



Engineering Graphics

Practical Book

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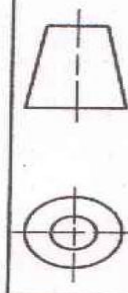
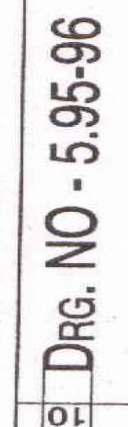
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SYLLABUS

(AS PER GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD)

1. Introduction to Engineering Graphics, Drawing instruments and accessories, BIS – SP 46. Use of plane scales and Representative Fraction.
2. Engineering Curves: Classification of Engineering Curves, Construction of Conics, Cycloidal Curves, Involute and Spirals.
3. Loci of Points: Path of the points moving on simple arrangements and simple mechanisms, slider crank mechanism, four bar chain mechanism etc.
4. Projections of Points & Lines: Introduction to principal planes of projections, Projections of the points located in same quadrant and different quadrants, Projections of line with its inclination to one reference plane and with two reference planes. True length of the line and its inclination with the reference planes.
5. Projections of Planes: Concept of different planes, Projections of planes with its inclination to one reference plane and with two reference planes. Concept of auxiliary plane method for projections of the plane.
6. Projections of Solids & Section of Solids: Classification of solids. Projections of solids like Cylinder, Cone, Pyramid and Prism with its inclination to one reference plane and with two reference planes. Section of such solids and the true shape of the section.
7. Development of Lateral Surfaces: Concept of development of the different surfaces. Parallel Line Development and Radial Line Development.
8. Orthographic Projections: Principle of projection, Principal planes of projection, Projections from the pictorial view of the object on the principal planes for View from Front, View from Top and View from Side using first angle projection method and third angle projection method, Full Sectional View.
9. Isometric Projections and Isometric View or Drawing: Isometric Scale, Conversion of orthographic views into isometric projection, isometric view or drawing.

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1. Loci of Points

1. OBA is a simple slider crank chain. OB is a crank of 30mm length. BA is a connecting rod of 90mm length. Slider A is sliding on a straight path passing through point O. Draw the locus of the mid-point of the connecting rod AB for one complete revolution of the crank OB.
2. In an offset slider crank chain OBA, the crank OB is 300mm long and the connecting rod BA is 100mm long. Slider 'A' slides in a horizontal guide 150mm below the horizontal from O. Draw the loci of point P and Q where the point P is a point on the con-rod BA, 250mm from B and the point Q is the end point of PQ, a rod attached at right angle to con-rod AB at P.
3. A link AB of 72mm length rotates about its centre in the clockwise direction. While the link completes one revolution, the insect walks across the length from one end to the other. Plot the locus of the insect assuming the rotation of the link and the motion of the insects as uniform
4. A pendulum OC pivoted at O, is 120mm long. It swings 30degree to the right of vertical and also 30degree to the left of vertical. Insect, initially at O reaches the point C, when the pendulum completes two oscillations. Draw the path of the insect, assuming motion of insect and of pendulum as uniform.

2. Engineering Curves

1. Diameter of the rolling or the generating circle is D . Construct the cycloid. Draw tangent and normal at any point of curve. Initial position of point P is at the point of contact between generating circle and the directing line
2. Construct an Archimedean Spiral of one convolution, given the maximum and minimum radii as 55 mm and 31 mm respectively. Draw tangent and normal to the curve at any point.
3. The vertex of hyperbola is 30 mm from its directrix and the eccentricity ratio of the hyperbola is $5/3$. Draw the hyperbola curve and draw tangent and normal to the curve at a point 65 mm from the directrix.
4. The major axis and minor axis of the ellipse are 125 mm and 75 mm respectively. Construct the half ellipse by concentric circle method and another half by oblong method.

3. Projection of Planes and Lines

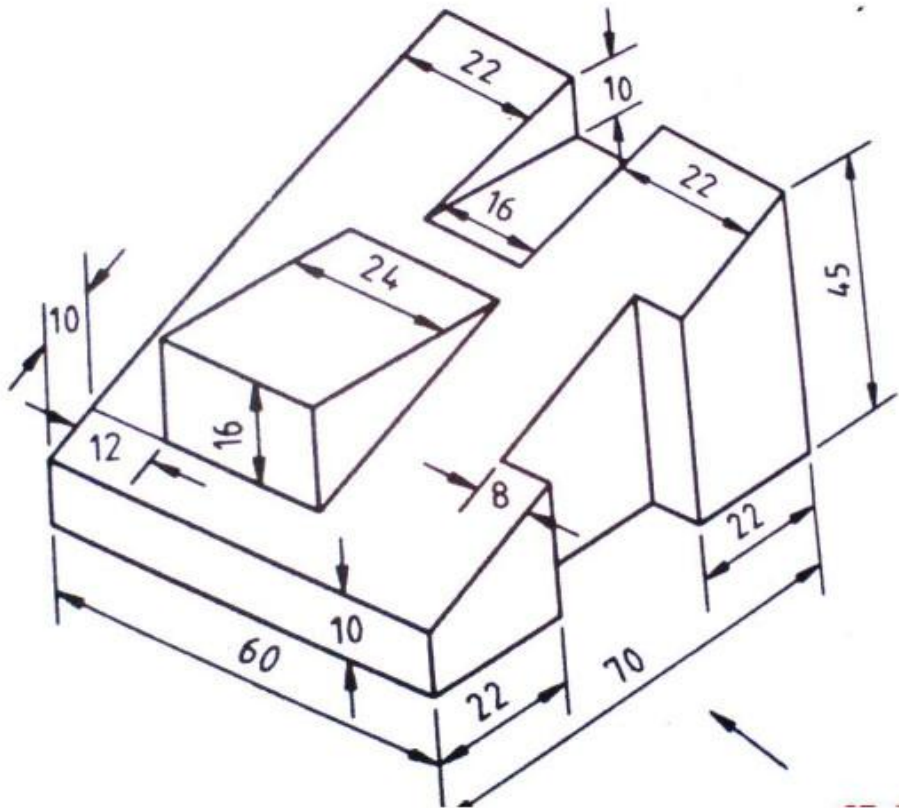
1. A line EF, 75 mm long, has its end E 20 mm below H.P. and 25 mm behind V.P. The end F is 50 mm below H.P. and 65 mm behind VP. Draw the projections of line EF and find its inclinations with H.P. and V.P.
2. The distance between the end projectors of the straight line KL is 48 mm. The end K is 20 mm below H.P. and 25 mm behind V.P. The end L is 12 mm above H.P. and 40 mm in front of V.P. Draw the projections and find the T.L. of the line, its inclinations with H.P. and V.P. and also its traces.
3. A regular pentagonal plate, of 50 mm sides, has one of its corners on H.R. The plane of the pentagon is inclined at 30 degree to the H.P. The side of the pentagon, which is opposite to the corner, which is on H.P. is inclined at 45 degree to the V.P. Draw the projections of the plate.
4. ABCD is a rhombus of diagonals $AC = 100\text{mm}$ and $BD = 70\text{mm}$. Its corner A is in the H.P. and the plane is inclined to the H.P. such that its plan appears to be a square and the plan of the diagonal AC makes an angle of 20° to the V.P. Draw the projections of the plane and find its inclination with the H.P.

4. Projections of Solid and Development of Lateral Surface

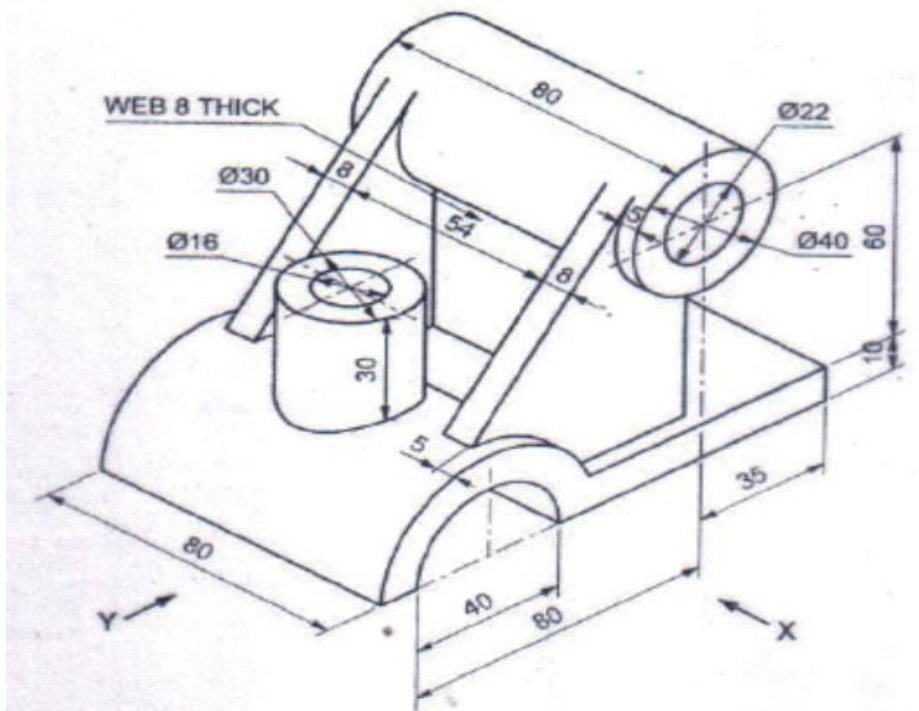
1. A square pyramid, 40 mm base sides and axis 60 mm long, has a triangular face on the ground and the vertical plane containing the axis makes an angle of 45° with the VP. Draw its projections. Take apex nearer to VP.
2. A right circular cone, 40 mm base diameter and 60 mm long axis is resting on Hp on one point of base circle such that its axis makes 45° inclination with Hp and 40° inclination with VP. Draw its projections.
3. A pentagonal prism, 30 mm base side & 50 mm axis is standing on Hp on its base whose one side is perpendicular to VP. It is cut by a section plane 45° inclined to Hp, through midpoint of axis. Draw FV, sec. TV & sec. Side view. Also draw true shape of section and Development of surface of remaining solid.
4. A cone, 50 mm base diameter and 70 mm axis is standing on its base on Hp. It is cut by a section plane 45° inclined to HP through base end of end generator. Draw projections, sectional views, true shape of section and development of surfaces of remaining solid.

5. Orthographic Projections

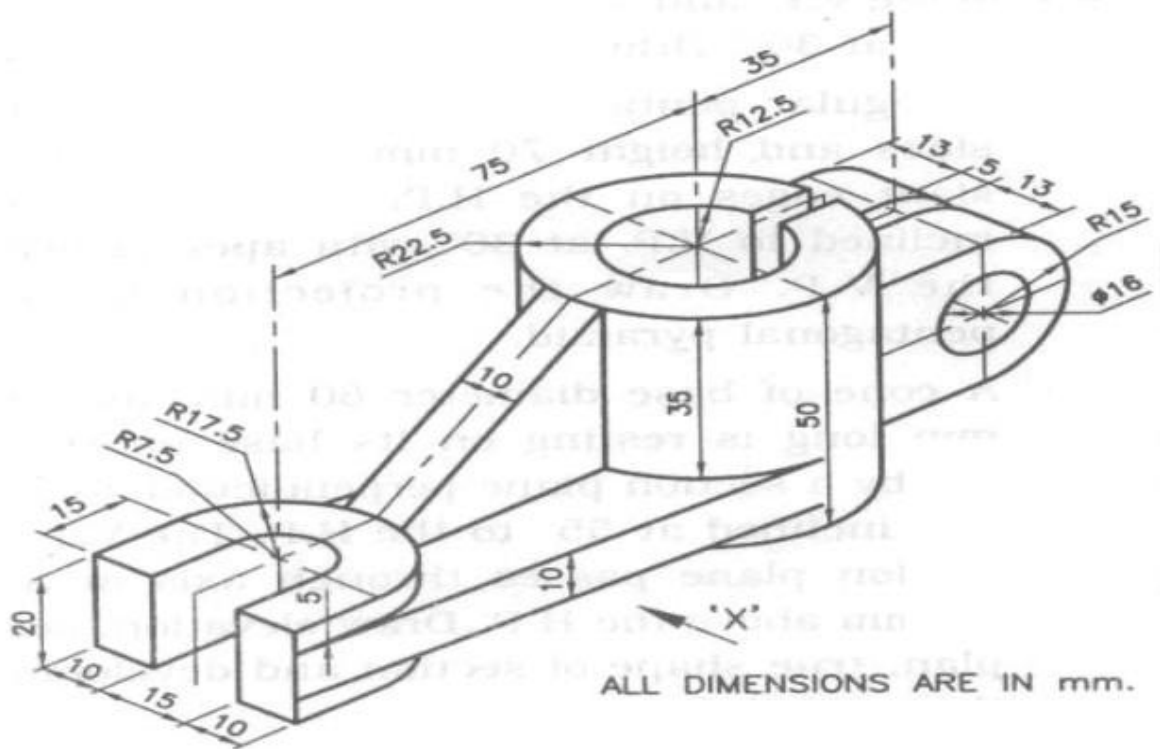
1. Draw the orthographic projections of following problems.



2. Draw the orthographic projections of following problems.

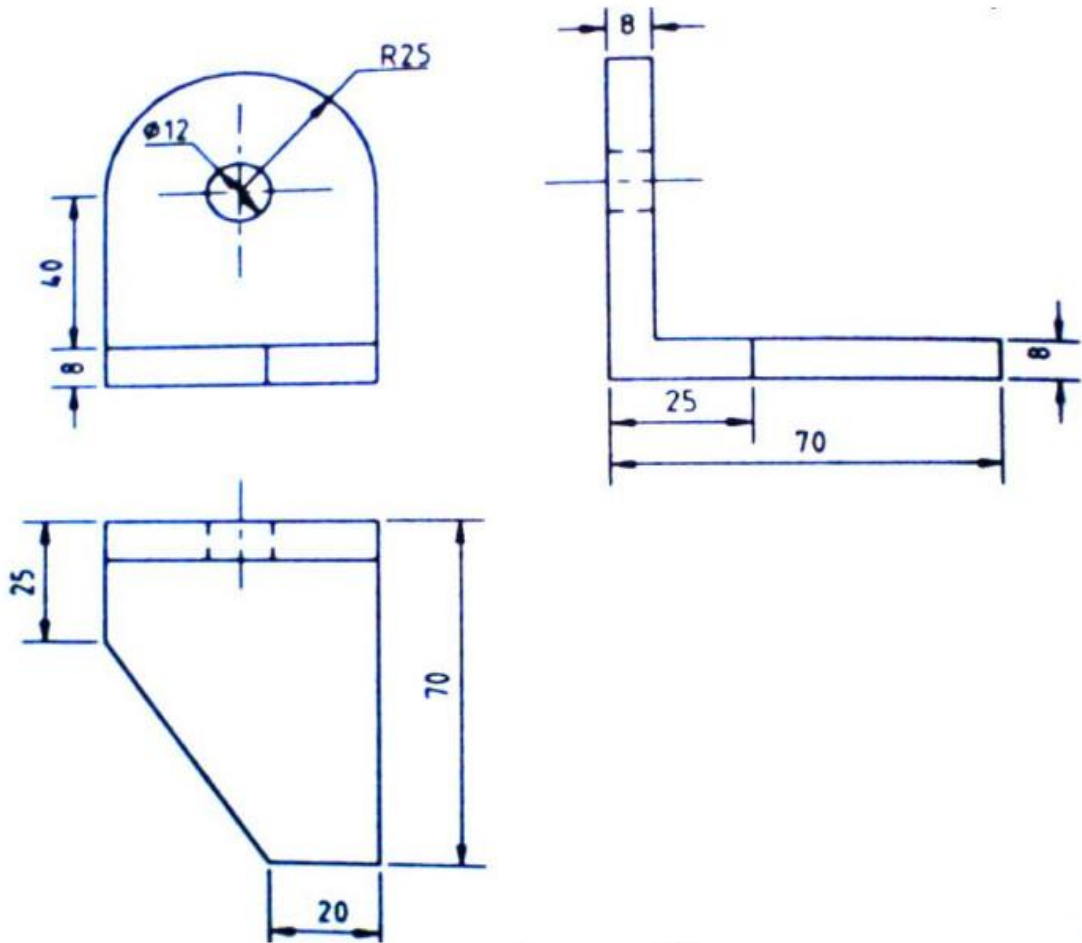


3. Draw the orthographic projections of following problems.

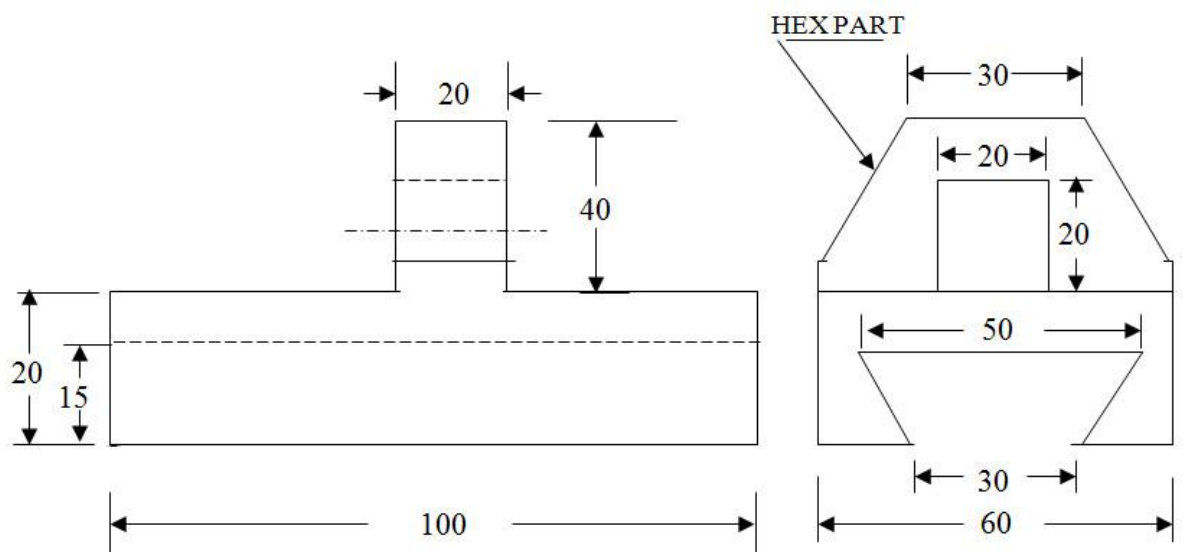


6. Isometric Projections

1. Draw the isometric projections of following problem.



2. Draw the isometric projections of following problem.



3. Draw the isometric projections of following problem.

