
Explanation: The isometric view should be drawn according to the given views and in such

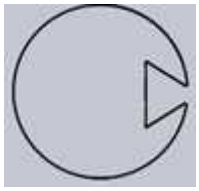
a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

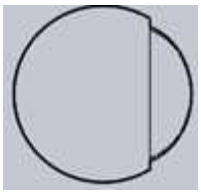
8. Identify the top view for the below given sphere.



a) 

b) 

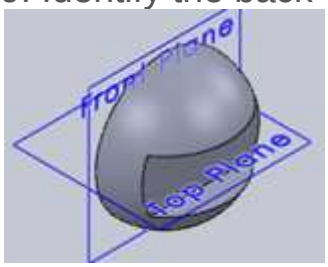
c) 

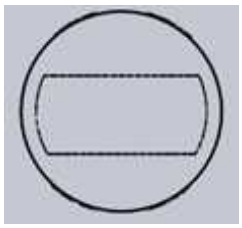
d) 

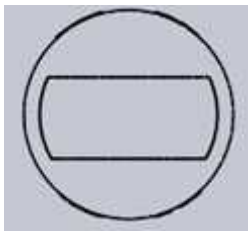
Answer: d

Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

9. Identify the back view for the below given hemi-sphere.



a) 

b) 

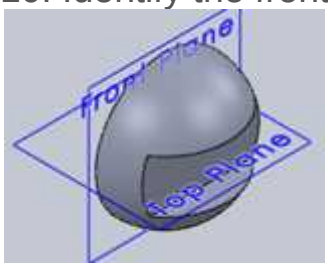
c) 

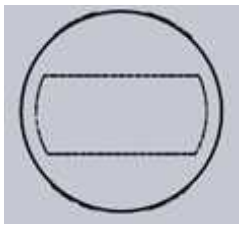
d) 

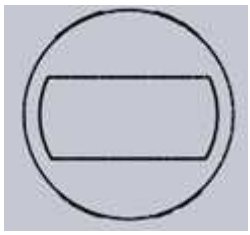
Answer: a

Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines. If arrow is not given the name on plane gives u enough information about observer.

10. Identify the front view for the below given hemi-sphere.



a) 

b) 

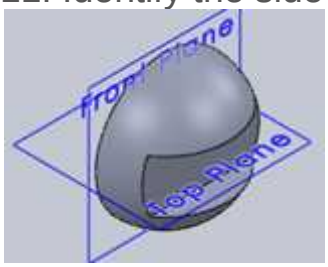
c) 

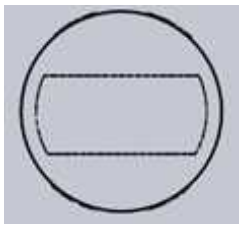
d) 

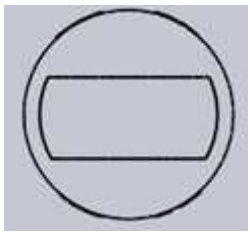
Answer: b

Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

11. Identify the side view for the below given hemi-sphere.



a) 

b) 

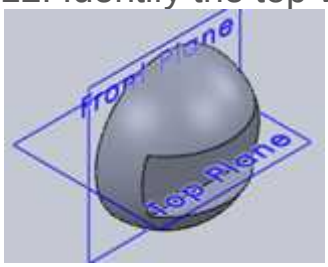
c) 

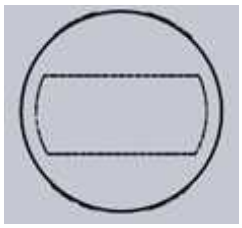
d) 

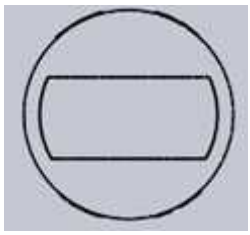
Answer: c

Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines.

12. Identify the top view for the below given hemi-sphere.



a) 

b) 

c) 

d) 

Answer: d

Explanation: The isometric view should be drawn according to the given views and in such a way that maximum possible details are visible. Arrow mark in the given figure show the direction in which front view is taking and dotted lines represent hidden edges, parts and lines

Oblique Projections

1. Oblique projections are useful for making an assembly.
a) True
b) False
Answer: a
Explanation: The oblique projection represents three dimensional objects on the projection plane by one view only. This type of drawing is useful for making an assembly of an object and provides directly a production drawing of the object for manufacturing purpose.

2. Lines of sights (projectors) for oblique projection will be _____
a) Parallel to each other and perpendicular to projection plane
b) Not parallel to each other and perpendicular to projection plane
c) Parallel to each other and inclined to projection plane
d) Not parallel to each other and inclined to projection plane
Answer: c
Explanation: When an observer looks towards an object from infinity, the lines of sight will be parallel to each other and inclined to the projection plane in oblique projection, but the lines of sight will be parallel to each other and perpendicular to projection plane in orthographic projection.

3. All the faces of the object are distorted in the shape and size.
a) True
b) False
Answer: b
Explanation: In oblique projection the faces of object which are perpendicular to the plane of projection will be distorted and all the faces of the object are distorted in the shape and size in isometric projection.

4. Which of the following statement is wrong in case of oblique projection?
a) The object is drawn with the reduced dimensions.
b) Projectors are parallel to each other and inclined to projection plane.
c) The choice of the position of the object depends upon the shape and size.
d) The faces of object which are perpendicular to the plane of projection will be distorted.
Answer: a
Explanation: In isometric projection the object is drawn with the reduced dimensions for

about 82% but in oblique projection the object is drawn with the actual dimensions. The choice of the position of the object depends upon the shape and size.

5. When the receding lines are drawn to full size scale then the oblique projection is _____

a) Cabinet projection
b) Isometric projection
c) Orthographic projection
d) Cavalier projection

Answer: d

Explanation: When the receding lines are drawn to half size scale then the oblique projection is cabinet projection. When the receding lines are drawn to full size scale then the oblique projection is cavalier projection.

6. When the receding lines are drawn to half size scale then the oblique projection is _____

a) Cabinet projection
b) Isometric projection
c) Orthographic projection
d) Cavalier projection

Answer: a

Explanation: When the receding lines are drawn to half size scale then the oblique projection is cabinet projection. When the receding lines are drawn to full size scale then the oblique projection is cavalier projection.

7. Which are not usually used as angle between the projection plane and receding lines for oblique projection?

a) 30 degrees
b) 50 degrees
c) 45 degrees
d) 60 degrees

Answer: b

Explanation: Usually used as angles are 30, 45, 60 degrees which are between the projection plane and receding lines for oblique projection. But if needed any angle can be taken as per requirement of the view.

8. The appearance of the distortion of an object can be improved by _____ the length of the receding lines.

a) increasing
b) doubling
c) shortening
d) dividing

Answer: c

Explanation: The appearance of the distortion of an object can be improved by shortening the length of the receding lines. The receding lines may be inclined either upwards or downwards, or to the left or right depending upon the necessity to show the details.

9. In oblique projection, the object is assumed to be placed with one face _____

a) parallel to plane of projection
b) parallel to adjacent edge
c) perpendicular to plane of projection
d) perpendicular to adjacent edge

Answer: a

Explanation: In oblique projection, the object is assumed to be placed with one face parallel to plane of projection and receding lines are drawn from the faces parallel to projection plane and other parallel face.

10. The perpendicular edges of planes parallel to projection plane are drawn at an angle of 30, 45, 60 degrees with the horizontal. The inclined lines are called _____

a) projectors
b) slanting edges
c) contour lines
d) receding lines

Answer: d

Explanation: Projectors are the imaginary lines drawn from object to projection planes. Slanting edges can be used for edges of pyramid etc. The perpendicular edges of planes parallel to projection plane are drawn at an angle of 30, 45, 60 degrees with the horizontal. The inclined lines are called receding lines.

11. The faces parallel to projection plane are having _____ size and shape in oblique projection.

a) actual
b) double
c) half

d) increased

Answer: a

Explanation: Oblique projection is a specified projection which is used for making an assembly of an object and provides directly a production drawing of the object for manufacturing purpose.

12. In cavalier projection the receding lines are drawn _____

a) half of its actual size

b) double of its actual size

c) full size

d) increased or decreased to particular ratio

Answer: c

Explanation: Cavalier projection is one of the type of oblique projection in which the receding lines are drawn to full size scale and projectors are inclined at 30 degrees, 45 degrees, 60 degrees to the plane of projection.

Definitions and Methods of Perspective Projections

1. In perspective projection, the eye is assumed to be situated at a _____ position relative to the object. The _____ is placed between ____ and the _____

a) definite, picture plane, eye, object

b) indefinite, object, eye, picture plane

c) indefinite, picture plane, eye, object

d) indefinite, object, picture plane, eye

Answer: a

Explanation: In perspective projection, the eye is assumed to be situated at a definite position relative to the object. The picture plane is placed between eye and the object and the object can also placed between the eye and picture plane.

2. In perspective projection the projectors are _____ to each other and _____ to picture plane.

a) parallel, perpendicular

b) not parallel, inclined

c) parallel, inclined

d) not parallel, perpendicular

Answer: b

Explanation: In perspective projection the projectors are not parallel to each other and inclined to picture plane. In orthographic view the projector are parallel to each other and perpendicular to plane of projection.

3. In perspective projection, the horizontal plane in which the object is assumed to be situated is called _____
a) horizontal plane
b) picture plane
c) ground plane
d) auxiliary ground plane
Answer: c
Explanation: In perspective projection, the horizontal plane in which the object is assumed to be situated is called ground plane. And the imaginary plane is at the level of the eye above the ground plane and at right angles to the picture plane is called horizontal plane.

4. In perspective projection, the point where the eye of the observer is located while viewing the object is called _____
a) ground point
b) horizon point
c) center of vision
d) station point
Answer: d
Explanation: In perspective projection, the point where the eye of the observer is located while viewing the object is called station point and the distance of the station point from the picture plane, when taken equal to about twice the greatest dimension of the object gives the good view in the perspective.

5. In perspective projection, the point in which the perpendicular axis pierces the picture plane and lies on horizon line is called _____
a) ground line
b) horizon line
c) center of vision
d) station line
Answer: c
Explanation: In perspective projection, the point in which the perpendicular axis pierces the picture plane and lies on horizon line is called center of vision. And the line in which the horizon plane intersects the picture plane is called horizon line. It is parallel to ground line.

6. In perspective projection, the imaginary plane is at the level of the eye above the ground plane and at right angles to the picture plane is called _____

a) horizontal plane
b) picture plane
c) ground plane
d) auxiliary ground plane

Answer: a

Explanation: In perspective projection, the imaginary plane is at the level of the eye above the ground plane and at right angles to the picture plane is called horizontal plane. And the horizontal plane in which the object is assumed to be situated is called ground plane.

7. In perspective projection, the imaginary vertical plane which passes through the station point and the center of vision. It contains the perpendicular axis. It is perpendicular to both the picture plane and ground plane. It is called _____

a) central plane
b) picture plane
c) ground plane
d) auxiliary ground plane

Answer: a

Explanation: In perspective projection, the imaginary vertical plane which passes through the station point and the center of vision. It contains the perpendicular axis. It is perpendicular to both the picture plane and ground plane. It is called central plane.

8. In perspective projection, the line drawn through the station point and perpendicular to the picture plane is sometimes called the line of sight or axis of vision is called _____

a) ground line
b) horizon line
c) perpendicular line
d) station line

Answer: c

Explanation: In perspective projection, the line drawn through the station point and perpendicular to the picture plane is sometimes called the line of sight or axis of vision is called perpendicular line.

9. In perspective projection, the horizontal plane placed above the horizon plane on which the top view of the object and of the perspective elements is projected is called _____

a) horizontal plane
b) picture plane
c) ground plane
d) auxiliary ground plane

Answer: d

Explanation: In perspective projection, the horizontal plane placed above the horizon plane on which the top view of the object and of the perspective elements is projected is called auxiliary ground plane.

10. In which method, points on the perspective are obtained by projecting the top view and either the front view or the side view of visual rays?

a) Watching method
b) Vanishing point method
c) Visual-ray method
d) Perspective method

Answer: c

Explanation: In visual-ray method, points on the perspective are obtained by projecting the top view and either the front view or the side view of visual rays. In addition to the top view of the visual rays, use of vanishing points of straight lines is made in Vanishing point method.

11. In addition to the top view of the visual rays, use of vanishing points of straight lines is made in this method. What is this method?

a) Watching method
b) Vanishing point method
c) Visual-ray method
d) Perspective method

Answer: b

Explanation: In visual-ray method, points on the perspective are obtained by projecting the top view and either the front view or the side view of visual rays. In addition to the top view of the visual rays, use of vanishing points of straight lines is made in Vanishing point method.

12. In perspective projection, the line in which the horizon plane intersects the picture plane is called _____ and it is parallel to ground line.

a) ground line
b) horizon line
c) center of vision
d) station line
Answer: d
Explanation: In perspective projection, the line in which the horizon plane intersects the picture plane is called horizon line. It is parallel to ground line. And the point in which the perpendicular axis pierces the picture plane and lies on horizon line is called center of vision.

Types of Perspective

1. When an object has its one or more faces parallel to the picture plane, its perspective is called _____ perspective also called one point perspective.
a) parallel
b) oblique
c) vanishing
d) angular
Answer: a
Explanation: When an object has its one or more faces parallel to the picture plane, its perspective is called parallel perspective also called one point perspective as the edges converge to a single vanishing point of the parallel faces.

2. When an object has its two faces inclined to the picture plane, its perspective is called _____ perspective also called two point perspectives.
a) parallel
b) oblique
c) vanishing
d) angular
Answer: d
Explanation: When an object has its two faces inclined to the picture plane, its perspective is called angular perspective also called two point perspectives as the edges of the object converge to two vanishing points.

3. When an object has its three faces inclined to the picture plane, its perspective is called _____ perspective also called 3 point perspective.
a) parallel

b) oblique
c) vanishing
d) angular
Answer: b
Explanation: When an object has its three faces inclined to the picture plane, its perspective is called oblique perspective also called 3 point perspective as edges of the object converge to three vanishing points.

4. Vanishing points for all horizontal lines are inclined at 45 degrees to the picture plane are given special name of _____ points.
a) vanishing
b) far
c) distance
d) distant
Answer: c
Explanation: Vanishing points for all horizontal lines are inclined at 45 degrees to the picture plane are given special name of distance points on account of their definite positions. They are equidistant from the center of vision.

5. Which are equidistant from the center of vision?
a) Station point
b) Ground point
c) Distance point
d) Vanishing point
Answer: c
Explanation: The distance points are equidistant from the center of vision the distance of each from the centre of vision being equal to the distance of the station point from the picture plane the perspectives of all horizontal lines inclined at 45 degrees to the picture plane converge to a distance points on the horizon line.

6. The distance of which points from the centre of vision being equal to the distance of the station point from the picture plane?
a) Station point
b) Ground point
c) Distance point
d) Vanishing point
Answer: c
Explanation: The distance points are equidistant from the center of vision the distance of

each from the centre of vision being equal to the distance of the station point from the picture plane the perspectives of all horizontal lines inclined at 45 degrees to the picture plane converge to a distance points on the horizon line.

7. The perspectives of all horizontal lines inclined at ___ degrees to the picture plane converge to a distance points on the horizon line.
a) 30
b) 45
c) 60
d) 90
Answer: b
Explanation: The distance points are equidistant from the center of vision the distance of each from the centre of vision being equal to the distance of the station point from the picture plane the perspectives of all horizontal lines inclined at 45 degrees to the picture plane converge to a distance points on the horizon line.

8. The perspectives of all horizontal lines inclined at 45 degrees to the picture plane converge to a distance points on the _____
a) ground line
b) perpendicular axis
c) horizon line
d) center of vision
Answer: c
Explanation: The distance points are equidistant from the center of vision the distance of each from the centre of vision being equal to the distance of the station point from the picture plane the perspectives of all horizontal lines inclined at 45 degrees to the picture plane converge to a distance points on the horizon line.

9. The perspectives of all horizontal lines inclined at 45 degrees to the picture plane converge to a _____ points on the horizon line.
a) vanishing
b) far
c) distance
d) distant
Answer: c
Explanation: The distance points are equidistant from the center of vision the distance of each from the centre of vision being equal to the distance of the station point from the

picture plane the perspectives of all horizontal lines inclined at 45 degrees to the picture plane converge to a distance points on the horizon line.

10. The measuring line or the line of heights is the trace or the line of intersection with the _____ plane, of the vertical plane containing the point or points whose heights are to be determined.
a) ground plane
b) picture plane
c) horizontal plane
d) central plane
Answer: b
Explanation: The measuring line or the line of heights is the trace or the line of intersection with the picture plane, of the vertical plane containing the point or points whose heights are to be determined. Heights of points lying in different vertical plane can be measured from their respective line of heights.

11. Heights of points lying in different _____ can be measured from their respective line of heights.
a) ground plane
b) picture plane
c) vertical plane
d) central plane
Answer: c
Explanation: The measuring line or the line of heights is the trace or the line of intersection with the picture plane, of the vertical plane containing the point or points whose heights are to be determined. Heights of points lying in different vertical plane can be measured from their respective line of heights.

12. The measuring line or the line of heights is the trace or the line of intersection with the picture plane, of the _____ plane containing the point or points whose heights are to be determined.
a) ground plane
b) picture plane
c) vertical plane
d) central plane
Answer: c
Explanation: The measuring line or the line of heights is the trace or the line of intersection

with the picture plane, of the vertical plane containing the point or points whose heights are to be determined.

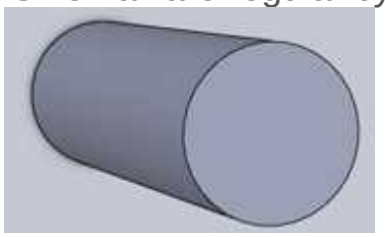
Perspectives of Circles and Solids

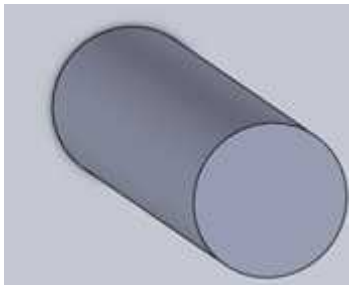
1. The perspective view of a circle in any type of typical position be_____
a) circle
b) ellipse
c) oval
d) lemniscate
Answer: b
Explanation: The station point in anywhere from the picture plane if a circle is placed in any angle with the ground plane in the maximum possible critical position the perspective of the circle will always be ellipse.

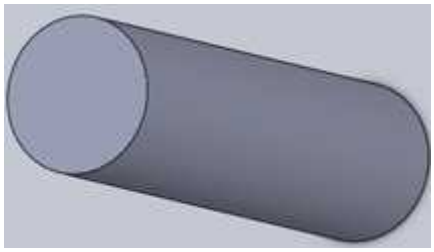
2. To draw the perspective view of circle the circle should be enclosed in _____ and then pointing points and next steps goes on.
a) square
b) rectangle
c) rhombus
d) parallelogram
Answer: a
Explanation: To obtain points on ellipse, the circle should be enclosed in a square and mid points of sides and intersection of diagonals with the circle are 8 points. Lines are drawn through these points, parallel to the sides of the square.

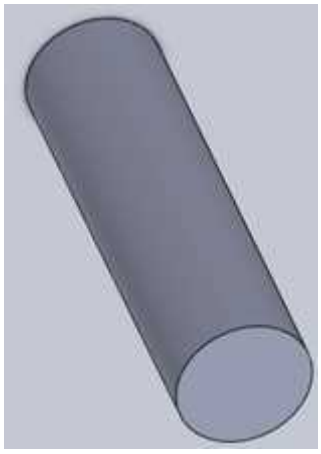
3. The perspectives of concentric circles are not concentric _____
a) circles
b) ellipses
c) spheres
d) ellipsoids
Answer: b
Explanation: Perspectives of concentric circles are not concentric ellipses. Though the both circles give ellipses but inner ellipse might be closer to one of side of outer ellipse and also might be closer to only one side of outer ellipse.

4. Given all are regular cylinders. Identify the one which is in perspective view.

a) 

b) 

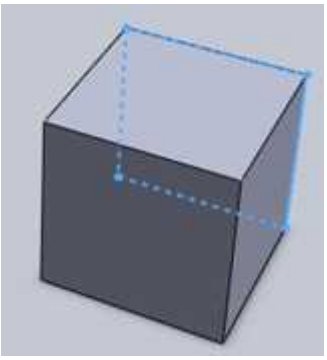
c) 

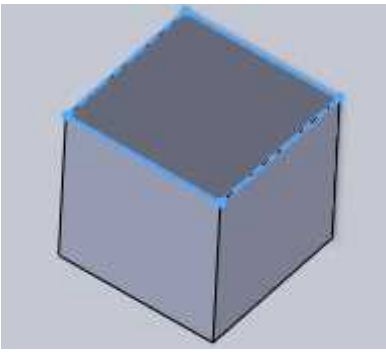
d) 

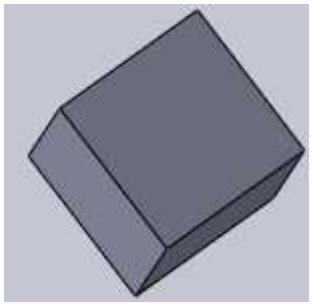
Answer: a

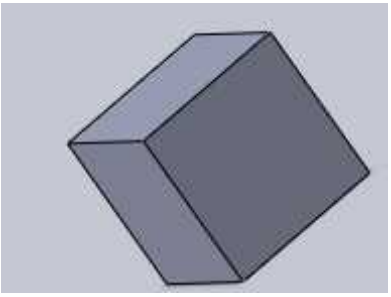
Explanation: In orthographic projection, isometric projection the parallel faces in the solid which having same dimensions will show true exact sizes or in proportions and also in parallel faces but in perspective view the parallel line, edges, faces show differ in dimensions.

5. Given all are cubes. Identify the one which is in perspective view.

a) 

b) 

c) 

d) 

Answer: a

Explanation: In orthographic projection, isometric projection the parallel faces in the solid which having same dimensions will show true exact sizes or in proportions and also in parallel faces but in perspective view the parallel line, edges, faces show differ in dimensions.

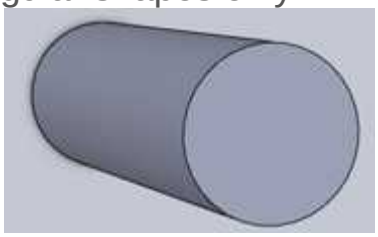
6. Curve of any shape can be drawn in perspective by enclosing it in a _____

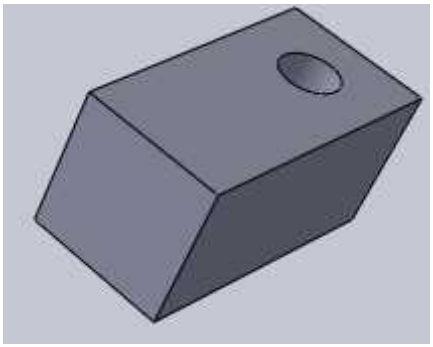
a) rectangle
b) cube
c) cylinder
d) square

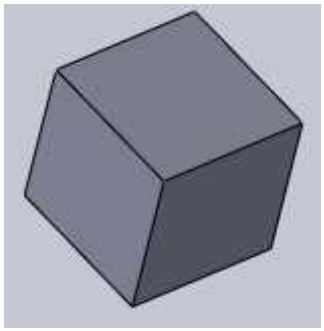
Answer: a

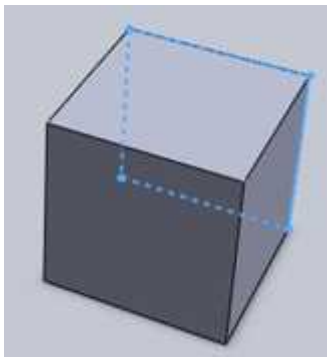
Explanation: Curve of any shape can be drawn in perspective by enclosing it in a rectangle and then drawing horizontal and vertical lines through a number of points on the curve similar to a circle which is enclosed in square.

7. Which of the following is not in a perspective view? All given figures are regular shapes only.

a) 

b) 

c) 

d) 

Answer: c

Explanation: In orthographic projection, isometric projection the parallel faces in the solid which having same dimensions will show true exact sizes or in proportions and also in parallel faces but in perspective view the parallel line, edges, faces show differ in dimensions.

8. The perspective will remain same even if the station point changes.

a) True

b) False

Answer: b

Explanation: The position of the station point is of great important. Upon its position, the general appearance of the perspective depends. Hence, it should be so located as to view the object in the best manner.

9. For large objects such as buildings, the station point is usually taken at the eye level of a person of normal height that is about _____ meters.

a) 2

b) 1

c) 1.5

d) 1.8

Answer: d

Explanation: For large objects such as buildings, the station point is usually taken at the eye level of a person of about 1.8 meters. For small objects, the station point should be fixed at such a height which gives good view of top faces and side faces.

10. The position of picture plane relative to the object is independent of size of perspective view.

a) True

b) False

Answer: b

Explanation: The perspective will show the object reduced in size when it is placed behind the picture plane. If the object is moved nearer the picture plane the size of the perspective will increase and vice versa.

11. The perspective will show the object _____ in size when it is placed behind the picture plane. If the object is moved nearer the picture plane the size of the perspective will _____

a) reduced, decrease
b) reduced, increase
c) increased, reduce
d) increased, increase

Answer: b

Explanation: The perspective will show the object reduced in size when it is placed behind the picture plane. If the object is moved nearer the picture plane the size of the perspective will increase and vice versa.

12. The perspective will show the object _____ in size when it is placed in front of the picture plane. If the object is moved nearer the picture plane the size of the perspective will _____

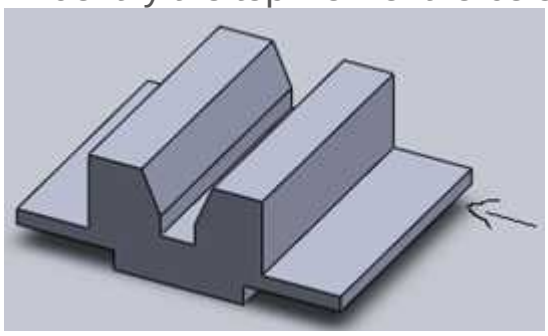
a) reduced, decrease
b) reduced, increase
c) increased, reduce
d) increased, increase

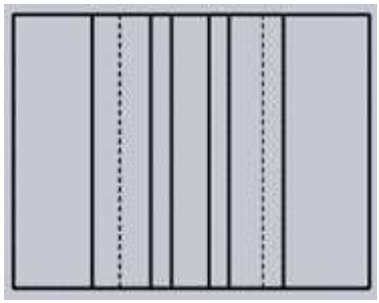
Answer: c

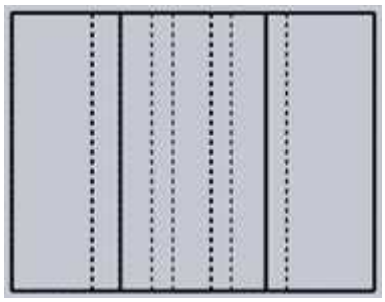
Explanation: The perspective will show the object increased in size when it is placed in front of the picture plane. If the object is moved nearer the picture plane the size of the perspective will reduce and vice versa.

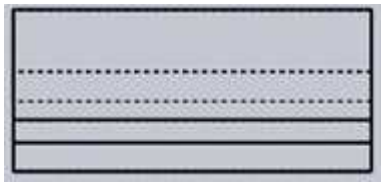
Orthographic Reading and Conversion of Views

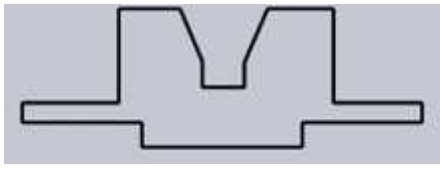
1. Identify the top view of the below given component.



a) 

b) 

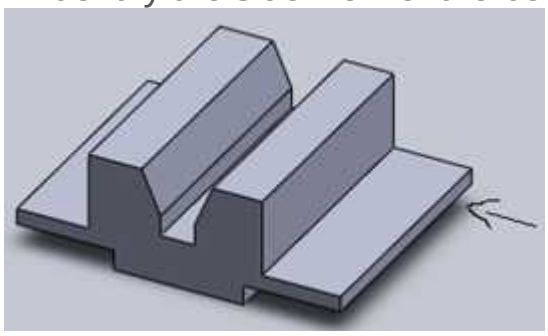
c) 

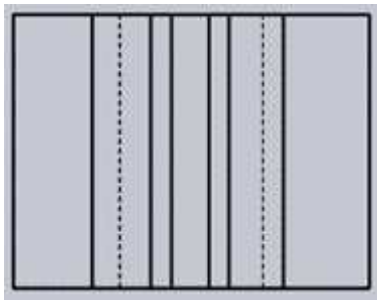
d) 

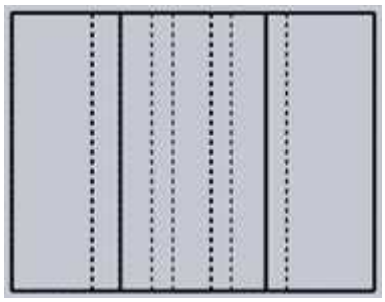
Answer: a

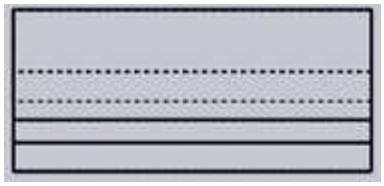
Explanation: Arrow mark in the given figure shows the direction in which front view is taking and dotted lines represent hidden edges and lines. For some objects top and bottom are same and for other both sides view are same and similar for rest.

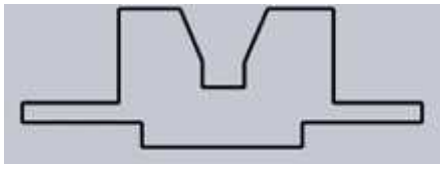
2. Identify the side view of the below given component.



a) 

b) 

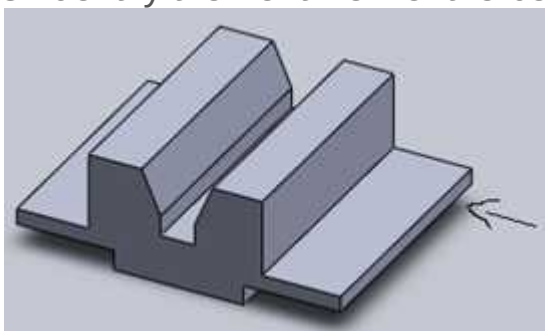
c) 

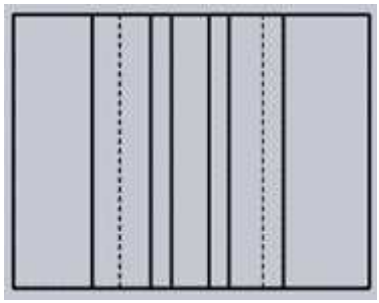
d) 

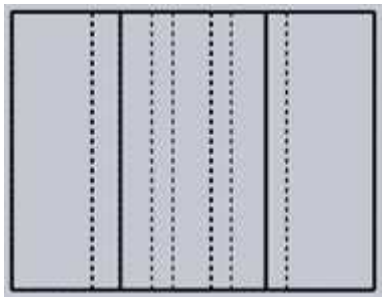
Answer: d

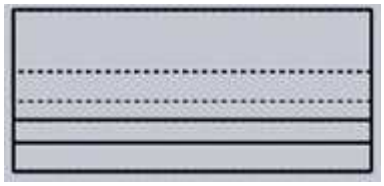
Explanation: Arrow mark in the given figure shows the direction in which front view is taking and dotted lines represent hidden edges and lines. For some objects top and bottom are same and for other both sides view are same and similar for rest.

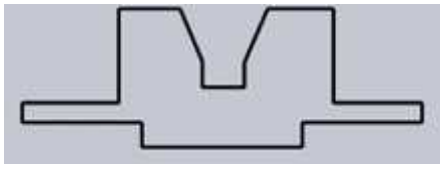
3. Identify the front view of the below given component.



a) 

b) 

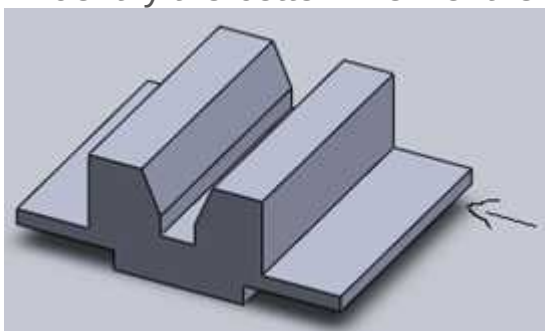
c) 

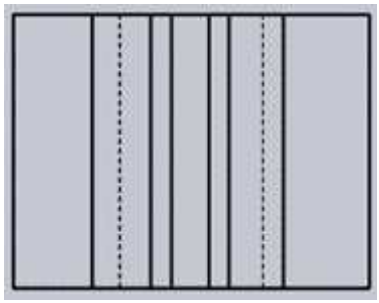
d) 

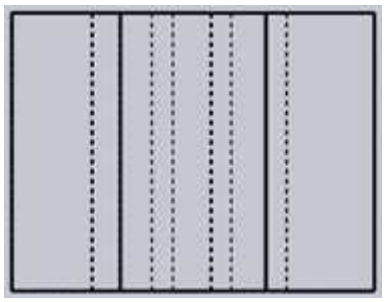
Answer: c

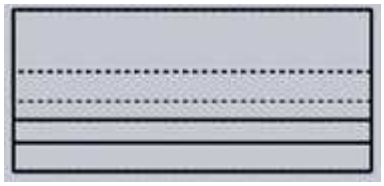
Explanation: Arrow mark in the given figure shows the direction in which front view is taking and dotted lines represent hidden edges and lines. For some objects top and bottom are same and for other both sides view are same and similar for rest.

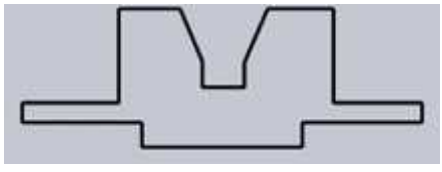
4. Identify the bottom view of the below given component.



a) 

b) 

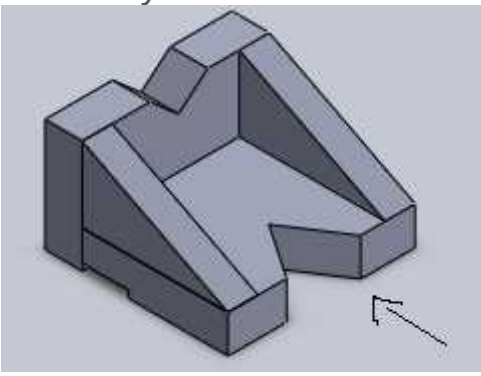
c) 

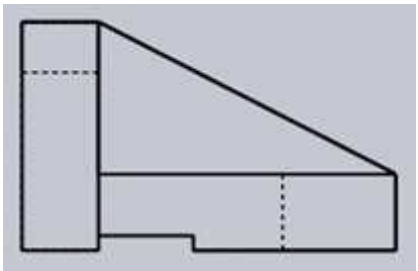
d) 

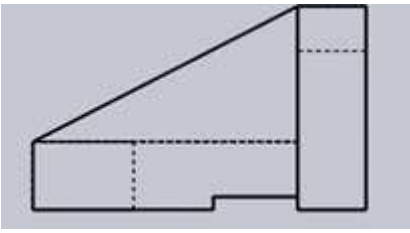
Answer: b

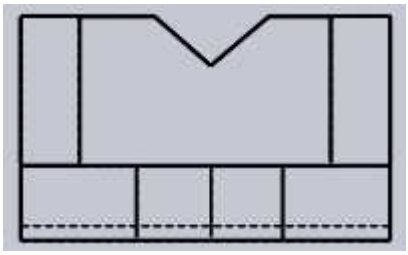
Explanation: Arrow mark in the given figure shows the direction in which front view is taking and dotted lines represent hidden edges and lines. For some objects top and bottom are same and for other both sides view are same and similar for rest.

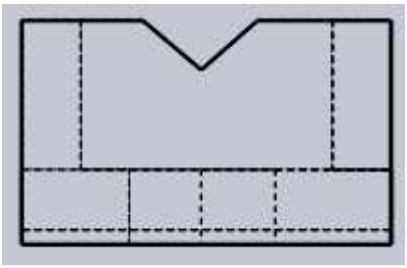
5. Identify the front view of the below given component.



a) 

b) 

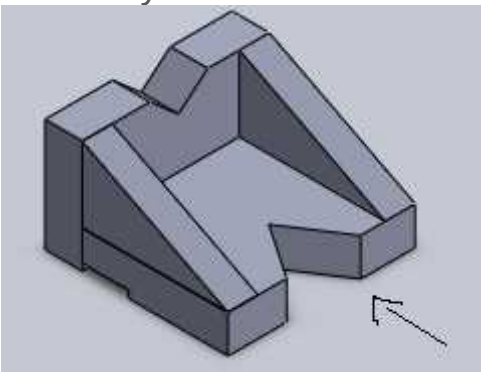
c) 

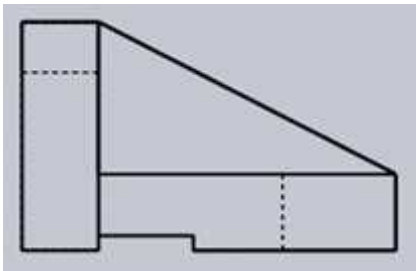
d) 

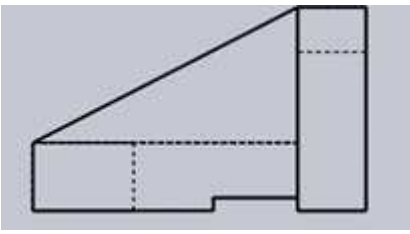
Answer: c

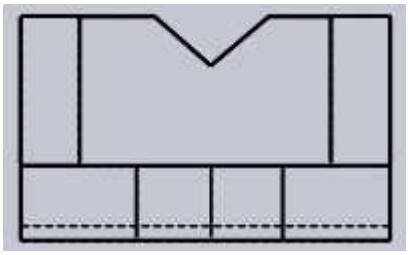
Explanation: Arrow mark in the given figure shows the direction in which front view is taking and dotted lines represent hidden edges and lines. For some objects top and bottom are same and for other both sides view are same and similar for rest.

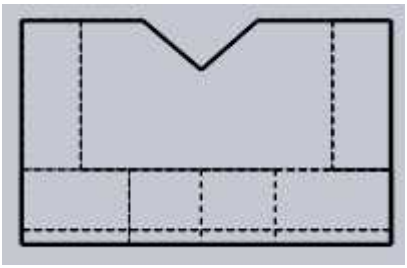
6. Identify the back view of the below given component.



a) 

b) 

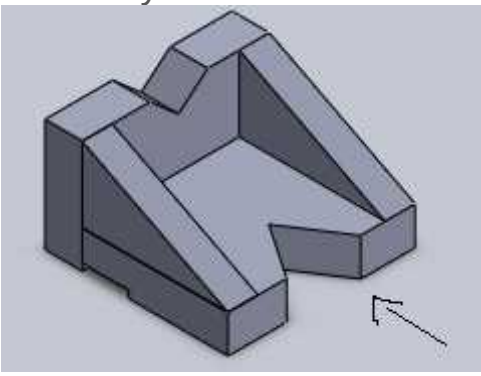
c) 

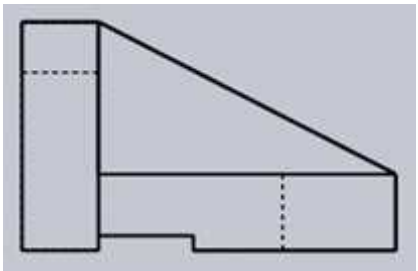
d) 

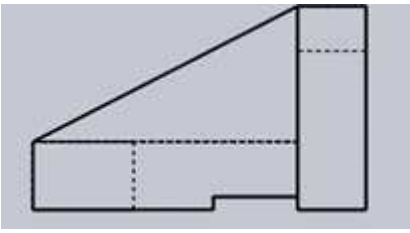
Answer: d

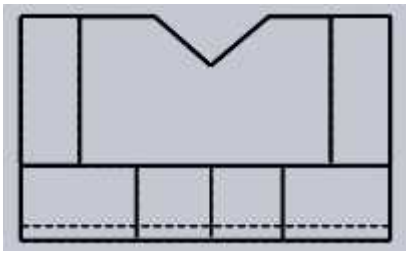
Explanation: Arrow mark in the given figure shows the direction in which front view is taking and dotted lines represent hidden edges and lines. For some objects top and bottom are same and for other both sides view are same and similar for rest.

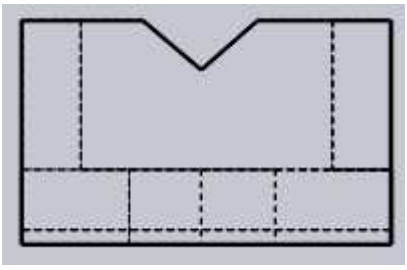
7. Identify the left side view of the below given component.



a) 

b) 

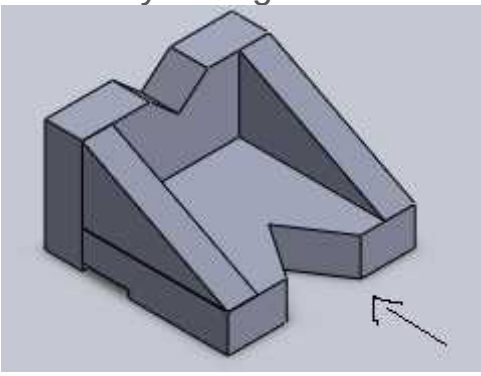
c) 

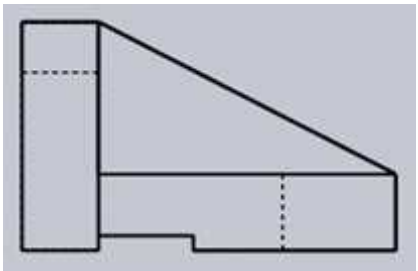
d) 

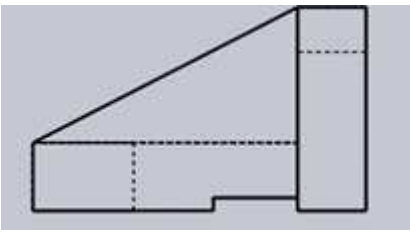
Answer: a

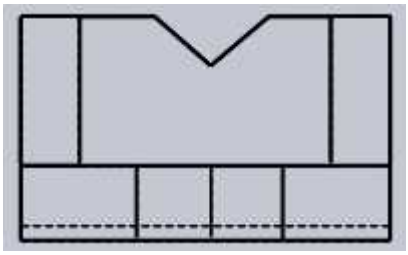
Explanation: Arrow mark in the given figure shows the direction in which front view is taking and dotted lines represent hidden edges and lines. For some objects top and bottom are same and for other both sides view are same and similar for rest.

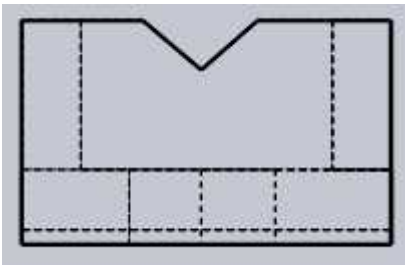
8. Identify the right side view of the below given component.



a) 

b) 

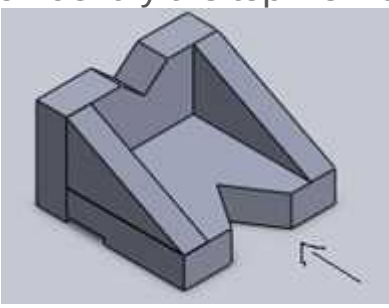
c) 

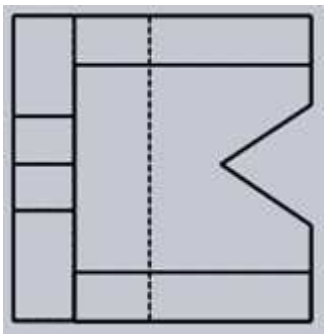
d) 

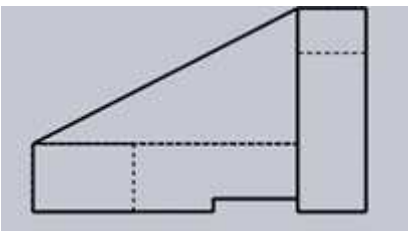
Answer: b

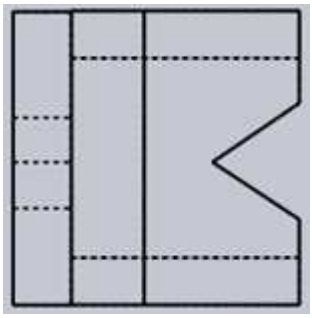
Explanation: Arrow mark in the given figure shows the direction in which front view is taking and dotted lines represent hidden edges and lines. For some objects top and bottom are same and for other both sides view are same and similar for rest.

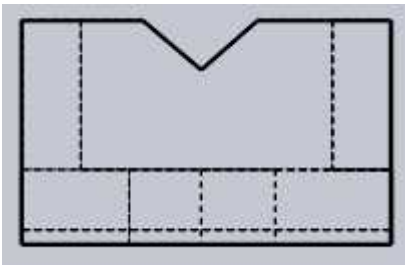
9. Identify the top view of the below given component.



a) 

b) 

c) 

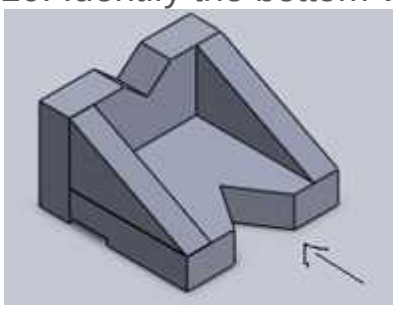
d) 

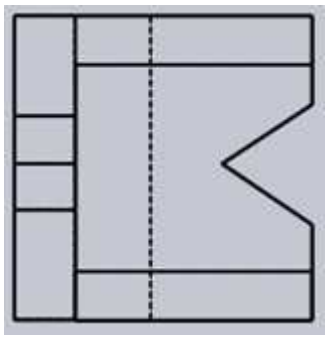
Answer: a

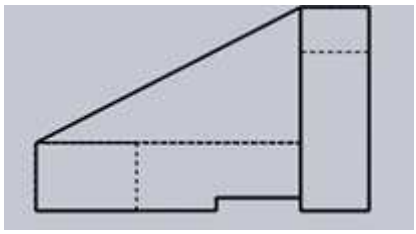
Explanation: Arrow mark in the given figure shows the direction in which front view is taking

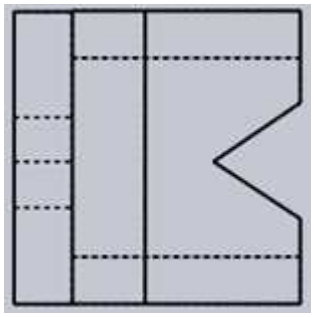
and dotted lines represent hidden edges and lines. For some objects top and bottom are same and for other both sides view are same and similar for rest.

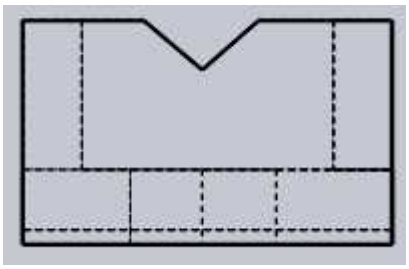
10. Identify the bottom view of the below given component.



a) 

b) 

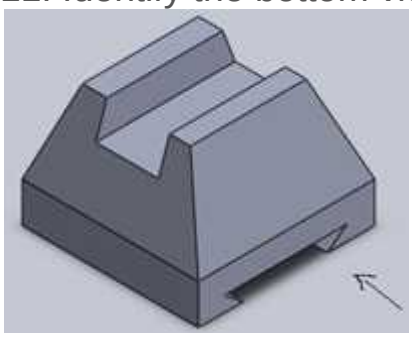
c) 

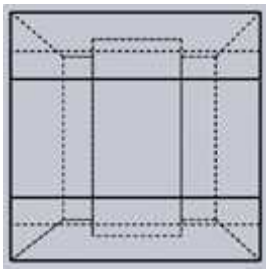
d) 

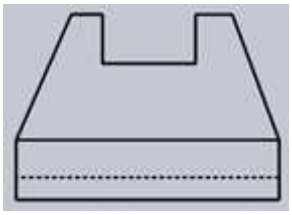
Answer: c

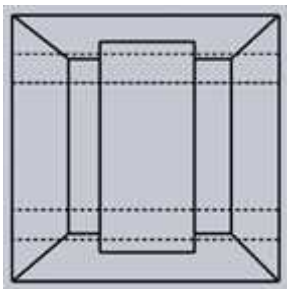
Explanation: Arrow mark in the given figure shows the direction in which front view is taking and dotted lines represent hidden edges and lines. For some objects top and bottom are same and for other both sides view are same and similar for rest.

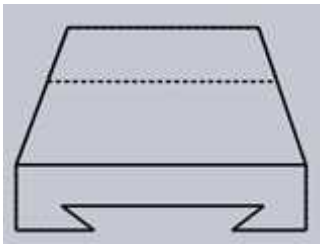
11. Identify the bottom view of the below given component.



a) 

b) 

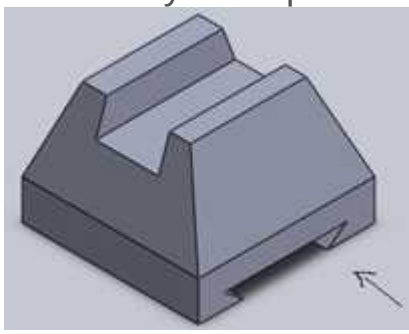
c) 

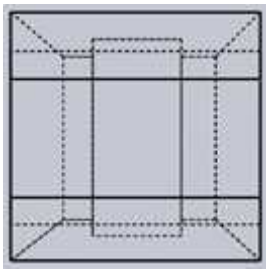
d) 

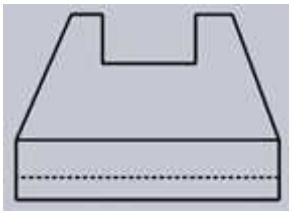
Answer: a

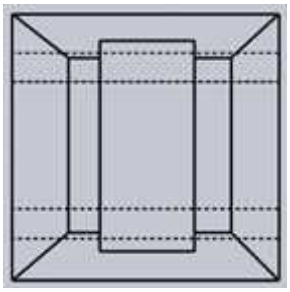
Explanation: Arrow mark in the given figure shows the direction in which front view is taking and dotted lines represent hidden edges and lines. For some objects top and bottom are same and for other both sides view are same and similar for rest.

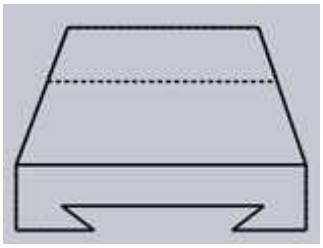
12. Identify the top view of the below given component.



a) 

b) 

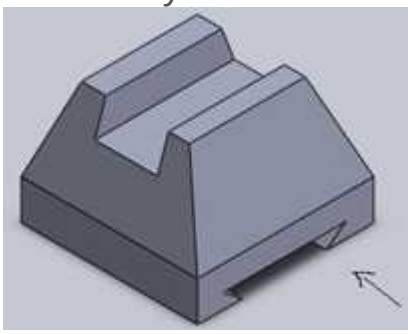
c) 

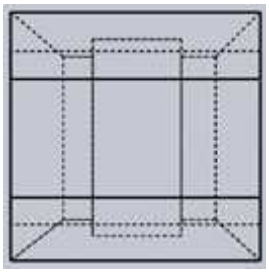
d) 

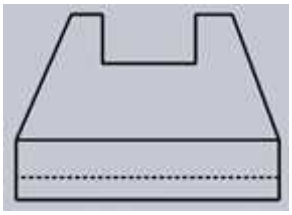
Answer: c

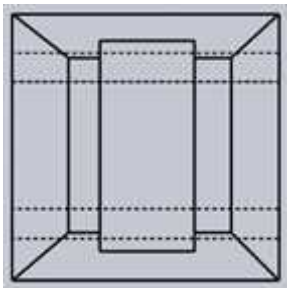
Explanation: Arrow mark in the given figure shows the direction in which front view is taking and dotted lines represent hidden edges and lines. For some objects top and bottom are same and for other both sides view are same and similar for rest.

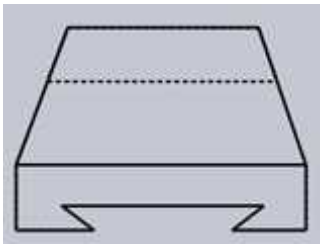
13. Identify the left side view of the below given component.



a) 

b) 

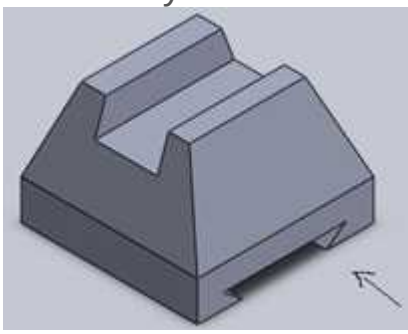
c) 

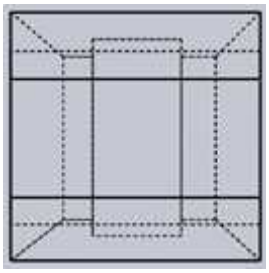
d) 

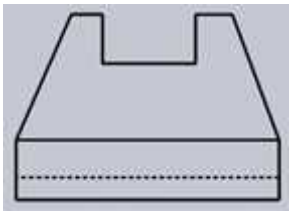
Answer: b

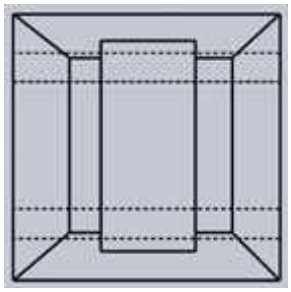
Explanation: Arrow mark in the given figure shows the direction in which front view is taking and dotted lines represent hidden edges and lines. For some objects top and bottom are same and for other both sides view are same and similar for rest.

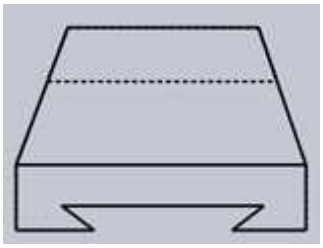
14. Identify the back view of the below given component.



a) 

b) 

c) 

d) 

Answer: d

Explanation: Arrow mark in the given figure shows the direction in which front view is taking and dotted lines represent hidden edges and lines. For some objects top and bottom are same and for other both sides view are same and similar for rest.

Centres of Gravity

1. Which of the following is not the definition of center of gravity?
a) A point on which whole weight if body balances
b) A point through which the resultant of forces of gravity of every particle in body acts
c) It is also called center of mass
d) The point in the body where the gravity becomes zero

Answer: d

Explanation: The center of gravity is defined as point on which whole weight if body balances (or) a point through which the resultant of forces of gravity of every particle in body acts. It is also called center of mass. It may not necessarily lie within the body.

2. The center of gravity of a triangle is on _____
a) centroid
b) circum center
c) in center
d) ortho center

Answer: a

Explanation: The center of gravity is defined as point on which whole weight if body balances (or) a point through which the resultant of forces of gravity of every particle in body acts. For planar objects like triangle the center of gravity will be at its centroid.

3. Given steps in procedure to find the center of gravity of the quadrilateral ABCD. Arrange the steps.
i. Draw lines joining G1 with G2 and G3 with G4.
ii. In given quadrilateral draw diagonal BD and locate centers of gravity G1, G2 of

triangles BCD and ABD.
iii. The point of intersection of lines G1G2 and G3G4 gives the center of gravity of the quadrilateral ABCD.
iv. Similarly draw the diagonal AC and determine the centers of gravity G3, G4 of triangles ABC and ADC.
a) i, ii, iii, iv
b) ii, iv, i, iii
c) iii, iv, i, ii
d) iv, i, ii, iii
Answer: b
Explanation: Given is irregular quadrilateral so first we have to make it to regular simpler shapes like triangle and the finding center of gravity for those and intersection of forces acting gives the center of gravity of whole.

4. Given steps in procedure to find the center of gravity of the trapezium ABCD. Arrange the steps.
i. Join E and F which intersects the line PQ at G. G is center of gravity.
ii. Similarly produce CD to a point F so that FD=AB.
iii. Draw a line joining the midpoints P and Q of the parallel sides AB and DC respectively.
iv. Produce AB to a point E so that BE=DC.
a) i, ii, iii, iv
b) ii, iv, i, iii
c) iii, iv, ii, i
d) iii, i, ii, iv
Answer: c
Explanation: Given is trapezium and the steps given are for finding the center of gravity in simple way. In this the parallel lines are extended up to the length of their opposite sides and intersection of line joining ends and line joining midpoints of parallel lines gives the center of gravity.

5. The center of gravity of an equilateral triangle is on its circum center.
a) True
b) False
Answer: a
Explanation: For equilateral triangle the centroid and circum center and in center coincides

so as the centre of gravity is the centroid for any triangle but here comes center of gravity also coincides with all other 3 points.

6. The center of gravity of a circular ring will be a _____
a) line which acts as axis of that ring
b) point anywhere in its inner circumference
c) point at center of ring
d) point on centroid of cross section of ring
Answer: c
Explanation: The center of gravity is defined as point on which whole weight if body balances (or) a point through which the resultant of forces of gravity of every particle in body acts. It is also called center of mass. It may not necessarily lie within the body.

7. For symmetrical objects the center of gravity lies at intersection of axes.
a) True
b) False
Answer: a
Explanation: The center of gravity is defined as point on which whole weight if body balances (or) a point through which the resultant of forces of gravity of every particle in body acts. It may not necessarily lie within the body.

8. The center of gravity of a right angled triangle having h as height and b as base length and vertex at 90 degrees is at origin.
a) (h/3,b/3)
b) (b/4,h/4)
c) (b/3,h/3)
d) (h/2,b/2)
Answer: c
Explanation: Given is a right angled triangle having h as height and b as base length and vertex at 90 degrees is at origin. The center of gravity coincides with the centroid of the triangle the given answer is the centroid for such a triangle.

9. Which of the following game make use of center of gravity?
a) Caroms
b) Seesaw
c) Tic-Tac-Toe
d) Swing
Answer: b

Explanation: The center of gravity is defined as point on which whole weight if body balances (or) a point through which the resultant of forces of gravity of every particle in body acts. It is also called center of mass.

10. The center of gravity of a rectangle having h as height and w as width, one of its vertex is origin and its width is along x-axis is _____
a) (w/3,h/3)
b) (w/4,h/4)
c) (h/2,w/2)
d) (w/2,h/2)
Answer: d
Explanation: Given a rectangle having h as height and w as width, one of its vertices is origin and its width is along x-axis which is symmetric planar object and for symmetrical objects the center of gravity lies at intersection of axes.

Screw Threads

1. Flank is a _____
a) line
b) point
c) distance
d) surface
Answer: d
Explanation: The surface between the crest and the root is called the flank of the thread. Depth is the distance between the crest and root, measured at right angles to the axis. It is equal to the half of the difference between the outside and core diameter denoted by D.

2. For a unified triangular external thread the distance between the crest and root (d) is ____ when pitch (p) is given.
a) d= 0.75 p
b) d= 0.5 p
c) d= 0.61 p
d) d= 0.64 p
Answer: c
Explanation: For a buttress thread the distance between the crest and root (d) is 0.75 times the pitch, for square thread ‘d’ is 0.5 times the pitch, for a Whitworth external thread ‘d’ is 0.64 times the pitch, for a unified triangular external thread the ‘d’ is 0.61 times the pitch.

3. For a Whitworth external thread the distance between the crest and root (d) is ____ when pitch (p) is given.
a) d= 0.75 p
b) d= 0.5 p
c) d= 0.61 p
d) d= 0.64 p
Answer: d
Explanation: For a buttress thread the distance between the crest and root (d) is 0.75 times the pitch, for square thread ‘d’ is 0.5 times the pitch, for a Whitworth external thread ‘d’ is 0.64 times the pitch.

4. For buttress thread the angle between the two flanks is ____
a) 55 degrees
b) 47.5 degrees
c) 29 degrees
d) 45 degrees
Answer: d
Explanation: For buttress thread the angle between the two flanks is 45 degrees, for British association thread the angle between the two flanks is 47.5 degrees, for acme thread the angle between the two flanks is 29 degrees.

5. For acme thread the angle between the two flanks is ____
a) 55 degrees
b) 47.5 degrees
c) 29 degrees
d) 45 degrees
Answer: c
Explanation: For Whitworth thread the angle between the two flanks is 55 degrees, for British association thread the angle between the two flanks is 47.5 degrees, for acme thread the angle between the two flanks is 29 degrees.

6. For a square thread the distance between the crest and root (d) is ____ when pitch (p) is given.
a) d= 0.86 p
b) d= 0.5 p
c) d= 0.61 p
d) d= 0.64 p
Answer: b

Explanation: For a buttress thread the distance between the crest and root (d) is 0.75 times the pitch, for square thread ‘d’ is 0.5 times the pitch, for a Whitworth external thread ‘d’ is 0.64 times the pitch.

7. For a buttress thread the distance between the crest and root (d) is ____ when pitch (p) is given.
a) d= 0.86 p
b) d= 0.5 p
c) d= 0.64 p
d) d= 0.75 p
Answer: d
Explanation: For a buttress thread the distance between the crest and root (d) is 0.75 times the pitch, for square thread ‘d’ is 0.5 times the pitch, for a Whitworth external thread ‘d’ is 0.64 times the pitch.

8. For Whitworth thread the angle between the two flanks is ____
a) 55 degrees
b) 47.5 degrees
c) 29 degrees
d) 45 degrees
Answer: a
Explanation: For Whitworth thread the angle between the two flanks is 55 degrees, for British association thread the angle between the two flanks is 47.5 degrees, for acme thread the angle between the two flanks is 29 degrees.

9. For British association thread the angle between the two flanks is ____
a) 55 degrees
b) 47.5 degrees
c) 29 degrees
d) 45 degrees
Answer: b
Explanation: For Whitworth thread the angle between the two flanks is 55 degrees, for British association thread the angle between the two flanks is 47.5 degrees, for acme thread the angle between the two flanks is 29 degrees.

10. If a nut, when turned in clockwise direction screws on a bolt, the thread is a left-hand thread.
a) True

b) False

Answer: b

Explanation: If a nut, when turned in clockwise direction screws on a bolt, the thread is a right-hand thread; but if it screws off the bolt when turned in the same direction, the thread is said to be left hand thread.

11. Practical application of the right-hand, left-hand threads is made in a coupler-nut and turn-buckle.

a) True

b) False

Answer: a

Explanation: The length of a tie-bar can be adjusted by this nut. Looking from right, if the nut is turned in clockwise direction, the ends of the rods will move closer to each other. They will move further apart when the nut is turned in anticlockwise direction.

Nut and Washers

1. The angle of chamfer for hexagonal and square nut is ____ degrees as per standards.

a) 30

b) 45

c) 60

d) 15

Answer: a

Explanation: The upper corners of this nut are rounded-off or chamfered. The chamfering is generally conical. The angle of chamfer is 30-45 degrees with the base of the nut. Due to chamfering, an arc is formed on each vertical face and circle is formed on top surface.

2. The angle through which the spanner will have to be turned to get next hold is ____ degrees in case of hexagonal shape.

a) 90

b) 60

c) 30

d) 45

Answer: b

Explanation: The angle through which the spanner will have to be turned to get next hold is 60 degrees in case of hexagonal shape as 360/6 is 60 degrees. In case of square nut the

spanner can have better hold but angle is 90 degrees so it is more convenient to use hexagonal nut.

3. Width across the flats in case of hexagonal nut is___ where D is the diameter of shank.
a) 2D
b) 1.5D +3mm
c) 1.4D
d) 1.5D
Answer: b
Explanation: Width across the flats in case of hexagonal nut is 1.5D+3mm where D is the diameter of shank, thickness or height of nut is D itself and distance across diagonally opposite corners in case of hexagonal nut is 2D.

4. Distance across diagonally opposite corners in case of hexagonal nut is _____ where D is nominal diameter.
a) 2D
b) 1.5D +3mm
c) 1.4D
d) 1.5D
Answer: a
Explanation: Width across the flats in case of hexagonal nut is 1.5D+3mm where D is the diameter of shank, thickness or height of nut is D itself and distance across diagonally opposite corners in case of hexagonal nut is 2D.

5. What is the name of the nut which is a hexagonal nut with a washer?
a) Dome nut
b) Wing nut
c) Flanged nut
d) Cap nut
Answer: c
Explanation: Flanged nut is hexagonal nut with a washer that is a flat circular disc attached to it. It is thus provided with a larger bearing surface. A bolt can be used in a comparatively large-size hole with help of this nut. It is widely used in automobiles.

6. What is the name of the nut which is a hexagonal nut provided with a cylindrical cap?
a) Dome nut

b) Wing nut
c) Flanged nut
d) Cap nut
Answer: d
Explanation: Cap nut is a hexagonal nut provided with a cylindrical cap at the top to protect the end of the bolt from corrosion. It also prevents leakage through the threads. Flanged nut is hexagonal nut with a washer that is a flat circular disc attached to it.

7. What is the name of the nut which is a cap nut with spherical dome at the top?
a) Dome nut
b) Wing nut
c) Flanged nut
d) Cap nut
Answer: a
Explanation: It is a form of cap nut with spherical dome at top. Flanged nut is hexagonal nut with a washer that is a flat circular disc attached to it. Cap nut is a hexagonal nut provided with a cylindrical cap at the top.

8. What is the name of the nut which can be easily operated by the thumb and a finger?
a) Ring nut
b) Wing nut
c) Cap nut
d) Flanged nut
Answer: b
Explanation: Wing nut can be easily operated by thumb and a finger and is used where it is required to be adjusted frequently. It is used in a hacksaw. Cap nut is a hexagonal nut provided with a cylindrical cap at the top.

9. What is the name of the nut which is in form of a ring provided with slots in the curved surface for c-spanner?
a) Ring nut
b) Wing nut
c) Capstan nut
d) Flanged nut
Answer: a
Explanation: Ring nut is in form of a ring provided with slots in the curved surface for a

special C-spanner. These nuts are generally used in pairs, one nut acting as a lock-nut for the other. Wing nut can be easily operated by the thumb and a finger.

10. What is the outer diameter of washer when nominal diameter of bolt is 5 mm?
a) 13 mm
b) 15 mm
c) 10 mm
d) 12 mm
Answer: a
Explanation: When nominal diameter of bolt is D the thickness of the washer is 0.12D and outer diameter is 2D+3 mm and inner diameter is D+0.5mm. Here D is 5 mm so 2D+3 mm = 2 x 5+3= 10+3 = 13 mm.

11. What is the thickness of washer when nominal diameter of bolt is D?
a) 0.12D
b) 0.1D
c) D
d) 0.09D
Answer: a
Explanation: Washer is a cylindrical piece of metal placed below the nut to provide smooth bearing surface. The thickness of washer when nominal diameter of bolt is D is 0.12D and outer diameter is 2D+3 mm and inner diameter is D+0.5mm

Locking Arrangements for Nuts

1. Which of the following is not reason for arranging locking nuts?
a) to get rid of slack while vibrations in machines
b) to get rid from the loosing of connected parts
c) for more protection and security
d) to get rid of screwing off the bolts
Answer: c
Explanation: There is always a tendency for the nuts to get slack and to screw off the bolts slightly. The connected parts might get loose, and lead to serious breakdown. It is, therefore, desirable to secure the nut in some way so as to prevent it from getting loose.

2. Lock-nut or check-nut is chamfered on _____
a) upper side

b) lower side
c) both sides
d) none sides
Answer: c
Explanation: The lock nut is used along with an ordinary nut. The thread in lock nut presses against the bottom side of the thread in the bolt. When ordinary nut is held by spanner, while the lock is turned backwards with another spanner the two nuts are thus locked tightly against each other.

3. The diameter of the hole in which the split pin is to be put is _____ when D is the diameter of bolt.
a) 0.12D
b) 0.2D
c) 0.3D
d) 0.4D
Answer: b
Explanation: When D is the diameter of bolt the diameter of the hole in which the split pin is 0.2D approximately, 0.3D is the height of slot made in the nut in which split pin is arranged and 0.12D is the thickness of the washer.

4. A hexagonal nut with a slot cut half way across it and a cap screw is passed through clear hole in the upper to lower part. The name of the nut is _____
a) Simmond's locknut
b) Penn nut
c) Castle nut
d) Sawn nut or wiles nut
Answer: d
Explanation: Sawn nut is a hexagonal nut with a slot cut half way across it and a cap screw is passed through clear hole in the upper to lower part. On tightening the screw, the friction between the thread in upper part increases and prevents slacking.

5. _____ is a nut in which a collar is provided at the upper end of the hexagonal nut and a fiber ring is fitted inside it.
a) Simmond's locknut
b) Penn nut
c) Castle nut
d) Sawn nut or wiles nut
Answer: a

Explanation: Simmond’s locknut is a nut in which a collar is provided at the upper end of the hexagonal nut and a fiber ring is fitted inside it. The internal diameter of ring is less than the core diameter of the bolt the end of the bolt, on reaching the ring, cuts its own thread in ring which prevents slacking.

6. _____ is a nut in which slots are cut in a cylindrical collar provided on the top of the nut, thus overcoming the disadvantage of slotted nut.
a) Simmond’s locknut
b) Penn nut
c) Castle nut
d) Sawn nut or wiles nut
Answer: c
Explanation: Castle nut is a nut in which slots are cut in a cylindrical collar provided on the top of the nut, thus overcoming the disadvantage of slotted nut the nuts which are widely used in automobile and locomotive engines and also in steam engine.

7. A hexagonal nut with slots cut in the upper end of it and through opposite faces in which slotted pin is inserted is called _____ nut.
a) Simmond’s locknut
b) Slotted nut
c) Castle nut
d) Sawn nut or wiles nut
Answer: b
Explanation: Slotted nut is a hexagonal nut with slots cut in the upper end of it and through opposite faces in which slotted pin is inserted through the slot which comes in line with the hole drilled in the bolt and is then opened out at its end.

8. The nut which has a cylindrical grooved collar at its lower end and this collar fits into a corresponding recess in the adjoining piece is named as.
a) Simmond’s locknut
b) Grooved nut
c) Castle nut
d) Sawn nut or wiles nut
Answer: b
Explanation: Grooved nut is a nut which has a cylindrical grooved collar at its lower end and this collar fits into a corresponding recess in the adjoining piece. A set-screw is inserted through the nearest face of the piece. The dog-end of the set-screw enters the groove and prevents slackening of the nut.

9. The _____ nut in which small pin is screwed in the piece adjoining the nut so that it touches one of the faces of the hexagonal nut which is sufficient to prevent its getting loose.
a) Grooved nut
b) Penn nut
c) Castle nut
d) Ring nut
Answer: b
Explanation: The Penn nut in which small pin is screwed in the piece adjoining the nut so that it touches one of the faces of the hexagonal nut which is sufficient to prevent its getting loose. But it becomes an obstruction if the nut is required to be tightened further through a small angle.

10. The nuts which are widely used in automobile and locomotive engines and also in steam engine are _____ nuts.
a) Simmond's locknut
b) Penn nut
c) Castle nut
d) Sawn nut or wiles nut
Answer: c
Explanation: Castle nut is a nut in which slots are cut in a cylindrical collar provided on the top of the nut, thus overcoming the disadvantage of slotted nut the nuts which are widely used in automobile and locomotive engines and also in steam engine

Bolts

1. Which of the following is not the method to prevent rotation of a bolt while screwing a nut on or off it?
a) By keeping a square neck
b) By providing a snug
c) By keeping a lock nut
d) By inserting a pin in shank
Answer: c
Explanation: The connected parts might get loose, and lead to serious breakdown a lock nut in some way so as to prevent it from getting loose but not to prevent rotation of a bolt while screwing a nut on or off.

2. Which bolt is commonly used in bearing for shafts?
a) Hook bolt
b) Eye-bolt
c) T-headed bolt
d) Square-headed bolt
Answer: d
Explanation: Square-headed bolt is commonly used in bearing for shafts and this bolt head is chamfered at its upper end. The hook bolt is used when it is not possible to drill a hole in the piece adjoining the bolt-head.

3. Which bolt is commonly used in big ends of connecting rods, eccentrics?
a) Hook bolt
b) Eye-bolt
c) T-headed bolt
d) Cheese-headed bolt
Answer: d
Explanation: This bolt is used when the space for accommodating the bolt-head is comparatively limited, or where the use of a spanner for holding it is to be avoided. It is commonly used in big ends of connecting rods etc.

4. Which bolt is used in machine-tool tables in which T-slots are cut to accommodate the T-heads?
a) Hook bolt
b) Eye-bolt
c) T-headed bolt
d) Countersunk-headed bolt
Answer: c
Explanation: This bolt is used in machine-tool tables in which T-slots are cut to accommodate the T-heads. This is often made use of in gland and stuffing box arrangement in boiler mountings such as stop valve, feed-check valve etc.

5. The bolt which is used where the head of a bolt must not project above the surface of the connected piece is _____
a) Stud-bolt
b) Tap-bolt or cap screw
c) T-headed bolt
d) Countersunk-headed bolt
Answer: d

Explanation: Countersunk-headed bolt is used where the head of a bolt must not project above the surface of the connected piece; this form of the bolt is used. It may be provided with a snug or a neck square cross-section.

6. The bolt which is used when it is not possible to drill a hole in the piece adjoining the bolt-head is _____
a) Hook bolt
b) Tap-bolt or cap screw
c) T-headed bolt
d) Countersunk-headed bolt
Answer: a
Explanation: This bolt passes through a hole in one piece only, while the other piece is gripped by the hook-shaped bolt-head. It is used when it is possible to drill a hole in the piece adjoining the bolt-head. The square neck prevents rotation of the bolt.

7. The bolt which has a circular ring of rectangular cross-section as its head, which can be conveniently held to prevent its rotation is _____
a) Hook bolt
b) Eye-bolt
c) T-headed bolt
d) Stud bolt
Answer: b
Explanation: Eye-bolt has a circular ring of rectangular cross-section as its head, which can be conveniently held to prevent its rotation. The hook bolt is used when it is not possible to drill a hole in the piece adjoining the bolt-head.

8. Which bolt is used as an appliance for lifting heavy machines?
a) Hook bolt
b) Eye-bolt
c) Lifting eye-bolt
d) Cup-headed bolt
Answer: c
Explanation: Lifting eye-bolt is used as an appliance for lifting heavy machines. It is screwed inside a threaded hole on the top of the machine, directly above its centre of gravity. The hook bolt is used when it is not possible to drill a hole in the piece adjoining the bolt-head.

9. Which bolt is mainly used in marine shaft couplings?
a) Headless tapered bolt
b) Tap-bolt or cap screw
c) Lifting eye-bolt
d) Countersunk-headed bolt
Answer: a
Explanation: Headless tapered bolt has no head and has shank which is tapered is mainly used in marine shaft couplings. Lifting eye-bolt is used as an appliance for lifting heavy machines. Tap-bolt or cap screw is used as a screw that is when it is not possible to accommodate the nut.

10. Which bolt is used as a screw that is when it is not possible to accommodate the nut?
a) Headless tapered bolt
b) Tap-bolt or cap screw
c) Stud-bolt or Stud
d) Countersunk-headed bolt
Answer: b
Explanation: This bolt is used as a screw that is when it is not possible to accommodate the nut. It is used as a screw that is screwed into a threaded hole in a casting instead of a nut. Frequent insertion or removal of the tap-bolt is likely to damage the threads in the casting.

11. Bolt which consists of only a cylindrical shank threaded at both ends is called _____
a) Headless tapered bolt
b) Tap-bolt or cap screw
c) Stud-bolt or Stud
d) Countersunk-headed bolt
Answer: c
Explanation: Bolt which consists of only a cylindrical shank threaded at both ends is called Stud-bolt or Stud. And some having collared are called collar studs and stud with middle portion made square in section facilitates gripping of the stud while screwing or unscrewing it.

12. The _____ bolt is often made use of in gland and stuffing box arrangement in boiler mountings such as stop valve, feed-check valve etc.
a) Headless tapered bolt

b) Tap-bolt or cap screw
c) T-headed bolt
d) Countersunk-headed bolt
Answer: c
Explanation: This bolt is used in machine-tool tables in which T-slots are cut to accommodate the T-heads. This is often made use of in gland and stuffing box arrangement in boiler mountings such as stop valve, feed-check valve etc.

Riveted Joints

1. What type of failure will occur when rivets are smaller than necessary?
a) Tearing of plate between the holes
b) Tearing of plate between the edges
c) Shearing of rivet
d) Crushing of plate
Answer: c
Explanation: Shearing of the rivet takes place if the diameter of the rivet is smaller than necessary. Tearing of the plate between the edges of the plate and rivet-hole takes place if the hole is too near the edge.

2. The necessary diameter (d) for thickness of plates (t) is _____
a) $d = 6*\sqrt{t}$
b) $d =4*\sqrt{t}$
c) $d =6*\sqrt{2t}$
d) $d =4*\sqrt{2t}$
Answer: a
Explanation: To prevent failure, the joint should be carefully designed. For elementary work, suitable values of the rivet diameter, positions of holes etc. for a given thickness of the plates the given empirical formulae is used.

3. The thickness of the fullering tool is about the _____ as that of the plates.
a) double
b) same
c) half
d) one third
Answer: b

Explanation: To prevent leakage through the joint, the plates are firmly formed together by caulking or fullering processes. Both the processes are generally performed with the aid of pneumatic power. The thickness of the fullering tool is about the same as that of the plates.

4. Tearing of the plate between the holes is taken when _____

a) they are near to each other
b) the hole is too near the edge
c) diameter of rivet is too small
d) rivet and plate is of different metals

Answer: a

Explanation: Tearing of the plate between the holes takes place if they are very near to each other. Tearing of the plate between the edges of the plate and rivet-hole takes place if the hole is too near the edge.

5. Tearing of the plate between the edges of the plate and rivet-hole takes place when _____

a) they are near to each other
b) the hole is too near the edge
c) diameter of rivet is too small
d) rivet and plate is of different metals

Answer: b

Explanation: Tearing of the plate between the edges of the plate and rivet-hole takes place if the hole is too near the edge. Tearing of the plate between the holes takes place if they are very near to each other.

6. In a lap joint, if the plates are connected to each other when the joint is made with only one row of rivets then it is called double-riveted lap joint.

a) True
b) False

Answer: b

Explanation: For a lap joint, if the plates are made to connect using only one row of rivets then it is called single-riveted lap joint. A joint is said to be double-riveted, triple riveted etc. accordingly to the number of rows of rivets in it.

7. A joint is said to be double-riveted, triple riveted etc. accordingly to the number of sheets used.

a) True

b) False

Answer: b

Explanation: For a lap joint, if the plates are made to connect using only one row of rivets then it is called single-riveted lap joint. A joint is said to be double-riveted, triple riveted etc. accordingly to the number of rows of rivets in it.

8. Width (L) of overlap of sheets is equal to _____ when d is the diameter of rivet in case of single-riveted lap joint.

a) 2d

b) 3d

c) 4d

d) 5d

Answer: b

Explanation: For a lap joint, if the plates are made to connect using only one row of rivets then it is called single-riveted lap joint. The width of overlap L is equal to 3d when d is the diameter of rivet.

9. In zigzag lap joint formation when P is the pitch between the rivets, the distance between the rows of rivets should not be less than _____

a) 0.6P

b) 0.8P

c) P

d) 1.2P

Answer: a

Explanation: When two or more rows of rivets are required, rivets may be arranged in chain or zigzag formations. In chain formation the rivets are arranged directly opposite to each other but in zigzag they are staggered.

10. In butt joint when one strap is used the thickness varies between _____ to _____ (T is the thickness of plate to be connected).

a) T, 1.125T

b) 0.7T, 0.8T

c) 0.5T, T

d) T, 1.5T

Answer: a

Explanation: In a butt joint, edges of the plates to be connected are butted against each other and the joint between them is covered by butt-plates or butt-straps on one or both

sides. At least two rows of rivets, one in each connected plate, are necessary to make the joint.

11. In butt joint when two straps is used the thickness varies between _____ to _____ (T is the thickness of plate to be connected).
a) T, 1.125T
b) 0.7T, 0.8T
c) 0.5T, T
d) T, 1.5T
Answer: b
Explanation: In a butt joint, edges of the plates to be connected are butted against each other and the joint between them is covered by butt-plates or butt-straps on one or both sides. At least two rows of rivets, one in each connected plate, are necessary to make the joint.

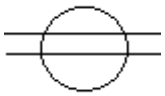
12. The flat ends of a boiler are prevented from bulging out and are strengthened by means of _____
a) connection of plates at right angles
b) gusset stays
c) welding
d) riveting
Answer: b
Explanation: Gusset stay is a plate which connects the flat end and the cylindrical shell of a boiler. Lengths of angle-section are used to make the joints. The flat ends of a boiler are prevented from bulging out and are strengthened by means of these stays.

Welded Joints

1. When welding of two metal parts are carried out by heating the parts at joint up to plastic condition and then joined together by applying external mechanical pressure it is named as Fusion welding.
a) True
b) False
Answer: b
Explanation: When welding of two metal parts are carried out by heating the parts at joint up to plastic condition and then joined together by applying external mechanical pressure it is named as Pressure welding or forge welding.

2. In _____ welding heavy current (50,000A) is passed through the joint which gets melt and welding is under external pressure.
a) Arc welding
b) Gas welding
c) Forge welding
d) Spot welding
Answer: d
Explanation: In this welding heavy current (50,000A) is passed through the joint which gets melt. The welding is completely under external pressure. Spot welding, seam welding and flash butt welding are examples of pressure resistance welding.

3. In which of the following welding only fusion welding takes place?
a) Seam welding
b) Flash butt welding
c) Spot welding
d) Arc welding
Answer: d
Explanation: Fusion welding is a process of welding by local fusion with or without use of a filler metal. The most commonly used fusion welding processes are gas welding and arc welding. The flame temperature varies from 2600 to 3200 degrees depends on fuel gases.

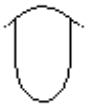
4. The symbol for weld type fillet is _____
a) 
b) 
c) 
d) 
Answer: a
Explanation: A welded joint is shown on a drawing by means of a symbol which specifies

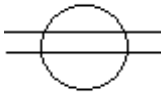
the form of weld and a bent arrow and a reference line indicating the location of the weld. The symbols shown here are recommended by the Bureau of Indian Standards.

5. The symbol for seam welding is _____

a) 

b) 

c) 

d) 

Answer: d

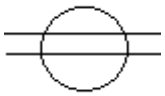
Explanation: A welded joint is shown on a drawing by means of a symbol which specifies the form of weld and a bent arrow and a reference line indicating the location of the weld. The symbols shown here are recommended by the Bureau of Indian Standards.

6. The symbol for weld type U butt is _____

a) 

b) 

c) 

d) 

Answer: c

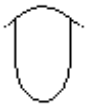
Explanation: A welded joint is shown on a drawing by means of a symbol which specifies

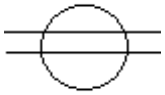
the form of weld and a bent arrow and a reference line indicating the location of the weld. The symbols shown here are recommended by the Bureau of Indian Standards.

7. The symbol for weld type V-butt is _____

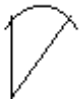
a) 

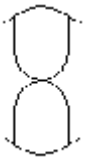
b) 

c) 

d) 

8. The symbol for weld type double-V butt is _____

a) 

b) 

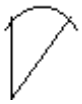
c) 

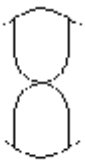
d) 

Answer: c

Explanation: A welded joint is shown on a drawing by means of a symbol which specifies the form of weld and a bent arrow and a reference line indicating the location of the weld. The symbols shown here are recommended by the Bureau of Indian Standards.

9. The symbol for spot welding is _____

a) 

b) 

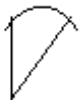
c) 

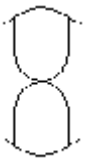
d) 

Answer: d

Explanation: A welded joint is shown on a drawing by means of a symbol which specifies the form of weld and a bent arrow and a reference line indicating the location of the weld. The symbols shown here are recommended by the Bureau of Indian Standards.

10. The symbol for weld type double U- butt is _____

a) 

b) 

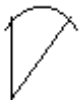
c) 

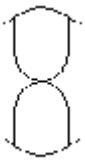
d) 

Answer: b

Explanation: A welded joint is shown on a drawing by means of a symbol which specifies the form of weld and a bent arrow and a reference line indicating the location of the weld. The symbols shown here are recommended by the Bureau of Indian Standards.

11. The symbol for weld type Bevel butt is _____

a) 

b) 

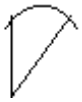
c) 

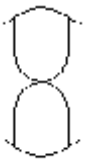
d) 

Answer: a

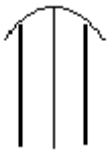
Explanation: A welded joint is shown on a drawing by means of a symbol which specifies the form of weld and a bent arrow and a reference line indicating the location of the weld. The symbols shown here are recommended by the Bureau of Indian Standards.

12. The symbol for edge welding is _____

a) 

b) 

c) 

d) 

Answer: d

Explanation: A welded joint is shown on a drawing by means of a symbol which specifies the form of weld and a bent arrow and a reference line indicating the location of the weld. The symbols shown here are recommended by the Bureau of Indian Standards.

Computer Aided Drawing

1. The commands Erase, Copy, Mirror, Trim, Extend, Break etc belongs to which tool bar?

a) Layer tool bar
b) Style tool bar
c) Modify tool bar
d) Draw tool bar

Answer: c

Explanation: The commands Erase, Copy, Mirror, Trim, Extend, Break, Join, Scale, Array etc belongs to ‘Modify tool bar’. The commands Donut, Block, Spline, Hatch, Rectangle, Ellipse, Polygon, and Arc etc belong to ‘Draw tool bar’.

2. The commands Donut, Block, Spline, Polygon, and Arc etc belong to which tool bar?

a) Layer tool bar
b) Style tool bar
c) Modify tool bar
d) Draw tool bar

Answer: d

Explanation: The commands Erase, Copy, Mirror, Trim, Extend, Break, Join, Scale, Array etc belongs to ‘Modify tool bar’. The commands Donut, Block, Spline, Hatch, Rectangle, Ellipse, Polygon, and Arc etc belong to ‘Draw tool bar’.

3. The command which works on two lines or a single poly line to create a beveled edge is _____

a) Chamfer
b) Fillet

c) Stretch
d) Extend
Answer: a
Explanation: Chamfer works on two lines or a single poly line to create a beveled edge. Fillet is used to create a round corner between two lines. Stretch command can either lengthen entities or shorten them and thus their shapes.

4. The command which is used to create a round corner between two lines is _____
a) Chamfer
b) Fillet
c) Stretch
d) Extend
Answer: b
Explanation: Fillet is used to create a round corner between two lines. Chamfer works on two lines or a single poly line to create a beveled edge. Stretch command can either lengthen entities or shorten them and thus their shapes.

5. The command ‘Oops’ is used to _____
a) create one or more copies of selected objects at another location
b) creates mirror image of selected objects about specified line
c) retrieves all objects erased by the last erase
d) deletes the selected entities
Answer: c
Explanation: The command ‘Oops’ is used to retrieves all objects erased by the last erase. Mirror is used to creates mirror image of selected objects about specified line. Command copy creates one or more copies of selected objects at another location.

6. The command ‘pedit’ is used for _____
a) erases a portion of line, arc, circle or a 2D poly line between two selected points
b) reverses the effects of a series of previously used commands
c) breaking a poly line into individual segments
d) editing of poly line properties
Answer: d
Explanation: The command ‘pedit’ is used for editing of poly line properties. Command ‘U’ is used for reverses the effects of a series of previously used commands. Command

‘break’ is used for erases a portion of line, arc, circle or a 2D poly line between two selected points.

7. The command ‘break’ is used for _____
a) erases a portion of line, arc, circle or a 2D poly line between two selected points
b) reverses the effects of a series of previously used commands
c) breaking a poly line into individual segments
d) editing of poly line properties
Answer: a
Explanation: The command ‘break’ is used for erases a portion of line, arc, circle or a 2D poly line between two selected points. Command ‘pedit’ is used for editing of poly line properties. Command ‘U’ is used for reverses the effects of a series of previously used commands.

8. The command ‘U’ is used for _____
a) erases a portion of line, arc, circle or a 2D poly line between two selected points
b) reverses the effects of a series of previously used commands
c) breaking a poly line into individual segments
d) editing of poly line properties
Answer: b
Explanation: The command ‘U’ is used for reverses the effects of a series of previously used commands. Command ‘pedit’ is used for editing of poly line properties. Command ‘break’ is used for erases a portion of line, arc, circle or a 2D poly line between two selected points.

9. The command ‘Explode’ is used for _____
a) erases a portion of line, arc, circle or a 2D poly line between two selected points
b) reverses the effects of a series of previously used commands
c) breaking a poly line into individual segments
d) editing of poly line properties
Answer: c
Explanation: The command ‘Explode’ is used for breaking a poly line into individual segments. Command ‘pedit’ is used for editing of poly line properties. Command ‘U’ is used for reverses the effects of a series of previously used commands.

10. The command which is used to set a new coordinate system by shifting the working XY plane to be desired location is?
a) 3DFACE
b) VPOINT
c) UCS
d) ELEV
Answer: c
Explanation: UCS is used to set a new coordinate system by shifting the working XY plane to be desired location. 3DFACE is used for making planar unmeshed surfaces that have three or four sides. VPOINT is used to set the viewpoint in 3D space for viewing the 3D models.

11. The command which is used for making planar unmeshed surfaces that have three or four sides is _____
a) 3DFACE
b) VPOINT
c) UCS
d) ELEV
Answer: a
Explanation: 3DFACE is used for making planar unmeshed surfaces that have three or four sides. VPOINT is used to set the viewpoint in 3D space for viewing the 3D models. UCS is used to set a new coordinate system by shifting the working XY plane to be desired location.

12. The command which is used to set the viewpoint in 3D space for viewing the 3D models is _____
a) 3DFACE
b) VPOINT
c) UCS
d) ELEV
Answer: b
Explanation: VPOINT is used to set the viewpoint in 3D space for viewing the 3D models. 3DFACE is used for making planar unmeshed surfaces that have three or four sides. UCS is used to set a new coordinate system by shifting the working XY plane to be desired location.

13. The command which is used to set elevation and thickness properties for 2D wireframe objects such as line, point, circle, polygon, arc is _____

a) 3DFACE
b) VPOINT
c) UCS
d) ELEV

Answer: d

Explanation: ELEV is used to set elevation and thickness properties for 2D wireframe objects such as line, point, circle, polygon and arc. 3DFACE is used for making planar unmeshed surfaces that have three or four sides.

14. The command which identifies the points on drawing entities that are visible on screen is _____ and this option allows the user to pick-up the points very accurately with respect to drawing displayed.

a) OSNAP
b) TABSURF
c) SNAP
d) GRID

Answer: a

Explanation: The command which identifies the points on drawing entities that are visible on screen is OSNAP. This option allows the user to pick-up the points very accurately with respect to drawing displayed.