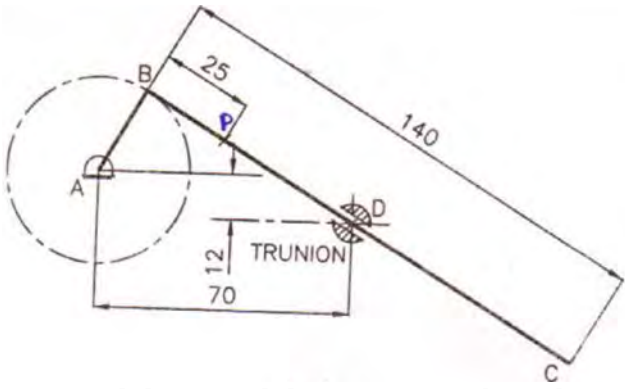
Sardar Vallabhbhai Patel Institute of Technology-Vasad
Mechanical Engineering Department
Question Bank for EG&D [3110013]

Scales

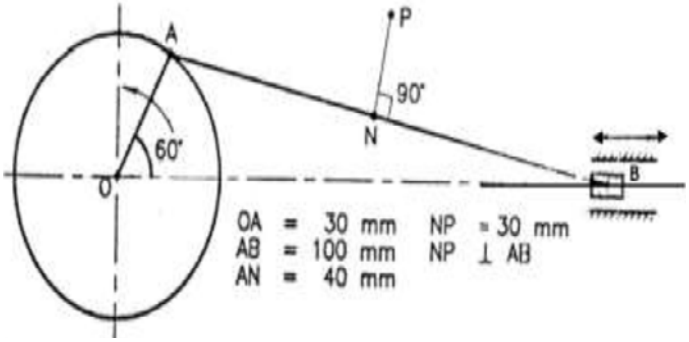
1. Draw a diagonal scale of R.F, 1:5 showing decimeters, centimeters and millimeters and long enough to measure up to 8 decimeters. Show a distance of 5.35 dm.
2. Construct a scale of 1cm = 1 m to read meters and decimeters and long enough to measure up to 14 meters. Show on this scale a distance equal to 12.4 meters.
3. For 100 cm of a line compare size of drawing length on basis of full scale, reducing scale & enlarged scale.
4. Define Representation Factor. If effective available drawing paper length is 25 cm and the distance between two places to be measure is 50 km what is the representative factor for scale.
5. The actual length of 500m is represented by a line of 15cm on a drawing. Construct a diagonal scale to read up to 400 m. Mark on the scale a length of 349 m.
6. Construct a diagonal scale of R.F. = 1/4000 to show 374 meters and long enough to measure up to 500 meters.

Loci of Points

1. In the mechanism shown in Figure, the connecting rod is constrained to pass through the trunnion at D. Trace the locus of the end C and a point P on BC for one complete revolution of the crank. In Fig consider AB as 30 mm.



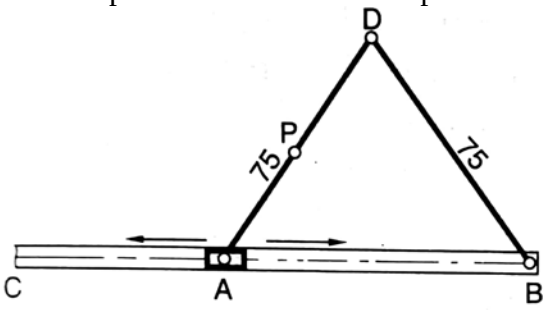
2. OAB is a slider crank mechanism. Slider B is sliding on a straight path passing through O as shown in Figure 1 given below. Crank OA is 30 mm and rotates in anticlockwise direction and length of connecting red AB is 100 mm. A rod NP of 30 mm length is attached to AB such that AN = 40 mm and NP is perpendicular to AB as shown Draw locus of point P for one complete revolution of the crank.



3. For an offset slider crank mechanism, the sliding end moves in the guide provided along the line CD, 25mm below the horizontal line passing through the Centre O. The connecting rod AB = 150mm long while the crank OA = 40mm. The connecting rod is extended up to Q beyond A. Draw the loci of points P and Q if AP=60mm and AQ=30mm.

Sardar Vallabhbhai Patel Institute of Technology-Vasad
Mechanical Engineering Department
Question Bank for EG&D [3110013]

4. As shown in the Figure, AD and DB are two equal size portions of a folding door hinged joint or pinned joint at D. Span CB of the door is 150 mm. The end B is fixed and the end A is constrained to move along the line BC. Draw the locus of the mid-point P of AD for a complete movement of the folding door.



5. A circular disc of diameter AB = 90mm, rotates with uniform angular velocity. The point-P which is at A, moves with uniform linear velocity and reaches the point-B, when the disc completes one revolution. Trace the locus of point-P moving from A to B.
6. A pendulum AB pivoted at A is 90mm long. It swings 30o to the left of vertical and then 30o to the right of vertical. Point-P initially at A reaches point-B, when the pendulum completes 1.5 oscillations. Draw the path of point-P assuming the motion of the point and the pendulum to be uniform.
7. A circular disc of diameter AB = 80mm, rotates about its centre O for one revolution. The point-P which is initially at A moves to the centre when disc completes half revolution and then comes back to A in remaining half revolution. Trace locus of the point-P assuming the rotation of disc and movement of the point to be uniform.

Projection of Points & Lines

1. A line AB is 100 mm long. It is inclined at 40° to the HP and 30° to the VP. The end A is 10 mm above HP and 25 mm in front of VP. Assuming the end B in the first quadrant, draw the projections of the line AB.
2. The distance between the end projectors of a straight line AB is 60 mm. Point A is 5 mm above HP and 30 mm in front of VP. Point B is 40 mm above HP and 50 mm behind VP. Draw the projections and find the inclination of straight line AB with HP and VP and the true length of the line.
3. Draw the projections of the following points on the same x-y line: (i) Point A is 20 mm above the HP and 20 mm behind the VP. (ii) Point B is 40 mm above HP and 10 in front of VP. (iii) Point C is 25 mm below HP and 40 mm behind VP.
4. Two lemons on a tree, planted near the compound wall of a bungalow are 1.0 m and 1.25 m above the ground and 0.5 m and 0.75 m from a 15 cm thick compound wall but on opposite sides of it. The distance between lemons measured along the ground and parallel to the wall is 1.0 m. Determine the real distance between the centres of two lemons.
5. Point A is 20 mm above HP and 30 mm in front of VP and point B is in the HP and 40 mm behind the VP. The distance between in their projectors is 50 mm. Draw the projections of the points. Also draw straight lines joining their top and front views.
6. The end P of a line PQ 120 mm long is 30 mm above HP and 60 mm behind VP. The line is incline at angle of 30o with the reference plans of the projection. The point Q is below HP and behind VP. Draw the projections of line PQ and locate the point Q.
7. Plan and elevation of a line AB, 80 mm long, measure 60 mm and 72 mm respectively. End A of the line is in HP and end B is in VP. Draw its projections, assuming the line to lie in first quadrant.

Sardar Vallabhbhai Patel Institute of Technology-Vasad
Mechanical Engineering Department
Question Bank for EG&D [3110013]

8. Point P of a straight line PQ is 25mm above H.P. and point Q is 65 mm in-front of V.P. The line makes an angle of 30º with H.P. and its plan is at 45º to the XY line. Draw the projections of the line if the plan length is 70mm. Also find the true length of the line and the angle made by the line with V.P.
9. Draw projection of following points: (i) Point R is 10 mm behind V.P. & 20 mm above H.P. (ii) Point S is in H.P. & 22 mm in front of V.P. (iii) Point T is 15 mm in front of V.P & 25 mm below H.P.
10. A line AB, 75mm long, is parallel to VP and inclined to the HP, by an angle 45º. Point A is 30mm below HP and 20mm in front of VP. Point B is in the first quadrant. Draw the projections of the straight line AB.
11. A line PQ, 100 mm long, is inclined at 30º to the HP and 45º to the VP. Its mid-point M is in the VP and 20mm above the HP. Draw its projections, when its end P is in the first quadrant and Q is in the third quadrant.
12. Draw Projections of the following lines: (i) Line MN 50mm is in 1stquadrant and parallels both H.P. & V.P. (ii) Line PQ 35mm is in 3rd quadrant and remains perpendicular to V.P. and parallel to H.P.
13. The distance between the end projectors of a straight line PQ is 60mm. The line makes 30º and 45º angles with HP and VP, respectively. The end P is 30mm below HP and 50mm in front of the VP. Draw its projections when end Q is in third quadrant. Find TL of the line.
14. A line AB, 90 mm long, is inclined to HP and VP by 45º & 30º respectively. End A is 10 mm above HP and 20 mm in-front of VP. End B is in first quadrant. Draw plan and elevation of the line.
15. A line PQ, 80 mm long, is inclined at 45º to HP. The end P is 15 mm above HP and is 50 mm in front of the VP. If front view of the line measure 65 mm draw projections of the line. Find the inclination of the line with the VP.
16. The distance between end projectors of line AB is 45 mm. Its end A is 20 mm below HP and 10 mm behind VP. Point B is 55 mm above HP and 60 mm in front of VP. Determine its true length of line AB.
17. Draw the projection of following points: 1) Point P is 20 mm above HP and 20 mm behind VP, 2) Point Q is 10 mm below HP and 30 mm behind VP, 3) Point R is 15 mm below HP and 20 mm in front of VP.
18. A line PQ is 80 mm long is inclined at an angle of 45° to HP and 30° to VP. One of its end points P is 20 mm above HP and 30 mm in front of VP. Draw the projection of line PQ.
19. A line AB is having its end A 10 mm above the HP and 30 mm in front of the VP. It is inclined at 450 to HP and 300 to VP. The end B is below the HP and behind the VP. The plan length of line is 80 mm. Draw projections of the line AB. Find True length and elevation length.
20. A line AB is inclined at 30° to HP and it is in first quadrant. End A is 10mm from HP while end B is in VP. Midpoint M of the line is 35mm above HP. Distance between end projectors of the line is 70mm. Draw projections of the line and find its PL, EL, TL and inclination with VP.
21. Distance between end projectors of a straight line PQ is 130mm. Point P is 40mm below HP and 25mm in font of VP. Point Q is 75mm above HP and 30mm behind VP. Draw projections of the line and find out missing data.

Engineering Curves

1. A triangle ABC has sides AB = 75 mm, BC = 60 mm and CA = 75 mm. Draw a parabola passing through points A, B and C when side BC is horizontal.
2. Draw an epicycloid with rolling circle diameter 50 mm and directing circle diameter 150 mm. Draw tangent and normal at a point on the curve 110 mm from the centre of the directing circle.
3. Draw a parabola by tangent method, given its base as 90 mm and the height of axis is 75 mm.
4. A point P moves towards another point O, 90 mm from it, and reaches it during 1.5 revolutions around it in clockwise direction. Its movement towards O is uniform with its movement around it. Draw the curve traced out by the point P and name it.
5. A fixed point is 54 mm away from a fixed straight line. Draw the locus of a point P moving in such a way that the ratio of its distance from the fixed straight line is 5:4. Name the curve.

Sardar Vallabhbhai Patel Institute of Technology-Vasad
Mechanical Engineering Department
Question Bank for EG&D [3110013]

6. Construct the Involute of circle of 35 mm diameter for one turn.
7. Draw an ellipse having major axis 110 mm and minor axis 70 mm by using rectangle method.
8. Construct an ellipse when the major axis is 110 mm and minor axis is 70 mm long by using concentric circle method.
9. Draw an epicycloid with rolling circle diameter as 60 mm and directing circle diameter as 180 mm. Draw normal and tangent at any point on the curve.
10. Draw the path of free end of string which is wound around a circle of 40 mm diameter. Also draw normal and tangent at any point on the curve. Name the curve.
11. The vertex of a hyperbola is 65mm from its focus. Draw the curve if the eccentricity is 3:2.
12. Inscribe an ellipse in parallelogram having sides 150 mm and 100 mm long and an included angle of 1200.
13. A wheel of diameter 60 mm, rolls on a straight horizontal road. Draw the locus of a point P on the periphery of the wheel for one revolution of the wheel, if P is initially on the road. Name the curve.
14. Construct an Involute of a regular pentagon of 25 mm sides.

Projection of Planes

1. An isosceles triangular plate of 50 mm base and 75 mm altitude, appears as an equilateral triangle of 50 mm in top view. Draw the projections of a plate if its 50 mm long edge is on the HP and inclined at 45° to the VP. What is the inclination of the plate with the HP?
2. ABCDE is a regular pentagonal plate of 40 mm sides, has its corner A on the HP. The plate is inclined to the HP such that the plan length of the edges AB and AE is each 35 mm. The side CD is parallel to both the reference planes. Draw the projections of the plate and find its inclination with the HP.
3. A circular plate, 50 mm diameter is resting on HP on one of the points of its periphery with surface of the plate perpendicular to VP and inclined to HP by 30°. Draw two projections of the circular plate.
4. A rectangle ABCD 60 mm x 40 mm, is parallel to HP with one of its sides inclined at 30_o to VP and the end of the side near to VP is 15 mm in front of the VP and 30 mm above HP. Draw its projections.
5. A regular hexagon lamina ABCDEF has a side AB in VP and its side DE 45 mm in front of the VP and inclined to HP at 30o. Draw its projections. Consider size of lamina as 50mm.
6. Draw the projections of rhombus diagonals 96 mm and 48 mm long. The smaller diagonal is parallel to both the reference planes, while the other diagonal is inclined at 30o to the HP and has one of its end points in the HP. Keep the center of rhombus 56 mm in front of the VP.
7. A square plate PQRS, edge 25mm, is in space with one of its corners in VP. Surface of the plate makes 50º with VP and it is perpendicular to HP. Draw its projections.
8. An isosceles triangular plate ABC has its base 45mm and altitude 60mm. It is so placed that the front view is seen as an equilateral triangle of 45mm side and (i) base is inclined at 45º to HP (ii) side is inclined at 45º to HP. Draw its plan when its corner A is on HP.
9. A semi-circular plate of 80mm diameter has its straight edge in the VP and inclined at 45º to the HP. The surface of the plate makes an angle of 30º with the VP. Draw its projections.
10. A regular pentagonal plate of 30 mm sides is resting on one of its edges on H.P. such that the surface is inclined at 45º to H.P. Draw the projections of the pentagonal surface considering plate in first quadrant.
11. A circular thin plate of 50 mm in diameter rests on H.P. on a point of its circumference P. The diameter line PQ is inclined at 30º to H.P. and 45º to V.P. Draw projection of circular surface.
12. A square plate of 30 mm side is resting on the HP on one of its corner in such a way that its surface makes an angle 45° to the HP. Draw the projections of the square plate when plan of diagonal passing through the corner on the HP makes 30° to the VP.

Sardar Vallabhbhai Patel Institute of Technology-Vasad
Mechanical Engineering Department
Question Bank for EG&D [3110013]

13. A square plate of side 60 mm is resting on HP on one of its corner. Plate is inclined to HP such that the plan of it is rhombus with a diagonal of 30 mm. Determine the inclination with HP. The plan of diagonal makes an angle of 450 VP.

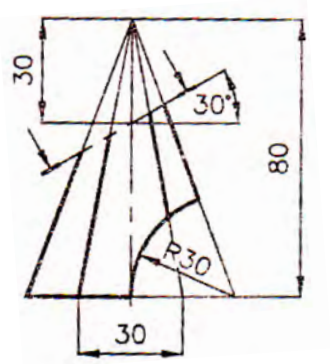
Projection and Section of Solids

1. Draw the projections of a cone, base 60 mm diameter and axis 90 mm long when it is resting on the HP on a point on its base circle with the axis making an angle of 30° with the HP and parallel to the VP.
2. A cylinder is resting on HP on its base. It is cut by AVP perpendicular to HP and inclined to VP by 45° and cutting it remaining 12 mm away from the axis. Draw the projections with section and draw also the true shape of the section. Take diameter of cylinder 55 mm and height 60 mm.
3. Draw the plan and elevation of a cone resting on HP on its base. Show on them the shortest path followed by a fly moving around the cone and returning to the same starting point. Fly starts from a point on the periphery of base. Take base diameter of cone 80 mm and height of axis 90 mm.
4. A cone of 70 mm diameter of the base circle and 60 mm length of axis is resting on its base on the HP. It is cut by an AIP so that true shape of the section is an isosceles triangle with the vertex angle of 50°. Set the required cutting plane and find its inclination with the HP. Draw sectional top view, front view and project the true shape of the section.
5. A right regular pentagonal pyramid, edges of base 25 mm and height 50 mm, has its base parallel to VP with one of its base edges in HP. Draw its projections. (FV and TV)
6. A right regular pentagon prism, edge of base 30 mm and height 75 mm resting on its base on HP, is cut by a section plane inclined to HP at 45o and meeting the axis at a distance of 18 mm from its top end. Develop the outside surface of the cut prism.
7. One of the rectangular faces of the vertical square prism, 40 mm side and axis 65 mm long, make an angle of 30o to VP. It is cut by an AIP passing through the center of the axis in making an angle of 40o to HP. Draw front view, sectional top view and true shape of the section.
8. A square pyramid, side of base 40mm and axis 60 mm long, has its base in HP and all edges of the base are equally inclined to VP. It is cut by a section plane perpendicular to the VP and inclined 45o to the HP such that it bisects the axis. Draw its sectional top view and sectional left side view.
9. A cone, diameter of base 55mm and height 60mm, is resting on HP on one of its generators with axis parallel to VP. Draw the projections of cone.
10. A cylinder of base diameter 50 mm and axis 70 mm rest in the HP, has its inclination 30º to the HP. Draw the projection of the cylinder.
11. A hexagonal pyramid is resting on HP on its base with two edges of the base parallel to V.P. Take edge of base 40 mm and height 80 mm. It is cut by a cutting plane perpendicular to V.P. and inclined to H.P. by 45º and passing through a point 25 mm from the apex on the axis. Draw elevation and sectional plan of pyramid.
12. A square pyramid, side of base 40 mm and axis length 60 mm is kept on the HP on one of its base edge such that its axis makes 30º with the HP. Draw the projection of the pyramid when the base edge which is on the HP makes 45º with the VP keeping apex of the pyramid away from the observer.
13. A cone having a diameter of base 80 mm and height 90 mm is resting with base on the HP. It is cut by AIP inclined at 45° to the HP. The cutting plane passes through the mid-point of the axis of the cone. Draw the FV, Sectional TV and true shape of the section.
14. A pentagonal pyramid, edges of base 50 mm and height 75 mm is resting on a corner on HP in such a way that slant edge containing corner makes an angle of 600 with HP and 300 with VP. Draw the projections.
15. A cylinder of 40 mm diameter and 60 mm height is resting on ground. It is cut by a section plane perpendicular to VP inclined at 450 to HP and intersecting the axis 32 mm above the base. Draw its front view and sectional top view and true shape.

Sardar Vallabhbhai Patel Institute of Technology-Vasad
Mechanical Engineering Department
Question Bank for EG&D [3110013]

Development of Surfaces

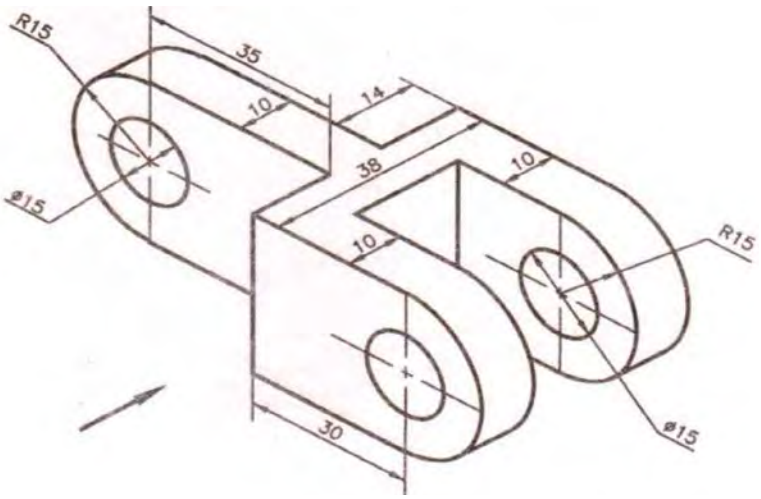
1. Figure shows the front view of a cut hexagonal pyramid. Draw the development of the lateral surface of the remaining portion of the pyramid.



2. Draw the development of pentagonal prism of side 30mm and height 60mm, when one of the edges of the base is perpendicular to VP.
3. A square pyramid made up of aluminium sheet with side of base 50mm and axis length 60mm is kept on HP on a corner of its base with its axis inclined to HP at an angle of 45° and parallel to VP. It is cut by a plane perpendicular to both HP and VP and passing through the corner on HP. Develop the surface of pyramid with portion containing apex.
4. The development of a cone is a semicircle of 80mm radius having a circular hole of 80mm diameter. Draw plan and elevation of the cone along with periphery of a circular hole shown on them.
5. A flume in the form of a frustum of a pyramid, has the base 6m square, top 2m square and an altitude 12m. A lightening conductor is taken from the mid-point of one of the top edges to the mid-point of the opposite edge in the base. Determine the shortest length and draw the projections of its path.
6. A right circular cone, base diameter 55mm, height 80mm rests on the ground on its base. A bee starts from right hand of its base rim and moves around the surface of the cone and finally comes back to the starting point. Find the length of the shortest path the bee should take in covering the distance along the surface of the cone. Also show the path in front and top views.

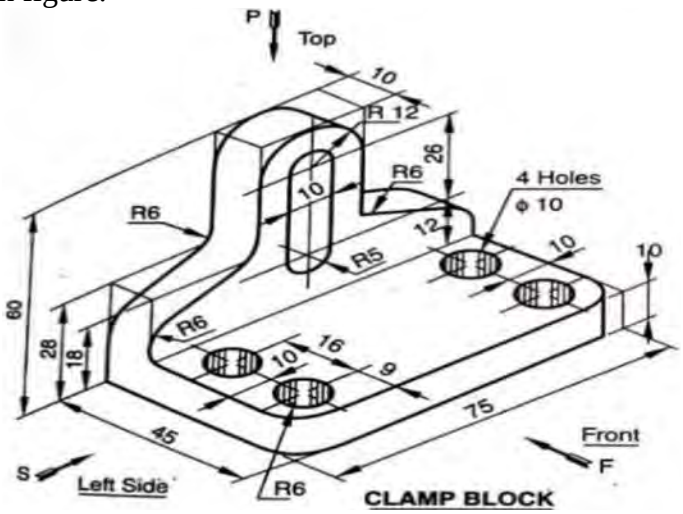
Orthographic Projection

1. Using third angle projection method draw right hand side view, front view and top view for the object shown in Figure.

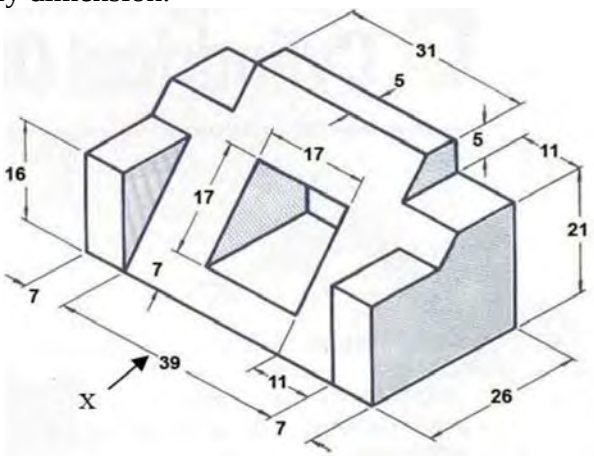


Sardar Vallabhbhai Patel Institute of Technology-Vasad
Mechanical Engineering Department
Question Bank for EG&D [3110013]

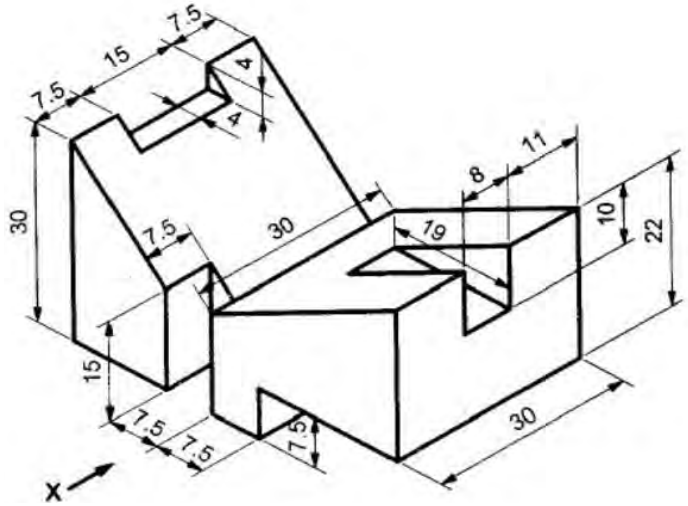
2. Draw and dimension completely Front view looking in the direction of arrow F, Side view looking direction of arrow S, Top view looking the direction of arrow P using first angle projection method and to full size scale of a given figure.



3. Draw the front view, top view and RHSV according to first angle projection method to full size scale of a given figure with completely dimension.

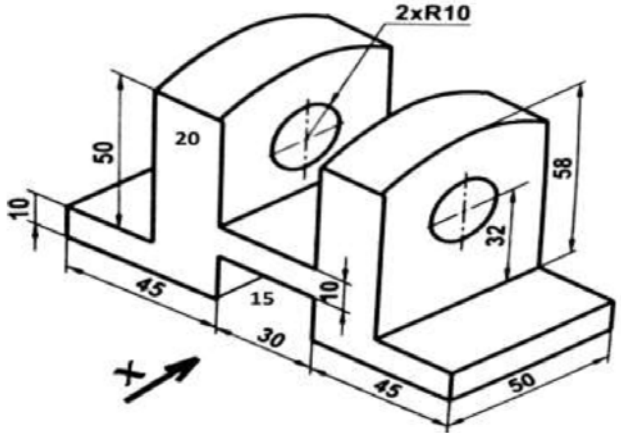


4. For the cuboid 50 x 30 x 20, draw all six orthographic views using 3rd angle projection method.
5. Draw the (i) Front view (ii) Right hand side view and (iii) Top view of Fig. 02 in first angle projection method. Consider length as 50mm in direction of X.

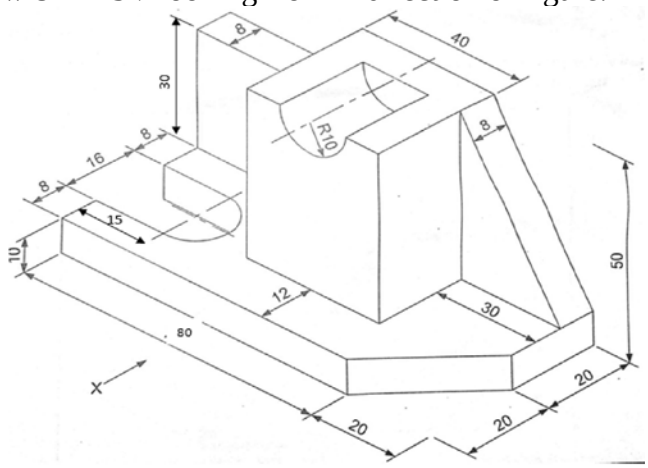


Sardar Vallabhbhai Patel Institute of Technology-Vasad
Mechanical Engineering Department
Question Bank for EG&D [3110013]

6. Draw front view, top view and right hand side view of object shown in Figure.

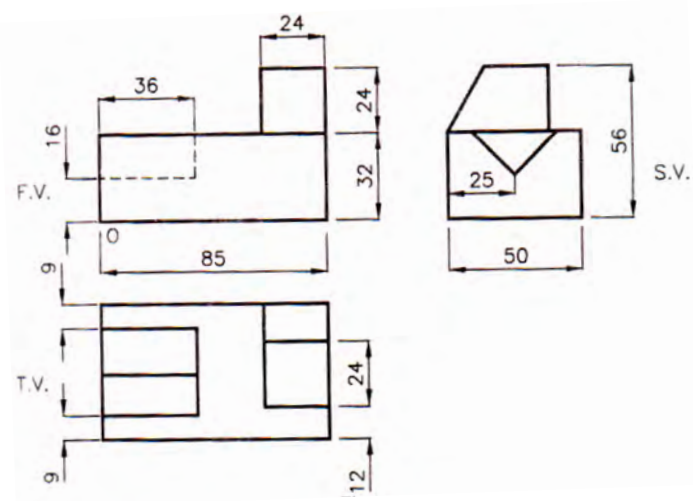


7. Draw Front View, Top View & RHSV looking from X direction of figure.



Isometric Projection

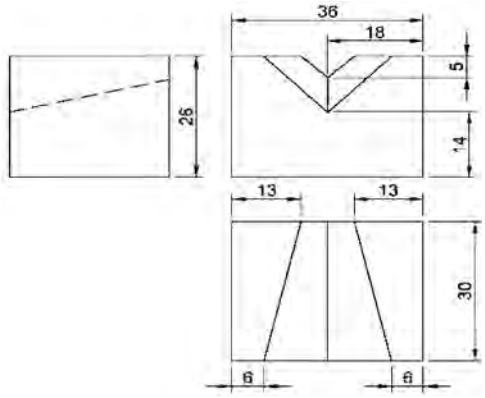
1. Draw isometric view from the orthographic projection shown in Figure.



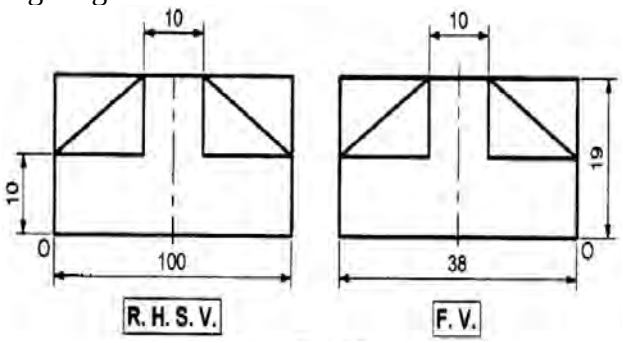
2. Draw the isometric scale of 80 mm long line and show 66 mm isometric length on it.
3. Draw the isometric view of the cone of 48 mm base diameter and 56 mm axis height.
4. Prepare isometric scale to measure 40mm and 74mm.

Sardar Vallabhbhai Patel Institute of Technology-Vasad
Mechanical Engineering Department
Question Bank for EG&D [3110013]

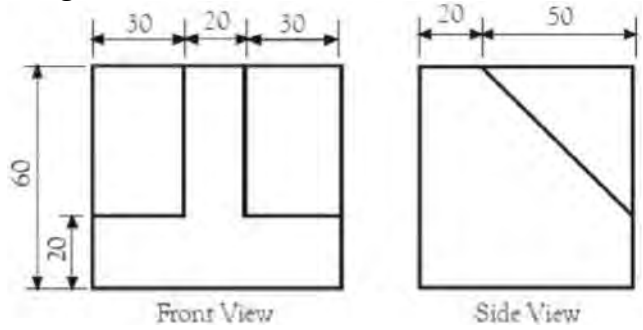
5. Figure shows three orthographic views according to first angle projection method of an object. Draw its isometric projection.



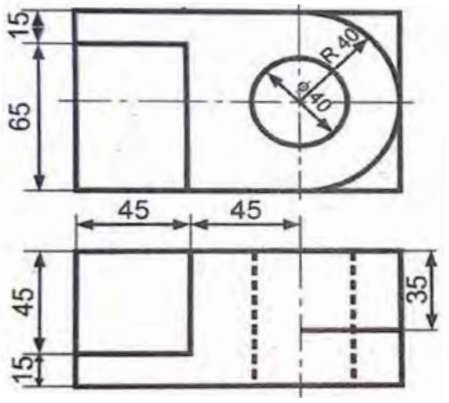
6. Draw isometric view of the Fig.03 given below.



7. Prepare isometric scale for 100mm orthographic length.
8. Draw isometric view refer to Figure 2.

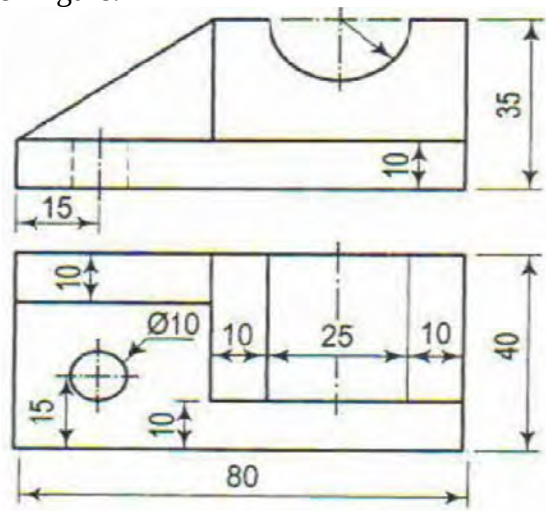


9. Construct isometric scale and find the isometric length for 35 mm and 50 mm true length from isometric scale.
10. Draw isometric drawing of figure.



Sardar Vallabhbhai Patel Institute of Technology-Vasad
Mechanical Engineering Department
Question Bank for EG&D [3110013]

11. Construct the isometric scale to measure 100 mm.
12. Draw isometric drawing of given figure.



Theories

1. Explain the following AutoCAD commands: hatch, circle and array
2. Explain the following AutoCAD commands : mirror, trim, extend and fillet
3. Define the following curves: involute, ellipse and cycloid
4. Differentiate between: (i) Prism and pyramid, (ii) Square pyramid and tetrahedron, (iii) Cube and square prism
5. Differentiate between aligned system and unidirectional system of dimensioning.
6. What is the difference between a First Angle and Third Angle projection?
7. Draw the conventional symbols for First Angle and Third Angle projection.
8. Write difference between line, polyline and its uses in AUTOCAD.
9. List and explain different methods to draw arc in AUTOCAD.
10. List the six Essential Commands of Modify Panel in AutoCAD.
11. List and explain different methods to draw Polygon in AUTOCAD.
12. List two applications of an ellipse, parabola and Hyperbola.
13. Define apparent shape and true shape with diagram.
14. Why chamfer is done on work piece. Write the steps to create chamfer in AUTOCAD.
15. List and explain different methods to draw circle in AUTOCAD.
16. Write difference between line, polyline and its uses in AUTOCAD.
17. List and explain different methods to draw rectangle in AUTOCAD.
18. Define right solid, oblique solid and regular solid.
19. Classify basic engineering curves.
20. Differentiate symmetric and axisymmetric solids with examples.
21. Draw simple sketch to differentiate types of dimensioning.
22. Show arrangement of six orthographic views in 1st Angle and 3rd Angle projection system.
23. What is the difference between isometric projection and isometric view?