

Chapter 1 : DRAWING INSTRUMENTS AND THEIR USES

REVIEW QUESTIONS

1. Name different types of drawing instruments.
2. What are the standard sizes of the drawing boards according to B.I.S.? Which size of drawing board is suitable for the practices of engineering students for A2 size of drawing sheet?
3. Explain the procedure for clamping a mini-drafter on the drawing board.
4. What are the standard sizes of the drawing sheets according to B.I.S.? Which size is suitable for the technical drawing?
5. How pencils are graded? Give the various shapes of the pencil lead along with their field of applications.
6. Write the precautions in using compass.
7. What is the maximum size of circle that can be drawn by a bow compass?
8. State three functions that a divider can perform.
9. What is the use of Engineer's scale? List the types of engineer's scale as recommended by B.I.S.
10. What is the use of french curves? Explain its working in brief.
11. State the angles that can be made with the help of a pair of set-squares.
12. How parallel lines are drawn with the help of a set-square? Explain with a neat sketch.
13. Distinguish between the use of an art gum eraser and a kneaded eraser.
14. Distinguish between the use of an eraser shield and a template.
15. Why should a sharpener be avoided for preparing the point of pencils?
16. What precautions would you maintain to keep your sheet neat and tidy?
17. Explain the need of the following for the layout of a drawing sheet.
(a) Grid references, (b) Metric reference graduation, and (c) Orientation mark.
18. What information should be contained in the title block of a drawing sheet?
19. What information may be included in the space for text?
20. What is a revision table? What information should be contained by it?
21. When an item references is required? How the item list is prepared?

Chapter 2 : LINES, LETTERING AND DIMENSIONING

REVIEW QUESTIONS

1. Draw basic types of lines recommended by BIS.
2. Give five applications of following lines in Mechanical Engineering drawing.
(a) Continuous narrow lines (b) Continuous wide lines
3. Draw suitable lines recommended by BIS for the following applications. (a) visible outlines (b) hidden lines (c) centre lines (d) cutting plane line (e) projection lines.
4. Write all the alphabets and numerals of 12 mm height using single stroke vertical capital letters according to Indian standards.

5. Write the name of your institute of 10 mm height using single stroke vertical capital letters according to Indian standards.
6. Write "the quick brown fox jumps over the lazy dog" of 12 mm height using single stroke vertical capital letters recommended by Bureau of Indian standards.
7. Distinguish between dimension line, projection lines and leaders with the help of a neat sketch.
8. Show various dimension line terminations (arrowheads) as recommended BIS.
9. Differentiate between aligned and unidirectional systems of linear dimensioning.
10. Explain (a) chain dimensioning and (b) parallel dimensioning.

Chapter 3 : GEOMETRICAL CONSTRUCTION

REVIEW QUESTIONS

1. What do you understand by a perpendicular bisector?
2. How the drafter is being used for drawing perpendicular lines and parallel lines?
3. How can you divide a line into given equal number of parts?
4. Distinguish between exterior and interior tangents used to connect two circles?
5. Explain possible ways by which an arc can connect two circles.
6. Explain the method of inscribing hexagon in the given circle.
7. Distinguish between inscribed figures and circumscribed figures.

Chapter 4 : SCALES

REVIEW QUESTIONS

1. Distinguish between a full size, a reduced size and an enlarged sized drawing.
2. Give two practical applications of an enlarged scale.
3. What are the advantages of using graphical scale over an engineering scale?
4. What is a representative fraction?
5. Enlist types of scales used in engineering practices.
6. What is the principle used for measuring lengths from diagonal scale?
7. What are the advantages of using a diagonal scale over a plain scale?
8. What is a comparative scale?
9. What is the difference between a direct and a retrograde vernier?
10. What is the difference between a diagonal and a vernier scale?
11. What are the applications of the scale of chords?

Chapter 5 : CONIC SECTIONS

REVIEW QUESTIONS

1. What is a conic section? Enlist its various types.
2. What is the inclination of the cutting plane in order to obtain following sections from a cone (a) parabola (b) ellipse (c) hyperbola (d) rectangular hyperbola.
3. Give two practical applications for the following curves. (a) parabola, (b) ellipse, (c) hyperbola.
4. Define eccentricity.
5. Enlist at least four common methods to draw the following curves. (a) parabola, (b) ellipse, (c) hyperbola.
6. What principle is used for construction of ellipse using intersecting arcs method?
7. How a tangent is drawn from a point on the ellipse?
8. Give an equation for an ellipse showing relationship among, major axis, minor axis and distance between foci.
9. Explain conjugate diameters.
10. What principle is used for construction of parabola by offset method?
11. How a tangent is drawn from a point on the parabola.
12. Define ordinate, double ordinate, abscissa and latus rectum.
13. What principle is used for construction of hyperbola using intersecting arcs method.

Chapter 6 : ENGINEERING CURVES

REVIEW QUESTIONS

1. Differentiate between epicycloid and hypocycloid.
2. Define a cycloid? How a tangent is drawn at a point on a cycloid?
3. What is an epicycloid? Give its practical applications.
4. What is a hypocycloid? Give its practical applications.
5. Define an involute of a polygon.
6. What is an Archimedean spiral? Define the term convolution.
7. Differentiate between an Archimedean and a logarithmic spiral.
8. What is the nature of hypocycloid when radius of the directing circle is (a) equal to the diameter of the rolling circle, (b) twice the diameter of the rolling circle?
9. Explain the working of a four bar mechanism with the help of a neat sketch.
10. With the help of a neat sketch describe a slider crank mechanism.

Chapter 7 : ORTHOGRAPHIC PROJECTIONS

REVIEW QUESTIONS

1. What do you mean by projection? Give its classification.
2. Differentiate between a pictorial view and multi-view.
3. What is an orthographic projection?
4. What is a multi-view projection? How it differs from axonometric projection?

5. How a solid or an object should be placed on the planes to obtain multi-views. Explain it with the help of necessary sketches.
6. Define vertical, horizontal and profile plane.
7. Define elevation, plan and end view.
8. Differentiate between first angle and third angle projection.
9. Give the symbolic representation of first and third angle projection.
10. What is the criterion for selection of the face of an object suitable for front view, while drawing multi-views?
11. Explain reference arrows method for representation of multi-views as suggested by BIS. Where this method is beneficial?
12. State the advantages of a sectional view.
13. State the advantages of a half sectional view.
14. To obtain a half sectional view, how much portion of the object is actually removed?
15. Can a cutting plane line ever be omitted in sectional drawings? If yes, when?
16. Name any five items that would not be cut in a sectional view though the cutting plane line may cut them longitudinally.
17. With the help of a suitable example show the difference between a revolved and a removed section.
18. State the advantages of auxiliary views.
19. Describe a situation when a secondary auxiliary view would be necessary.

Chapter 8 : PROJECTIONS OF POINTS

REVIEW QUESTIONS

1. If both the views of a point coincide with each other and lie below the reference line, state the angle in which the point lies.
2. State the similarities and dissimilarities in the projections of points which lie in the second angle and the fourth angle.
3. State the position of the point, the front view of which lies 50 mm below the reference line and the top view 30 mm above the front view.
4. State the position of the point, the top view of which lies 50 mm above the reference line and the front view 30 mm below the top view.
5. If the front view of a point lies above the reference line, state the possible angles in which the point may lie.
6. If the top view of a point lies above the reference line, state the possible angles in which the point may lie.
7. If the front view of a point lies below the reference line, state the possible angles in which the point may lie.
8. If the top view of a point lies below the reference line, state the possible angles in which the point may lie.

9. State the relationship between front view and top view of a point.
10. State the position of the point if its both views lie on the reference line.
11. State the position of the point, the top view of which lies on the reference line and the front view 50 mm below it.
12. State the position of the point, the front view of which lies on the reference line and the top view 50 mm below it.
13. State the position of the point, the top view of which lies on the reference line and the front view 45 mm above it.
14. State the position of the point, the front view of which lies on the reference line and the top view 35 mm above it.

Chapter 9 : PROJECTIONS OF STRAIGHT LINES

REVIEW QUESTIONS

1. A straight line is parallel to and 25 mm in front of the VP and inclined at 30° to the HP. What is the position of its HT and VT?
2. A straight line is parallel to and 40 mm above the HP and inclined at 45° to the VP. What is the position of its HT and VT?
3. The front view of a line is parallel to XY and measures 30 mm. What is its true length if the top view measures 65 mm?
4. The top view of a line is parallel to XY and measures 40 mm. What is its true length if the front view measures 75 mm?
5. A line is inclined at 30° to the HP and 60° to the VP. Which orthographic view of this line will show its true length?
6. The distance between end projectors of a line is zero. Which orthographic view of this line will show its true length?
7. A line is inclined to both the reference planes. State the positions of the front and top views of its HT.
8. A line is inclined to both the reference planes. State the positions of the front and top views of its VT.
9. The top view of a line is represented by a point on the reference line. State the position of the line.
10. A point on XY represents the front view of a straight line. What is the position of the line?
11. The top view of a line is 30 mm long. If the length of the line is extended by one third of its original length, what will be the measure of the new top view?
12. The front view of a line is 40 mm long. If the length of the line is reduced by one fourth of its original length, what will be the measure of the new front view?
13. One end of a line lies in the first angle and the other in the second angle. Which of the two views of the line will intersect the reference line?
14. One end of a line lies in the second angle and the other in the third angle. Which of the two views of the line will cross the reference line?

15. A line is inclined at an angle of 30° with HP. What will be its inclination with VP if the distance between its end projectors is zero?
16. If the front view of a line lies in the reference line, state all the possible positions of the line.
17. If the top view of a line lies in the reference line, state all the possible positions of the line.

Chapter 10 : PROJECTIONS OF PLANES

REVIEW QUESTIONS

1. If the top view of a plane is a straight line, will its front view always be the true shape?
2. If the front view of a plane lies in the reference line, will its top view always be the true shape?
3. The projections of a plane lying in the HP are drawn. What will be the change in the shape, size and position of the front view if the surface of the plane is inclined at 30° to the HP?
4. The projections of a plane parallel to VP are drawn. What will be the change in the shape, size and position of the top view if the surface of the plane is inclined at 45° to the VP?
5. A rectangular plane 60 mm long and 30 mm wide is parallel to and 20 mm above the HP. What will be the shape and position of its front view if the longer side is inclined at 30° to the VP?
6. The top view of a plane is a circle and the front view is a line inclined at 60° to XY. What is the true shape of the plane?
7. The surface of a hexagonal plane is perpendicular to both HP and VP. Which orthographic view will show the true shape?
8. The true shape of a pentagonal plane is seen in the side view. What will be the shapes of its front and top views?
9. Define the position of a plane rhombus such that its top view appears as a square.
10. Define the position of an elliptical plane such that its front view appears as a circle.

Chapter 11 : PROJECTIONS OF SOLIDS

REVIEW QUESTIONS

1. Differentiate between a triangular pyramid and a tetrahedron.
2. State the shape and number of faces in dodecahedron and icosahedron.
3. Define cylinder and cone in the form of surface of revolution.
4. What do you understand by a right regular solid?
5. Differentiate between frustum of a pyramid and a truncated pyramid.
6. A cube is resting on one of its corners in the HP with a solid diagonal vertical. What will be the outer shape of its top view?

7. A cube is resting on one of its corners in the HP with a solid diagonal perpendicular to the VP. What will be the outer shape of its front view?
8. State the position of a tetrahedron so as to get a square in the top view.
9. State the position of the centroid of a square pyramid.
10. What is the difference between the top view of a hexagonal prism and that of a hexagonal pyramid when both rest on their bases on the HP in the same orientation?

Chapter 12 : SECTIONS OF SOLIDS

REVIEW QUESTIONS

1. State the relationship of an auxiliary vertical plane with the reference planes.
2. Define an auxiliary inclined plane, auxiliary vertical plane and a profile plane.
3. How can the true shape of section be obtained when a solid is cut by an auxiliary inclined plane?
4. How can the true shape of section be obtained when a solid is cut by an auxiliary vertical plane?
5. A solid is cut by a profile plane. Which orthographic view is likely to show the true shape of section?
6. How would you locate the section plane which cuts a cone to get an isosceles triangle as true shape of section?
7. How would you locate the section plane which cuts a square pyramid to get a trapezium as true shape of section?
8. How would you locate the section plane which cuts a cube to get an equilateral triangle of largest possible side as true shape of section?

Chapter 13 : DEVELOPMENT OF SURFACES

REVIEW QUESTIONS

1. Differentiate between singly curved surface and doubly curved surface.
2. Name the method used for obtaining the developments of prisms and cylinders.
3. Name the method used for obtaining the developments of pyramids and cones.
4. Name two common methods of getting the development of spheres.
5. What precaution should be taken while obtaining the development of pyramids?
6. What are the dimensions of the cone whose development is a semicircle of 120 mm diameter?
7. State a few practical applications of development of surfaces.

Chapter 14 : INTERSECTION OF SURFACES

REVIEW QUESTIONS

1. What do you mean by key points? What is its significance in intersection of surfaces?
2. Name the methods of determining the curves of intersection.

3. Describe the conditions in which the curves of intersection between cylinder and cylinder is represented by straight lines.
4. Describe the conditions in which the curves of intersection between a cone and a cylinder is represented by straight lines.

Chapter 15 : ISOMETRIC PROJECTION

REVIEW QUESTIONS

1. What is the relation among projectors in isometric projections?
2. What is the relation between true length and isometric length?
3. Differentiate between isometric projection and isometric view.
4. State two similarities between isometric projections and oblique projections.
5. State the similarities and dissimilarities between dimetric and trimetric projections.
6. Name the methods preferred for drawing ellipse in isometric projections.
7. Define isometric axes and isometric planes.
8. What are the principles of dimensioning in isometric projections?
9. What are the advantages of drawing isometric views?

Chapter 16 : OBLIQUE PROJECTION

REVIEW QUESTIONS

1. State the similarities and dissimilarities between isometric projections and oblique projections.
2. Differentiate between the orthographic projection and oblique projection.
3. Explain the terms receding axes, receding angles and receding planes.
4. Differentiate between cavalier projection and cabinet projection.
5. With the help of suitable examples explain the rules for selecting the position of an object in oblique projection.
6. What are the principles of dimensioning in oblique drawing?
7. What are the advantages of drawing oblique projection?
8. Name the method that is preferred for drawing ellipse in oblique projections.

Chapter 17 : PERSPECTIVE PROJECTION

REVIEW QUESTIONS

1. What are the characteristics of Perspective projections?
2. Name different types of perspectives and their fields of application.
3. State the limitations of perspective drawing.
4. State the alternative names of one-point, two-point, three-point and aerial perspectives.
5. Compare visual ray and vanishing point methods of drawing perspective views.

6. Compare the merits and demerits of perspective projections with isometric and oblique projections.
7. Define the following terms with reference to perspective projections:
(a) Ground plane (b) Picture plane (c) Horizon plane (d) Central plane
8. Define the following terms with reference to perspective projections:
(a) Ground line (b) Horizon line (c) Central line (d) Axis of vision
9. What is a station point? What is its relation with the visual rays?
10. Make a line diagram and indicate the following:
(a) Ground plane (b) Picture plane (c) Horizon plane (d) Central plane
(e) Ground line (f) Horizon line (g) Central line (h) Axis of vision

Chapter 18 : COMPUTER AIDED DESIGN (CAD)

REVIEW QUESTIONS

1. Highlight the main advantages of a CAD system in design and drafting.
2. Give a brief review of CAD software used for drafting and modeling.
3. Name any five input devices used in computers and describe them in brief.
4. Give a brief description of output and storage devices of a computer.
5. Explain the functions of (a) Title bar (b) Standard toolbar (c) Properties toolbar and (d) Floating toolbar. State their default positions in AutoCAD classic workspace with the help of a block diagram.
6. Give a brief description of the facilities available in the AutoCAD status bar.
7. Explain the role of Units and Limits commands in setting up the AutoCAD drawing space.
8. Describe the types of length and angle units that can be set in AutoCAD. Give suitable examples of each.
9. Explain the different settings available in the Units dialogue box of AutoCAD.
10. Name any four common methods by which a command can be executed.
11. Explain the following systems of locating a point in the AutoCAD drawing space with the help of suitable examples.
(a) Absolute coordinate system (b) Relative rectangular coordinate system
(c) Relative polar coordinate system (d) Direct distance entry system
12. Describe the following commands to regulate the cursor movement for locating a point quickly.
(a) Snap and Grid (b) Polar tracking (c) Ortho
13. Name any five commands with their corresponding icons available under (a) draw toolbar (b) modify toolbar.
14. With the help of a ray diagram explain different options that are available in the following commands:
(a) Rectangle (b) Arc (c) Xline (d) Ellipse
15. With the help of a ray diagram and suitable examples explain different options that are available in the following commands.

(a) Line (b) Polygon (c) Circle (d) Spline

16. Explain different options that are available in the following commands with the help of ray diagram.
(a) Move (b) Copy (c) Rotate (d) Mirror
17. Explain different options that are available in the following commands with the help of ray diagram.
(a) Offset (b) Trim (c) Chamfer (d) Fillet
18. Which command is commonly used to create multiple copies in a rectangular or a polar pattern? Explain different settings available in the dialogue boxes for creating them.
19. Explain any six methods of drawing an arc in AutoCAD.
20. Explain the use of chamfer and fillet command in AutoCAD.
21. State a series of AutoCAD command steps to draw a circle of 10 cm diameter and divide it into twelve equal parts.
22. State a series of AutoCAD command steps to draw a rectangle of 50 cm X 30 cm with the help of (a) Line (b) Rectangle and (c) Polygon commands.
23. State a series of AutoCAD command steps to draw the top view of frustum of a hexagonal pyramid assuming suitable dimensions. You may use Polygon, Offset, Line and Array commands.
24. State a series of AutoCAD command steps to draw an isometric view of frustum of a square pyramid with the help of Line command or otherwise. Assume suitable dimensions.
25. State a series of AutoCAD command steps that will be required to draw an ellipse of given major and minor axes. How would you draw another ellipse parallel to it at a specified distance?
26. State a series of AutoCAD command steps to draw a pentagon inscribed in a circle of 70 mm diameter and also to draw five circles of equal diameter, each touching one side of the pentagon and two adjacent circles.