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Department of Mechanical Engineering

Engineering Drawing Practical Problem Sheet

Sheet No.:- 1.

Scales and Curves

(AutoCAD)

1. A Rectangular garden of area 196 sq.m is shown on a map by similar rectangle of 4 sq.m Construct a plain scale to read upto a single metre and long enough to measure up to 9.8 decameters. Show the distances of i) 2.2 decameters ii) 5.7 decameters iii) 9.7 decameters.
2. The area of a field is 50,000 sq. m the length and breadth of the field, on the map is 10 cm and 8 cm respectively. Construct a vernier scale, which can read upto one meter. Mark the lengths of 235 meter and 62 meter on the scale. What is RF of the scale?
3. Two fixed points L and M are 100 mm apart. Trace the complete path of a point PC (moving in the same plane as that L and M) in such way that the sum of its distances from L and M is always the same and equal to 125mm. Name the curve.
4. A cricket ball thrown up reaches the maximum height of 50 m and falls on the ground at a distance 125 m from the point of projection. Draw the path of cricket ball and name the curve. Assume the path of projection is from the ground level.
5. Draw the locus of a particle moving in such way that the product of its distance from two fixed lines, at right angles to each other is constant, if a point on the curve is 20 and 45 mm from lines. Name the curve and fixed lines.

1. A line AB measures 75 mm long and is in the first Quadrant. Front view and the top view of line are inclined at 45° to XY. End A is 20 mm in front of VP and 30mm above the HP. Draw the projections of the line, determine the true inclinations with the HP and VP.
2. A Straight line PQ is 100 mm long and makes an angle of 55° to the HP and 35° to the VP. The end P lies in both the planes. Draw the front view and top view of the line PQ.
3. A line AB, 100mm long, has its front view inclined at 45° to XY line. Point A is in the VP and 25 mm above the HP. Front view measures 60 mm. Draw the projections of the line AB and find the true length and true inclinations with HP and VP.
4. A and B are the ends of a straight line AB. The end A is 65mm above HP and 40mm in front of VP. The end B is 15mm above HP and 75mm in front of the VP. The distance between the projectors along XY line is 65mm. Draw the projections of the line AB and determine its inclination with HP and VP.

1. A pipeline from point A, running due north-east has downward gradient of 1 in 5. Another point B is 12m away from and due east of A and on the same level. Find the length and slope of the pipeline from B which runs due 15° east of north and meets pipeline from A.
2. A 20 m high telecommunication tower is tied at the top end by two ropes, having angle of depression of 30° and 40° . Other ends of the ropes are tied at two towers of height 5 m and 7.5 m and 14 m apart from each other. Draw the projections of the guy ropes and find their true lengths.
3. Three vertical poles AB, CD & EF are respectively 5, 8 & 12 meters long. Their ends B, D & F are on the ground and lie at the corners of an equilateral triangle of 10 m long sides. Determine graphically the distance between the top ends of the poles, i.e. AC, CE, & EA.
4. Two Mangoes A and B on a tree 0.5 meters and 1 meter above the ground. P and Q are two compound walls at right angles. Mango A is 0.30 meters from the wall. Draw three projections of two mangoes and find the real distance between their centers. Assume both the mangoes inside the compound.

1. A regular hexagonal thin plate of 25 mm side has a corner on ground. Its surface is inclined at 30° to the ground and the diagonal through the corner which is on the ground makes an angle of 45° with VP. Draw the projections.
2. A thin circular plate of 60 mm diameter appears in front view as an ellipse of major axis 60 mm and minor axis 45 mm respectively. Its major axis is parallel to both HP and VP. Draw the projections and find the inclination with HP.
3. A rhombus of diagonals 40 mm and 70 mm long respectively having one end of its longer diagonal in HP while that diagonal is 45° inclined to HP and makes 30° inclinations with VP. Draw its projections.
4. A semicircular plate of 80 mm diameter has its straight edge in the VP, and inclined at 45° to the HP. The surface of the plate makes an angle of 30° with the VP. Draw its projections.

1. A tetrahedron of 75 mm long edges has one edge on the HP and inclined at 45° to the VP, while a face containing that edge is vertical. Draw its three views.
2. Draw the projections of cone, base 50 mm diameter and axis 75 mm long, lying on a generator on the ground with the top view of the axis making an angle of 45° with the VP.
3. A cube 50 mm each side is resting on one of its corner on HP. The body diagonal through this corner is vertical. Plane containing an edge through this corner and the body diagonal perpendicular to both HP and VP. Draw the projections.
4. A pentagonal pyramid, side of base 30mm and height 70mm rests on one of the corners of its base on HP the base being tilted up until the vertex is 60mm above HP. Draw three views of the pyramid with the edge of the base opposite to the corner on which it is resting made inclined at 60° to VP.

1. A square pyramid of 50 mm edges of base and axis 70 mm long is resting on its base on the ground. It is cut by a section plane perpendicular to the VP and inclined to the HP in such way that the true shape of the section is trapezium with one of the parallel sides 20 mm long and opposite side is largest possible. Draw the projection, show the true shape of the section and determine the inclination of cutting plane with HP also draw the development of the lower retained portion.
2. A cube of 40mm long edges is resting on the ground on one of the faces with vertical faces equally inclined to the VP. A section plane perpendicular to the VP and inclined to the HP cuts the solid in such a way that the true shape of the section is an equilateral triangle of side 50mm. Determine the inclination of the section plane with the HP and draw the sectional top view and true shape of the section. Draw the development of the cut solid.
3. A cone diameter of base 50 mm and axis 60 mm long is resting on its base on the ground. It is cut by a section plane perpendicular to the VP in such that the true shape of the section is parabola having base 40 mm. Draw the three views showing section, true shape of the section and development of the remaining surface of cone removing its apex.

Draw Isometric Projection for Figure 1 & Isometric View for Figure 2, Figure 3

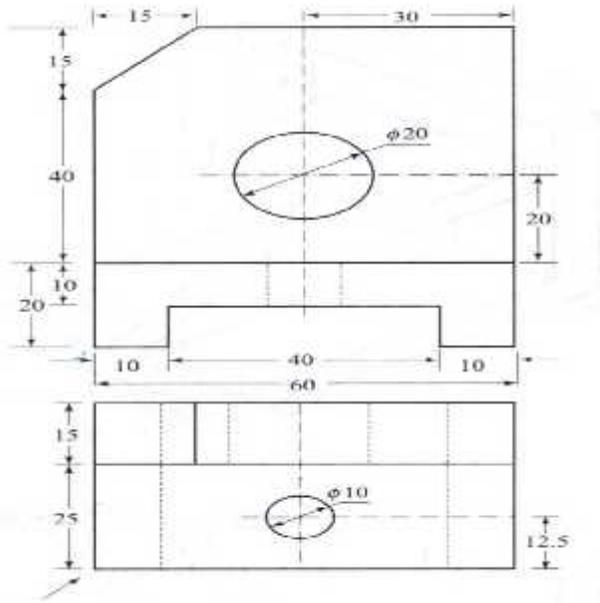


Figure No. 1

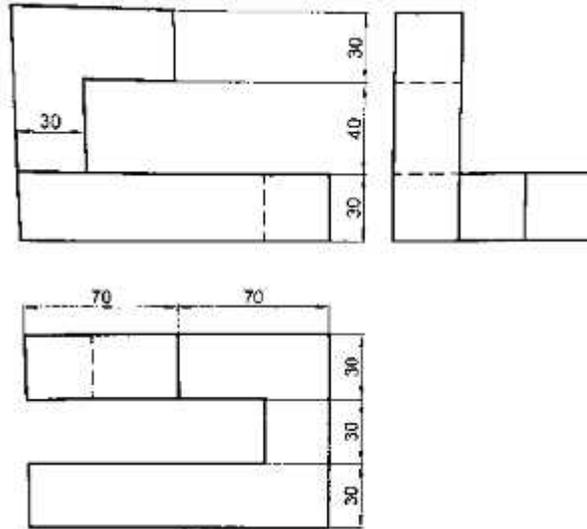


Figure No. 2

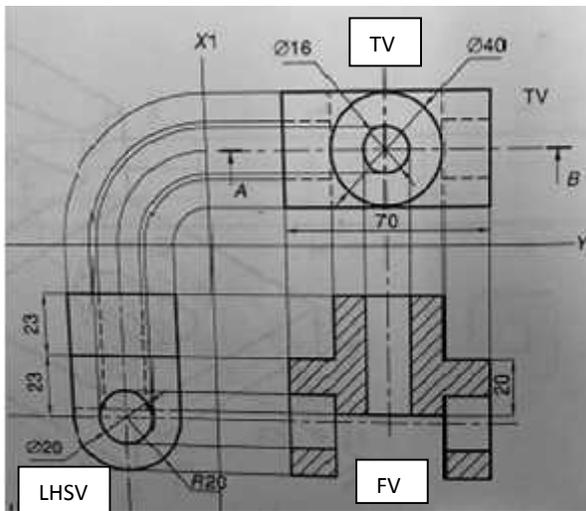


Figure No. 3