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LEAVING CERTIFICATE EXAMINATION, 1984

TECHNICAL DRAWING – HIGHER LEVEL – PAPER I
(Plane and Solid Geometry)

FRIDAY, 22 JUNE – MORNING 9.30 to 12.30

(200 marks)

INSTRUCTIONS

(a) Answer four 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) All dimensions on the question paper are given in millimetres.
(f) First or third angle projection may be used.

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1. Given the horizontal and vertical projections of two intersecting planes ABC and ABD.

$$A = 120 - 100 - 5$$
$$B = 215 - 5 - 100$$
$$C = 185 - 120 - 95$$
$$D = 205 - 80 - 15$$

   (a) Find the dihedral angle between the planes ABC and ABD.

   (b) Draw the projections of the perpendicular from C to the plane ABD.

   (c) On a separate diagram draw the projections of the skew lines AC and BD and determine the shortest distance between them.

2. (a) In Fig. 1 the circle rolls along the line ABCD for one complete revolution.
   Draw the locus of the point P on the circle for this movement.

   (b) Draw one convolution of a logarithmic spiral in which the shortest radius is 30 mm and the lengths of succeeding radii at 30° intervals are in the ratio of 10 : 11 .
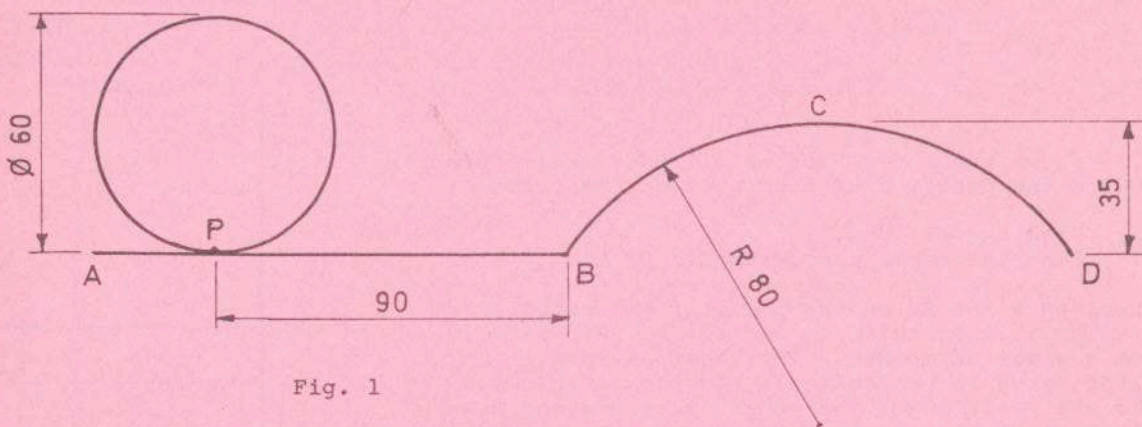

Fig. 1

3. Fig. 2 shows the elevation of a regular tetrahedron whose edges are 110 mm long. The face ABC is inclined at 45° to the horizontal plane as shown. The corner A is 50 mm from the vertical plane.

   (a) Draw the elevation and plan of the tetrahedron in the given position.

   (b) Determine the inclination of the face OAB to the horizontal plane. Hence draw the projections of a sphere which shall rest on the horizontal plane and touch the mid-point of the face OAB.
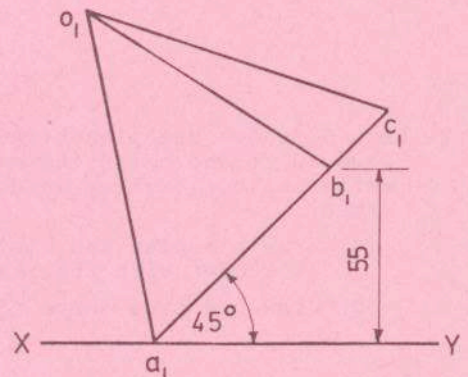

Fig. 2

OVER →

4. (a) Draw the diagram shown in Fig. 3.

   (b) Without altering the sides AB and AE, convert
       the figure ABCDE to a quadrilateral of
       equal area.

   (c) From E draw a line which shall divide the area
       of the figure ABCDE into two equal parts.

   (d) Using the line EF and continuing from F, draw a
       line which shall divide the figure ABCDE into two
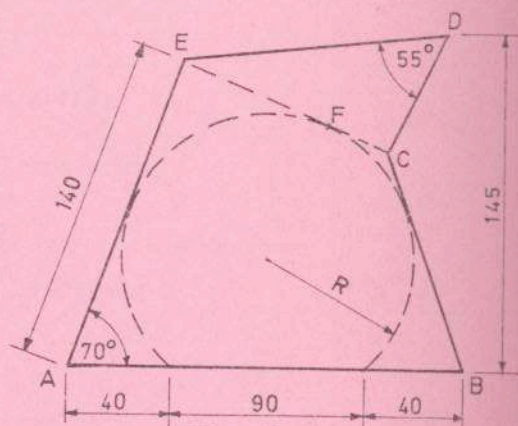   equal parts.

Fig. 3

5. Fig. 4 shows the incomplete projections of a rectangular pyramid and an equilateral
   triangular prism which penetrate each other.   The base of the pyramid is 110 mm by 80 mm
   and its height is 110 mm.   The sides of the equilateral triangle are 70 mm long.
   Complete the projections of the solids showing all lines of interpenetration.
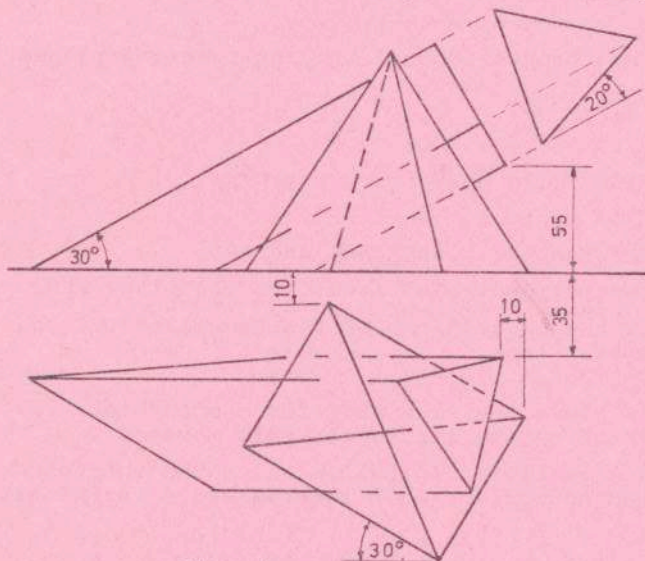
Fig. 4

6. (a) Fig. 5 shows the focus F of an ellipse, the directrix
       D-D and the position of a point P on the curve.

       (i) Draw the ellipse.
       (ii) Find the centre of curvature of the point P.

   (b) Two points A and B, on the curve of a hyperbola are
       55 mm apart and are 60 mm and 30 mm, respectively,
       from a given asymptote. The other asymptote
       to the curve is perpendicular to the given one.
       Find the position of the other asymptote and draw
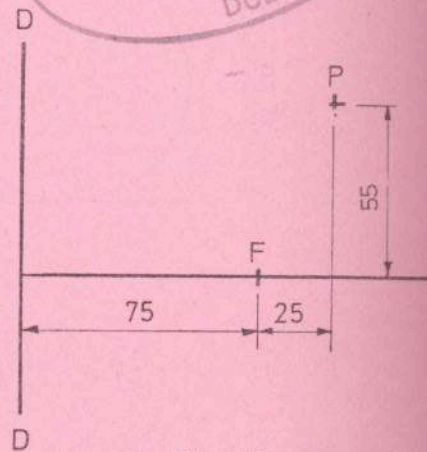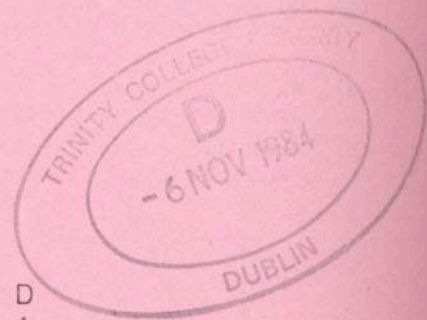   a portion of the curve.

Fig. 5

7. Fig. 6. shows the plan of a regular hexagonal pyramid, edge of
   base 40 mm and height 80 mm, resting on the horizontal plane,
   which has been cut by an oblique plane resulting in the section
   shown.

   (a) Draw the plan and elevation of the cut pyramid
       together with the traces of the oblique plane.

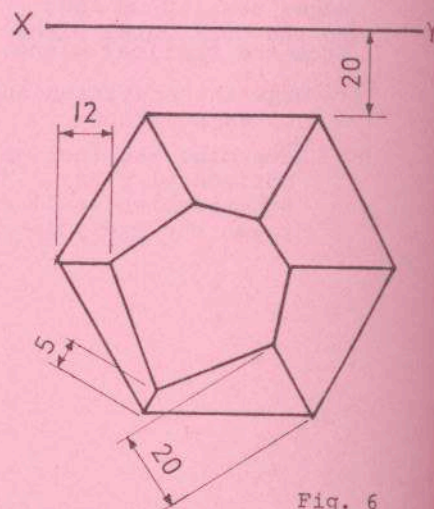   (b) Draw the true shape of the section.

Fig. 6