TECHNICAL DRAWING - ORDINARY LEVEL - PAPER I

(Plane and Solid Geometry)

TUESDAY, 25 JUNE - MORNING 9.30 - 12.30

200 marks

INSTRUCTIONS

(a) Answer <u>four</u> questions.
(b) All questions carry equal marks.
(c) Construction lines must be shown on all solutions.
(d) Write the number of the question distinctly on the answer paper.
(e) <u>All dimensions on the question paper are given in millimetres.</u>
(f) First or third angle projection may be used.

1. An isometric view of a shaped solid is shown in Fig. 1.

   (a) Draw an elevation of the solid looking in the
        direction of the arrow and project a plan.

   (b) By rotating the solid, or otherwise, draw
        a new plan of the solid when the surface A
        rests on the horizontal plane.

Fig. 1
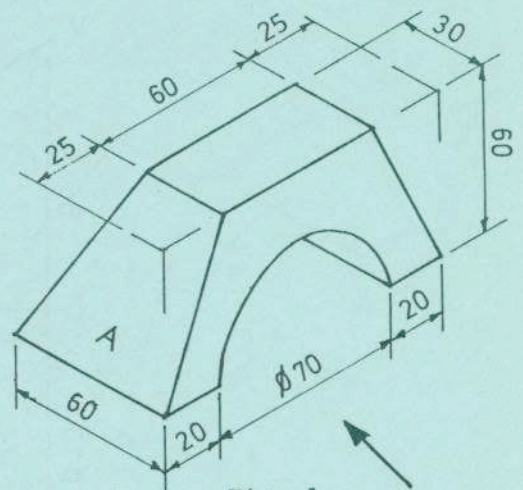
2. Fig. 2 shows the plan and incomplete elevation of two solids which penetrate each other.
   The solid resting in a horizontal position is an equilateral triangular prism of 60 mm
   side and length 170 mm.
   Draw the plan and complete the elevation of the solids showing all lines of interpenetration.

Fig. 2
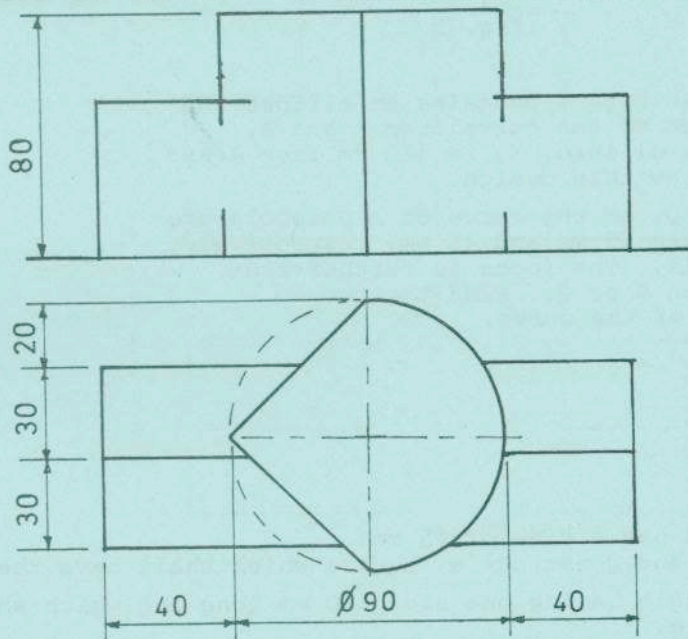
3. (a) Draw the plan and elevation of a
        cylinder of 50 mm diameter and height 90 mm
        and show two complete revolutions of a helix on the
        surface of the cylinder.

   (b) The rectangle ABCD shown in Fig. 3 is the development
        of the curved surface of a cylinder of 60 mm diameter
        and height 100 mm.
        Draw the elevation of the cylinder and show on it the
        helix whose development is the line PQ. Complete
        the helix for the full height of the cylinder.

Fig. 3
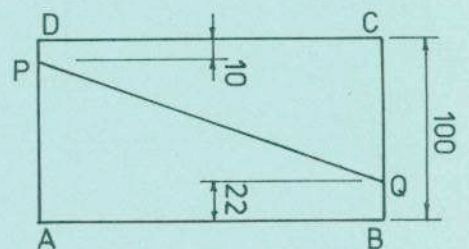
OVER →

4. The elevation of two spheres in contact is shown in Fig. 4.

   (a) Draw the elevation and project the plan of the two spheres.

   (b) Another sphere, C, of 50 mm diameter rests on the horizontal plane and is in contact with the two given spheres, A and B.
   Draw the projections of sphere C.

   (c) Find the true shape of the triangle joining the centres of spheres A, B and C.
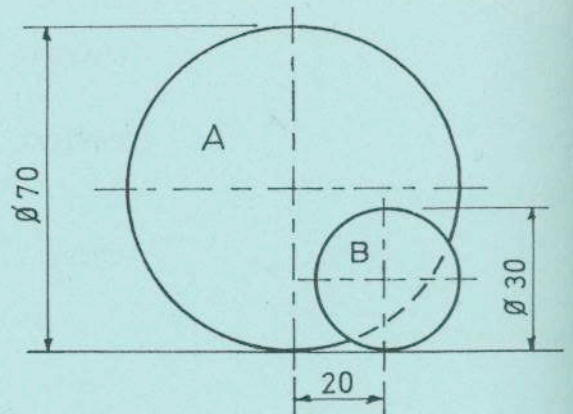
Fig. 4

5. Fig. 5 shows the plan and elevation of a solid which is cut by the given plane VTH.

   (a) Draw the plan and elevation of the cut solid.

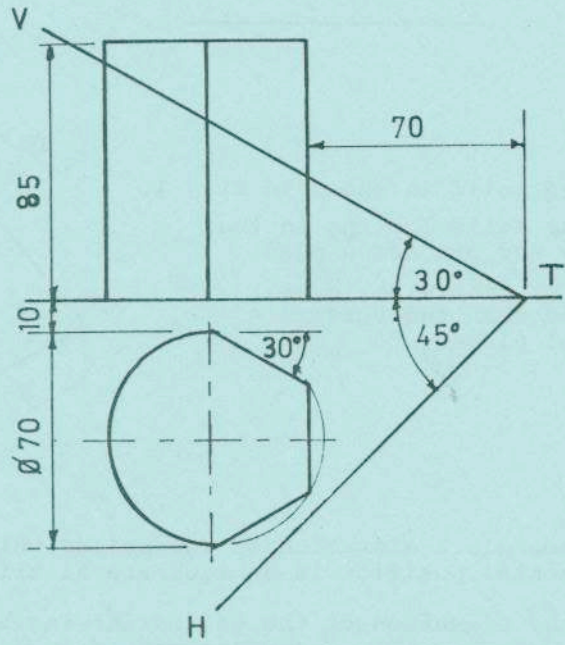   (b) Show the true shape of the section of the solid.

Fig. 5

6. (a) The design shown in Fig. 6 contains an ellipse and two tangents drawn to the curve from A and B.
   The centre of the ellipse, C, is 110 mm from A and 90 mm from B. Draw this design.

   (b) Two points, P and Q, on the curve of a parabola are 75 mm apart and are 35 mm and 45 mm, respectively, from the directrix. The focus is further from the directrix than P or Q. Find the focus and draw portion of the curve.
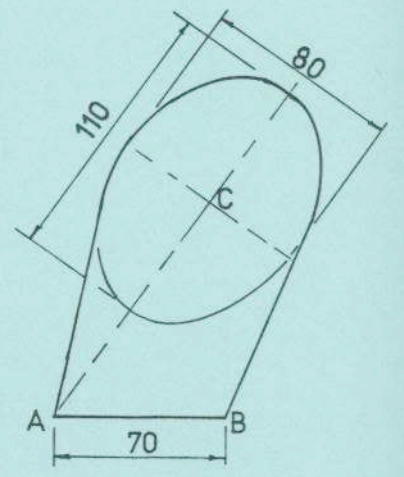
Fig. 6

7. (a) A regular pentagon has a side of 65 mm.
   Draw the pentagon and construct a square which shall have the same area as the pentagon.

   (b) Construct a rectangle having one side 180 mm long and which shall have the same area as the square.

   (c) Draw a triangle on the same base and having the same area as the rectangle and having a perimeter of 430 mm.