

**INDIAN INSTITUTE OF TECHNOLOGY, BOMBAY**  
**Department of Mechanical Engineering**

*ME-119 Engineering Drawing & Graphics*

*2015-16 Semester II*

Sheet 6: Projections of Solids

Note:

- *Practice all problems roughly before coming to the Drawing Session. For more details of the exercises in this sheet, refer Chapter 13 of the text book (N. D. Bhatt, Engineering Drawing, 50<sup>th</sup> Ed.).*
1. One of the body diagonals of a cube of 45mm edge is parallel to the H.P. and inclined at 45 degrees to the V.P. Draw the front view and the top view of the cube.
  2. A hexagonal prism, base 30 mm side and axis 75 mm long, has an edge parallel to the H.P. and inclined at 45 degrees to the V.P. Its axis makes an angle of 60 degrees with the H.P. Draw its projections.
  3. Draw the views of a cone, base 50 mm diameter and axis 75 mm long, having one of its generators in V.P. and inclined at 30 degrees to the H.P., the apex being in the H.P.
  4. A cone of base 60 mm diameter and height 80 mm is resting on a point on the circumference of the base on the HP. The apex is 55 mm above HP while the axis is inclined at 45 degrees to the VP. Draw its projections.
  5. A cylinder, 100 mm diameter and 150 mm long, has a rectangular slot 50 mm x 30mm cut through it. The axis of the slot bisects the axis of the cylinder at right angles and the 50 mm side of the slot makes an angle of 60 degrees with the base of the cylinder. Draw three views of the cylinder.
  6. The body diagonal of a cube is 75 mm long. The cube has a central 25 mm square hole. The faces of the hole make 45 degrees with the side faces of the cube. Draw the projections of the cube when a body diagonal is perpendicular to the H.P.
  7. A bucket, 300 mm diameter at the top and 225 mm diameter at the bottom has a circular ring 225 mm diameter and 50 mm wide attached at the bottom. The total height of the bucket is 300 mm. Draw the projections of the bucket when its axis is inclined at 60 degrees to the H.P. and as a vertical plane makes an angle of 45 degrees with the V.P. Assume the thickness of the plate of the bucket to be equal to that of a line.
  8. A pentagonal pyramid with base edges of 30 mm and height 65 mm is resting on a corner of the base on the HP. The triangular face opposite to the corner on the HP is inclined to the HP at 45 degrees with its shorter edge inclined to the VP at 60 degrees. Draw its projections.
  9. A triangular pyramid of base 40 mm side and height 60 mm is lying in space in such a

way that its axis is inclined at 60 degrees to HP and 30 degrees to VP. Draw its three views if the apex is towards the observer and a corner of base is towards the HP.

10. A circular disc of diameter 80 mm and thickness 30 mm has a centrally cut triangular hole of side 45 mm. The disc rests on the HP on a point on the circumference of an end such that a flat face of the disc makes 45 degrees with the HP. Draw the projections of the disc with the hole if the apparent inclination of the axis in the top view is 55 degrees.
11. A triangular prism with side of base 40 mm and height 70 mm has its edge of base in the VP and inclined at 60 degrees to the HP. The rectangular face containing that edge makes 30 degrees with the VP. Draw the projections of the prism.
12. The axis of a hexagonal prism (side of base 30 mm and height 60 mm) is inclined at 30 degrees to the HP. Two opposite rectangular faces are perpendicular to the HP and inclined to the VP at 45 degrees. Draw its projections.
13. A square pyramid with base side of 50 mm and height 80 mm has a corner of the base on HP and 45 mm in front of VP. The slant edge through that corner makes an angle of 50 degrees with HP. The apex is in the VP. Draw the projections of the solid and find the angle made by its base with VP.
14. A frustum of a triangular pyramid has base side 45 mm and top side 22 mm. Height of frustum is 40 mm. An edge of the base of the solid is on the HP and parallel to VP at a distance of 15 mm. The corresponding edge of the top is in the VP. Draw the views of the solid.
15. A pentagonal pyramid has a base of 30 mm sides and height 65 mm. It has a corner of its base in the HP and the triangular face opposite to it inclined at 45 degrees to the HP. A slant edge within that triangular face is inclined at 30 degrees to the VP. Draw the projections of the solid.
16. A regular pentagonal prism has base edge 25 mm and height 60 mm. One of the base edges of the prism makes 30 degrees with the HP and 60 degrees with the VP. The axis of the prism makes 45 degrees with the HP. Draw the projections. Find the angle made by the axis with the VP.
17. A tetrahedron ABCV of 70 mm edges is resting with its edge AB on the ground. The face ABV is inclined to the HP such that its plan is a right angled triangle. Draw the projections of the solid when its axis makes an angle of 30 degrees with the VP and vertex V is towards the observer.
18. A triangular prism has base sides of 40 mm and height 50 mm. It is lying on the ground on one of its rectangular faces with its axis perpendicular to the VP. A cone of diameter 40 mm and height 50 mm is resting on the ground and is leaning centrally on a face of the prism, with its axis parallel to the VP. Draw the projections of the solids and project another Front View on a reference line making an angle of 60 degrees with XY.

