## Unit – I

## ENGINEERING CURVES AND SCALES

1. Construct a parabola, with the distance of the focus from the directrix as 50 mm. Also draw normal and tangent to the curve, at a point 40 mm from the directrix.
2. Construct an ellipse, with distance of the focus from the directrix as 50 mm and eccentricity as 2/3. Also, draw normal and tangent to the curve at a point 40 mm from the directrix.
3. Construct a hyperbola, with the distance between the focus from the directrix as 50 mm and eccentricity as 3/2. Also, draw normal and tangent to the curve at a point 30 mm from the directrix.
4. Construct a cycloid, given the diameter of the generating circle as 40 mm. draw the tangent and normal to the curve at a point on it, 35 mm from the directing line.
5. Draw an epi-cycloid of a circle of 40 mm diameter, which rolls on another circle of 120 mm diameter for one revolution clock-wise. Draw a tangent and a normal to it at a point 95 mm from the centre of the directing circle.
6. Draw a hypo-cycloid of a circle of 40 mm diameter, which rolls inside another circle of 160 mm diameter for one revolution counter clock-wise. Draw a tangent and a normal to it at a point 65 mm from the centre of the directing circle.
7. Draw an involute of a square of side 30 mm. Also draw the tangent and normal to any point on the curve.
8. Draw the involute of a hexagon of side 20 mm. Also draw the tangent and normal to the curve at a distance 100 mm from the centre of the hexagon.
9. Draw the involute of a circle of 40 mm diameter. Also draw the tangent and normal to the curve at a point 95 mm from the centre of the circle.
10. On a map, the actual distance of 10 m is represented by a line of 50 mm long. Calculate the scale factor. Construct a diagonal scale, long enough to measure 30 m and mark on it, a distance of 26.3m.

## Unit-II

### Projections of points / Lines / Planes

1. Mark the projections of the following points on a common reference line with 25mm apart:
   a) P, 35mm behind the V.P. and 20mm below the H.P.
   b) Q, 40mm in front of the V.P. and 30mm above the H.P.
   c) R, 50mm behind the V.P. and 15mm above the H.P.
   d) S, 40mm below the H.P. and in the V.P.
   e) T, 30mm in front of V.P. and 50mm below the H.P.
   f) U, 35mm behind the V.P. and in the H.P.
   G) V is on the VP and HP Also mentions name the quadrants in which they lie.
2. Draw the projections of the following points on a common reference line by keeping the projections 25mm apart. Draw the projections of the following points on a common reference line by keeping the projections 25mm apart.
   i) Point A, 30 mm above HP and 20 mm in front of VP
   ii) Point B, 30 mm above HP and in VP
   iii) Point C, 35 mm in front of VP and in HP
   iv) Point D, 40 mm above HP and 20 mm behind VP
   v) Point E, 25 mm below HP and 30 mm behind VP
   vi) Point F, 35 mm below HP and 25 mm in front of VP
   vii) Point G is lying on both HP and VP.
3. A line CD measuring 80 mm is inclined at an angle of 30° to HP and 45° to VP. The point C is 20 mm above HP and 30 mm in front of VP. Draw the projection of straight line?
4. A line AB 60 mm long and inclined at 35° to HP and 55° to VP. The end A is 20 mm above HP and 10 mm in front of VP. Draw its projections.
5. The mid-point of a straight-line AB is 60mm above HP and 50 mm in front of VP. The line measures 80mm long and inclined at an angle of 30° to HP and 45° to VP. Draw its projections and state their ends lies in which quadrants?
6. A line AB 60 mm long has its end B 20 mm above HP and 25 mm infront of VP. The end A is 50 mm above HP and 50 mm infront of VP. Draw its projections and find its inclinations with VP and HP.
7. A regular pentagon of 30mm sides is resting on HP on one of it's sides with it's surface 450 inclined to HP. Draw it's projections when the side in HP makes 300 inclined with VP.

8. A circle of 50mm diameter is resting on HP on end A of it's diameter AC which is 300 inclined to HP while it's TV is 450 inclined to VP. Draw it's projections.
9. A thin rectangular plate of sides 60 mm x 30 mm has its shorter side in the VP and inclined at 30° to the HP. Project its top view if its front view is a square of 30 mm long sides.
10. A hexagonal lamina of 24 mm side has its surface inclined at 30° to HP. Its one side is parallel to HP and inclined at 45° to VP. Draw its projections.

## Unit – III

## PROJECTION OF SOLIDS

1. Draw Square prism of side 25 mm and axis 50 mm rest on one of its base edges on HP with its axis inclined at 30° to HP. Draw its projections.
2. A hexagonal prism of base side 30 mm and axis length 70 mm resting on one of its base edges on HP with axis inclined to 30° to HP and parallel to VP. Draw its projections.
3. A hexagonal prism of base side 25 mm and axis length 50 mm rest with one of its base corners on HP. Such that the base makes an angle of 60° to HP and its axis parallel to VP. Draw its projections.
4. Draw the projection of cylinder 40 mm diameter and axis 70 mm long when its rests on the HP on one of its base points. The axis of the cylinder is parallel to VP and inclined at 30° to HP.
5. A cone of base diameter 50 mm and axis length 65 mm is resting on HP on a point on the circumference of the base with its axis inclined at 40° to HP and parallel to VO. Draw its projections.
6. Draw the projection of pentagonal pyramid of base side 25 mm and axis 60 mm long when its lying on the HP on one of its base edges, such that the axis is parallel to VP and inclined at 30° to HP.
7. A square prism of base side 30 mm and axis length 60 mm lies on the HP on one of its longer edges with its faces equally inclined to the HP. Draw the projections when its axis is inclined at 35° to the VP.
8. Draw the projections of a pentagonal prism of base side 25 mm and axis length 50 mm when its lying on the ground on its rectangular face and the axis is inclined at 45° to VP.
9. Hexagonal pyramid of base side of 25 mm and axis 65 mm rests on the HP on one of its edges such that the triangular face containing the resting edge is perpendicular to both the HP and VP. Draw its projections.

**10.** Draw the projection of a cone of base diameter 50 mm and axis length 60 mm, when its lies on the ground on one of its generators with the axis parallel to the VP.

## Unit –IV

## SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES

1. A cube of 45 mm side rest with its face on HP such that one of its vertical face is inclined at 30° to VP. As sectional plane is parallel to VP cuts the cube at a distance of 15 mm from the vertical edge nearer to the observer. Draw its top and sectional views.
2. A hexagonal prism of side of base 30 mm and axis 75 mm long resting on its base on HP such that a rectangular face is parallel to VP. It is cut by section plane perpendicular to VP and inclined to HP. The sectional plane is passing through the top of an extreme lateral edge of the prism. Draw the sectional top view and true shape of the section.
3. A pentagonal pyramid of side of base 30 mm and axis 65 mm long, rests with its base on HP and one of the edges of its base on HP and one of the edges of its base is perpendicular to VP. It is cut by a section plane perpendicular to VP. It is cut by a section plane perpendicular to VP and parallel to HP and passing through the axis at a point 30 mm above the base. Draw the front and sectional top view.
4. A hexagonal pyramid of side of base is 30 mm and altitude 65 mm long rests with its base on HP with two of its base sides are parallel to VP. It is cut by a section plane perpendicular to VP and inclined at 45° to HP and passing through the axis at a distance of 30 mm from the apex. Draw the sectional top view and true shape of the section.
5. A square pyramid of base side 30 mm and axis 60 mm long is standing on the HP with its base edges are equally inclined to VP. It is cut by a section plane perpendicular to the VP and inclined at 30° to the HP bisecting the axis. Draw the sectional top view and true shape of the sections.
6. A hexagonal prism of base edge 20 mm and axis 50 mm long, rests with its base on HP such that one of its rectangular face is parallel to VP. It is cut by a section plane perpendicular to VP and inclined at 45° to HP and passing through the right corner of the top of the face of the prism. Draw the sectional top view also draw the lateral surfaces.
7. A hexagonal prism of base side 25 mm and height 50 mm is resting on one of its base on the HP and two of its lateral faces are parallel to VP. It is cut by a section plane perpendicular to VP and inclined at 30° to the HP. The

plane meets the axis at a distance 25 mm above the base. Draw the development of lateral surface of the prism.

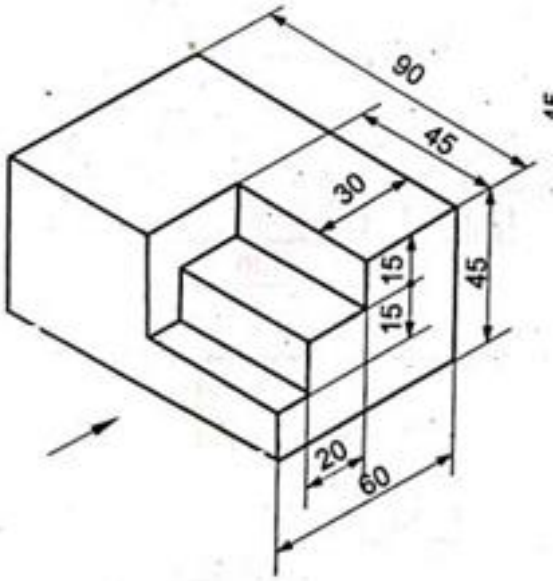
8. A pentagonal pyramid of base side 30 mm and height 60 mm stands with its base on HP and edge of the base is parallel VP and nearer to it. It is cut by section plane perpendicular to VP and inclined at 40° to the HP and passing through a point on the axis 35 mm above the base. Draw the sectional top view. Develop the lateral surfaces of the sectional top view, also draw the lateral surfaces of the truncated pyramid.
9. A cylinder of diameter 50 mm and axis 70 mm is resting on its base on the HP. It is cut by section plane perpendicular to VP and inclined at 45° to HP. Th section plane is passing through the top and extreme generator of the cylinder. Draw the development of lateral surface of the cylinder.
10. A cylinder of diameter 40 mm and height 70 mm is cut by a section plane perpendicular to VP and inclined at 55° to the HP meeting the axis at top face draw the lateral development of cylinder.

## Unit – V

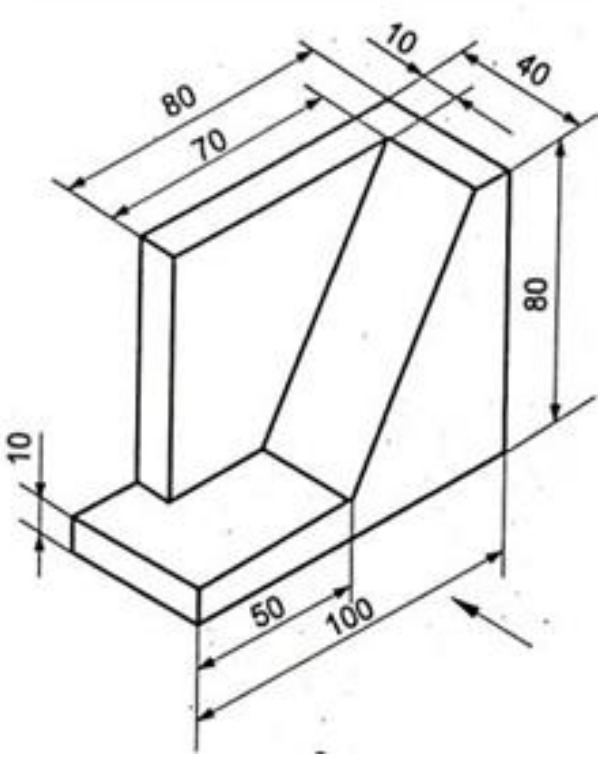
## ISOMETRIC PROJECTIONS AND ORTHOGRAPHIC PROJECTIONS

1. Draw the isometric view of a square prism, with side of base 40mm length of axis 70 mm, when its axis is (i) vertical and (ii) horizontal.
2. Draw the isometric view of a hexagonal prism, with side of base 25 mm and axis 60 mm long. The prism is resting on its base on H.P, with an edge of the base parallel to V.P.
3. Draw the isometric view of a pentagonal pyramid, with side of base 25 mm and axis 60 mm long. The pyramid is resting on its base on H.P, with an edge of the base (away from the observer) parallel to V.P.
4. Draw the isometric view of a cylinder of base diameter 25 mm and axis 40 mm long, when its axis is (i) vertical and (ii) horizontal.
5. Draw an isometric view of Cone with a base diameter is 50 mm side and 70mm long axis (a) when the base is on the HP (b) when the base is on the VP?

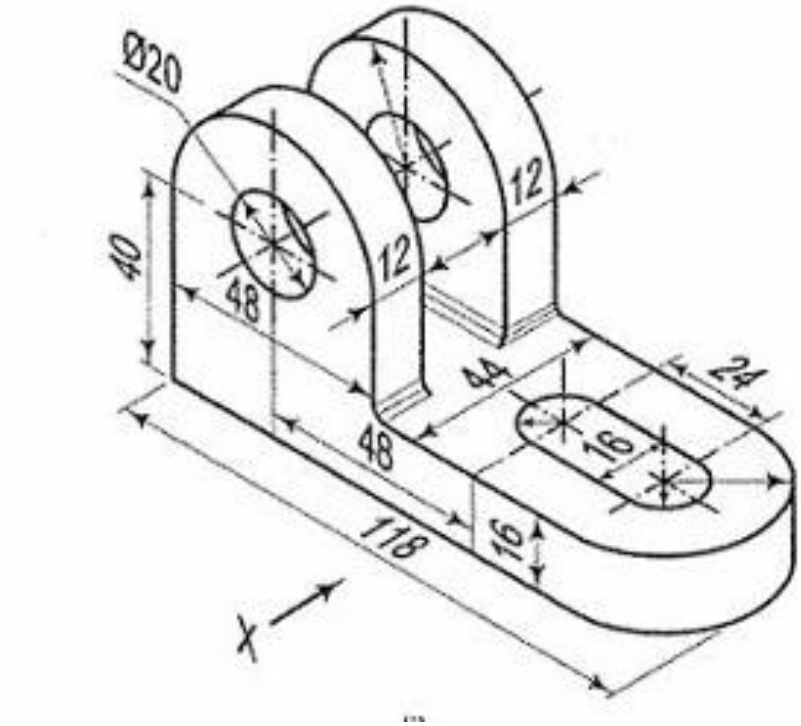
6. Draw the front view, top view and any one side view of the component give below. The front view of the object should be drawn as per the direction given.



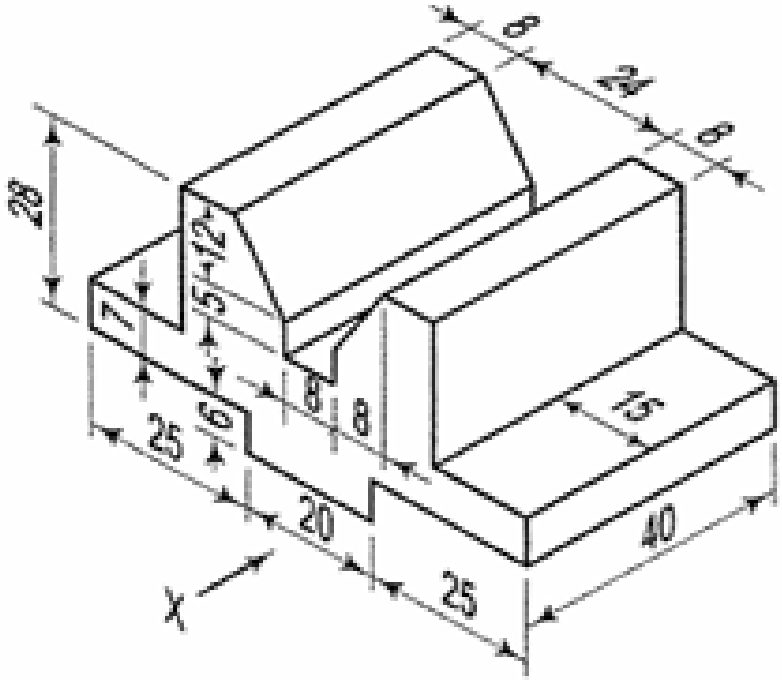

7. Draw the front view, top view and any one side view of the component give below. The front view of the object should be drawn as per the direction given.



8. Draw the front view, top view and any one side view of the component give below. The front view of the object should be drawn as per the direction given.




9. Draw the front view, top view and any one side view of the component give below. The front view of the object should be drawn as per the direction given.



10. Draw the front view, top view and any one side view of the component give below. The front view of the object should be drawn as per the direction given.