INDIAN INSTITUTE OF TECHNOLOGY, BOMBAY
Department of Mechanical Engineering

ME119 – Engineering Drawing and Graphics 2017-18 Semester II

Sheet 8: Development of Surfaces

Instruction:

- Practice all problems in rough before coming to the Drawing Session.
- For more details of the exercises in this sheet, refer Chapters 14 of the text book (N. D. Bhatt, Engineering Drawing, 53rd Ed.).
- Scale, dimension the drawings suitably. Label the important nodes/points on the drawings. Mention the scale if it is not 1:1.
- You may use the MIRROR command to reflect points around lines of symmetry.
- Make the title block and name plate before starting the drawing.
- Use 1st angle projection unless mentioned otherwise.

1. A hexagonal prism with base of side 20mm and length of axis 50mm is kept on the ground on its base such that two opposite sides of the base are parallel to the VP. It is cut by an auxiliary inclined plane that makes an angle of 45deg with the horizontal plane and also passes through the right-most corner of the top face of the prism. Draw the development of the lateral surface of this cut prism.
2. A cone of base diameter 60mm and slant height equal to the base diameter is resting on its base on the HP. It is cut twice: (i) first by an auxiliary inclined plane at 45deg to the horizontal plane that passes through a point on the axis 14mm from the apex, and (ii) it is also cut by a cylinder of diameter 60mm whose axis is perpendicular to the vertical plane and whose axis passes through the point where the rightmost generator intersects the base of the cone in the front view. Develop the portion of this cone lying between these two cuts. (Generators of the cone are line segments on the curved surface of the cone connecting the apex of the cone to points on the base circumference.)
3. A funnel is manufactured by a frustum of a cone and a truncated cylinder as shown in Fig 1 below. Diameter of the cylinder is 20mm and all other dimensions in mm are given in the figure. Draw the development of the funnel.

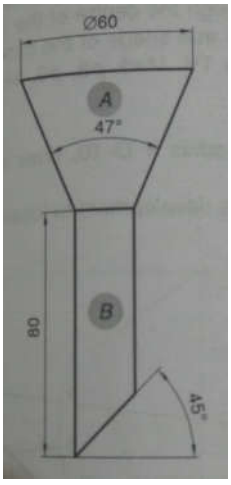

Figure 1

4. A frustum of a hexagonal pyramid is standing on its larger base on the ground with a side of the base parallel to the vertical plane. The side of the base is 35mm and of the top is 20mm. The axis of the frustum is 60mm long. An end of a thread is attached to a corner of the base which appears leftmost in the top view. This thread is then wound on the lateral surface, following shortest past, so that it will pass through the opposite corner of the top and then brought back to the same corner of the base. Determine the shortest length of the thread required and show the path followed by the thread in front view and top view.
5. Two views of a domestic dustbin are shown in Fig 2 below. Develop the lateral surfaces of the bin.

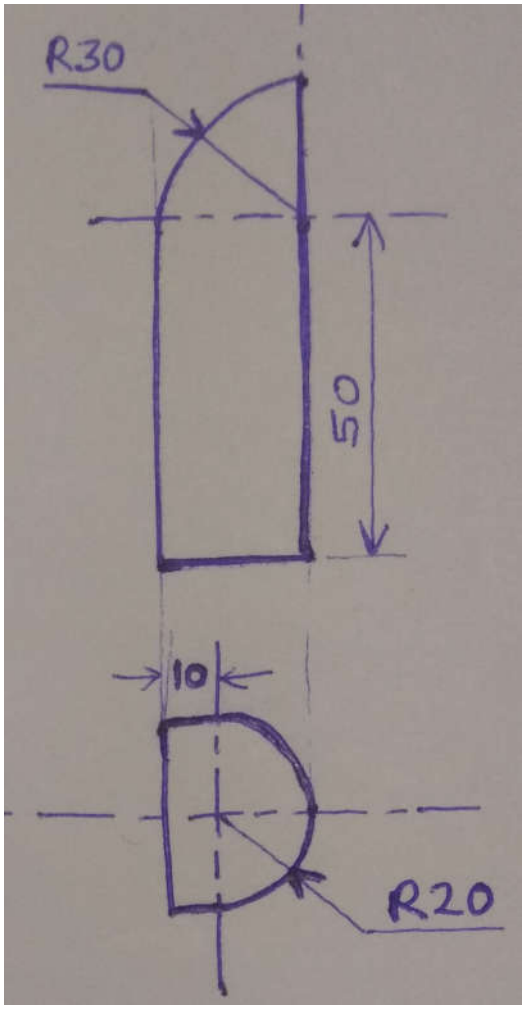

Figure 2

6. A cylinder is standing on its base on the HP. A pentagonal hole is cut through the cylinder. The axis of the hole is perpendicular to the vertical plane and bisects the axis of the cylinder. Also assume a flat face of the hole to be perpendicular to the horizontal plane. The base diameter and the height of cylinder are 70mm and 90mm respectively. The hole has a face width of 30mm. Draw the development of the lateral surface of the cylinder.