

1. Geometric Constructions

1. Prepare the Drawing sheet according to BIS standards.
2. Bisect a line of any unknown length.
3. Bisect an unknown angle.
4. Divide an unknown length of line into any no. of equal parts.
5. Divide a circle into 12 equal parts
 - a) Compass Method
 - b) Protractor Method
6. Construct a polygon (Pentagon) by using interior angle method.
7. Construct a polygon (Hexagon) by using exterior angle method.

2. Engineering Curves

1. A fixed point is 75 mm from a fixed straight line. Draw the locus of a point P moving such a way that its distance from the fixed straight line is
 - a) Twice its distance from the fixed point;
 - b) Equal to its distance from the fixed point; Name the curves.
2. The vertex of a hyperbola is 65 mm from its focus. Draw the curve if the eccentricity is $3/2$. Draw a normal and a tangent at any point on the curve.
3. Two straight lines OA and OB make an angle of 75° between them. P is a point 40 mm from OA and 50 mm from OB . Draw a hyperbola through P , with OA and OB as asymptotes, marking at least six points.
4. A circle of 50 mm diameter rolls along a straight line without slipping. Draw the curve traced out by a point P on the circumference, for one complete revolution of the circle. Name the curve. Draw a tangent and normal to the curve at any point on the curve.
5. A circle of 50 mm diameter rolls on another circle of 175 mm diameter and outside it. Trace the locus of a point on the circumference of the rolling circle for one complete revolution. When it rolls
 - (i) Outside and
 - (ii) Inside the other circle. Name the curve. Draw a tangent and a normal to the curve at any point on the curve.
6. Draw an involute for a triangle of side length 30 mm. Also draw a tangent and normal to the curve.
7. Draw an involute for a Square of side length 25 mm. Also draw a tangent and normal to the curve.
8. Draw an involute for a circle of diameter 40 mm. Also draw a tangent and normal to the curve.

3. Projections of Points

1. Draw the projections of the following points on the same ground line, keeping the projectors 25 mm apart.
 - a) *A*, in the H.P. and 20 mm behind the V.P.
 - b) *B*, 40 mm above the H.P. and 25 mm in front of the V.P.
 - c) *C*, in the V.P. and 40 mm above the H.P.
 - d) *D*, 25 mm below the H.P. and 25 mm behind the V.P.
 - e) *E*, 15 mm above the H.P. and 50 mm behind the V.P.
 - f) *F*, 40 mm below the H.P. and 25 mm in front of the V.P.
 - g) *G*, in both the H.P. and the V.P.
2. A point *P* is 50 mm from both the reference planes. Draw its projections in all possible positions.
3. A point *P* is 15 mm above the H.P. and 20 mm in front of the V.P. Another point *Q* is 25 mm behind the V.P. and 40 mm below the H.P. Draw projections of *P* and *Q* keeping the distance between their projectors equal to 90 mm.
Draw straight lines joining (i) their top views and (ii) their front views.
4. Two points *A* and *B* are in the H.P. The point *A* is 30 mm in front of the V.P., while *B* is behind the V.P. The distance between their projectors is 75 mm and the line joining their top views makes an angle of 45° with *xy*. Find the distance of the point *B* from the V.P.
5. Draw the projections of the following points
 - a) A point *P*; its top view is 40 mm above *xy*; the front view, 20 mm below the top view.
 - b) A point *Q*, its projections coincide with each other 40 mm below *xy*.

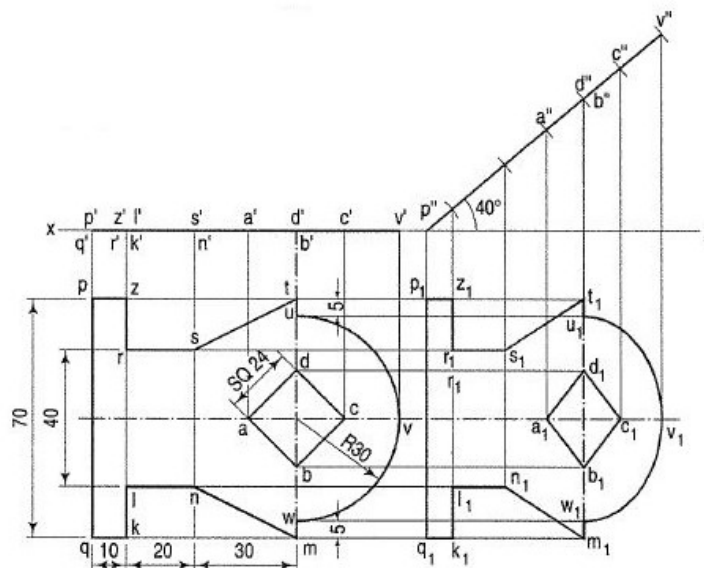
4. Projections of Lines

1. Draw the projections of a 75 mm long straight line, in the following positions:
 - a) Parallel to both the H.P. and the V.P. and 25 mm from each.
 - b) Parallel to and 30 mm above the H.P. and in the V.P.
 - c) Parallel to and 40 mm in front of the V.P. and in the H.P.
 - d) Perpendicular to the H.P., 20 mm in front of the V.P. and its one end 15 mm above the H.P.
 - e) Perpendicular to the V.P., 25 mm above the H.P. and its one end in the V.P.
2. A 100 mm long line is parallel to and 40 mm above the H.P. Its two ends are 25 mm and 50 mm in front of the V.P. respectively. Draw its projections and find its inclination with the V.P.
3. The top view of a 75 mm long line measures 55 mm. The line is in the V.P., its one end being 25 mm above the H.P. Draw its projections.

- Page 3

RGUKT RK Valley

- Page 3



6. Projections of Solids

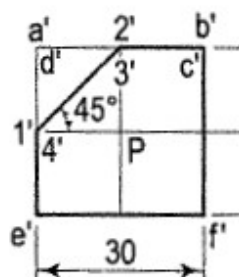
1. Draw the projections of a hexagonal pyramid, base 30 mm side and axis 60 mm long, having its base on the H.P. and one of the edges of the base inclined at 45° to the V.P.
2. Draw the projections of
 - (i) a cylinder, base 40 mm diameter and axis 50 mm long, and
 - (ii) a cone, base 40 mm diameter and axis 50 mm long, resting on the H.P. on their respective bases.
3. A cube of 50 mm long edges is resting on the H.P. with its vertical faces equally inclined to the V.P. Draw its projections.
4. A square pyramid, base 40 mm side and axis 65 mm long, has its base in the V.P. One edge of the base is inclined at 30° to the H.P. and a corner contained by that edge is on the H.P. Draw its projections.
5. A hexagonal prism has one of its rectangular faces parallel to the H.P. Its axis is perpendicular to the V.P. and 3.5 cm above the ground.
6. A triangular prism base 40 mm side and height 65 mm is resting on the H.P. on one of its rectangular faces with the axis parallel to the V.P. Draw its projections.

7. Projections of Sections of Solids

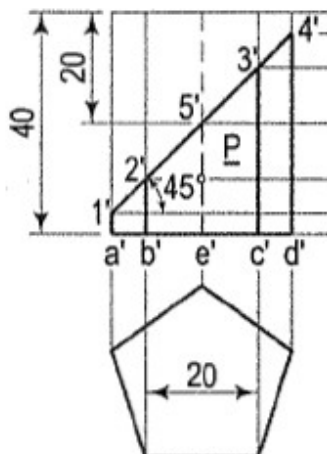
1. A cube of 35 mm long edges is resting on the H.P. on one of its faces with a vertical face inclined at 30° to the V.P. It is cut by a section plane parallel to the V.P. and 9 mm away from the axis and further away from the V.P. Draw its sectional front view and the top view.
2. A triangular prism, base 30 mm side and axis 50 mm long, is lying on the H.P. on one of its rectangular faces with its axis inclined at 30° to the V.P. It is cut by a horizontal section plane, at a distance of 12 mm above the ground. Draw its front view and sectional top view.
3. A square prism, base 40 mm side, axis 80 mm long, has its base on the H.P. and its faces equally inclined to the V.P. It is cut by a plane, perpendicular to the V.P., inclined at 60° to the H.P. and passing through a point on the axis, 55 mm above the H.P. Draw its front view, sectional top view and another top view on an A.I.P. parallel to the section plane.
4. A hexagonal prism has a face on the H.P. and the axis parallel to the V.P. It is cut by a vertical section plane, the H. T. of which makes an angle of 45° with xy and which cuts the axis at a point 20 mm from one of its ends. Draw its sectional front view and the true shape of the section. Side of the base 25 mm long; height 65 mm.

8. Development of surfaces

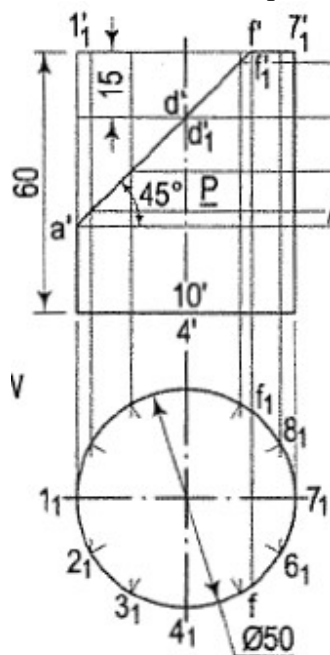
1. Draw the development of the surface of the part P of the cube, the front view of which is shown in fig.



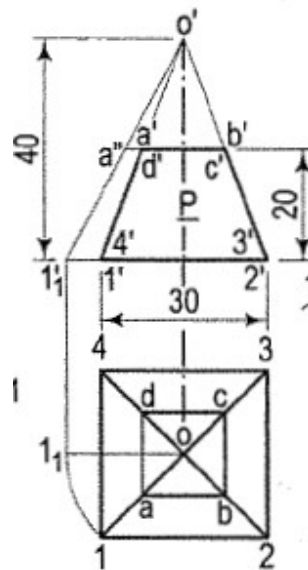
2. Draw the development of the lateral surface of the part P of the pentagonal prism shown in fig



3. Draw the development of the lateral surface of the part P of the cylinder shown in fig.



4. Draw the development of the lateral surface of the frustum of the square pyramid shown in fig.



5. Draw the development of the lateral surface of the truncated cone shown in fig.

