AN ROINN OIDEACHAIS

M.129

LEAVING CERTIFICATE EXAMINATION, 1985

TECHNICAL DRAWING - HIGHER LEVEL - PAPER I

(Plane and Solid Geometry)

TUESDAY, 25 JUNE - MORNING 9.30 to 12.30

(200 marks)

INSTRUCTIONS

Answer four questions.
All questions carry equal marks.
Construction lines must be shown on all solutions.
Write the number of the question distinctly on the answer paper.
All dimensions on the question paper are given in millimetres.
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 ADE.

$$A = 190 - 100 - 20$$
$$B = 140 - 15 - 75$$
$$C = 250 - 55 - 85$$
$$D = 150 - 55 - 100$$
$$E = 245 - 5 - 95$$

   (a) Find the dihedral angle between the planes.

   (b) Draw the plan and elevation of the perpendicular from D to the plane ABC.

   (c) On a separate diagram draw the projections of the skew lines BC and DE and show the plan and elevation of the shortest distance between them.

2. Fig. 1 shows the elevation of a cone with a point P on its surface.

   (a) Draw the plan and elevation of the cone and show the projections of the spiral which moves from the top to the bottom of the cone in one complete revolution and which passes through the point P.

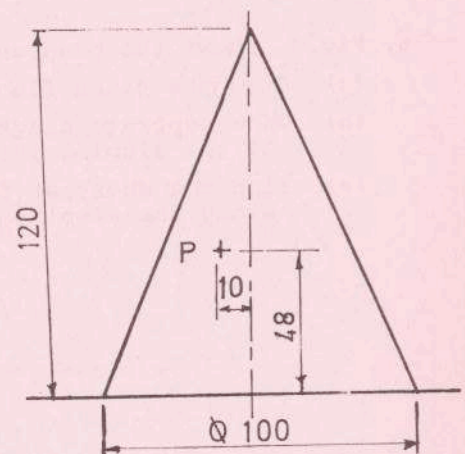   (b) Draw a tangent to the plan of the spiral at the point P.

Fig. 1

3. Fig. 2 shows a triangle ABC in which is contained a regular pentagon. The perimeter of the triangle ABC is 400 mm.

   (a) Draw the given figure.

   (b) Divide the area of the triangle ABC into three equal parts by drawing straight lines from D and E.

   (c) On a separate diagram draw the triangle ABC and inscribe in it a triangle similar to ABC having one vertex at E and the other two vertices on AC and BC, respectively.
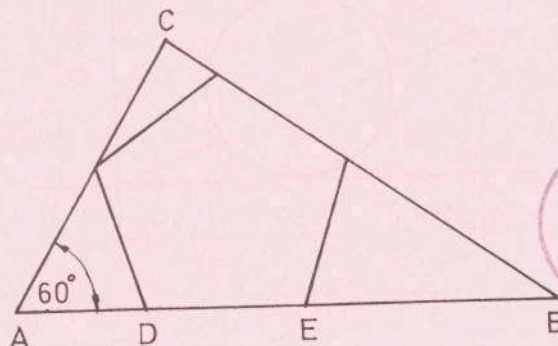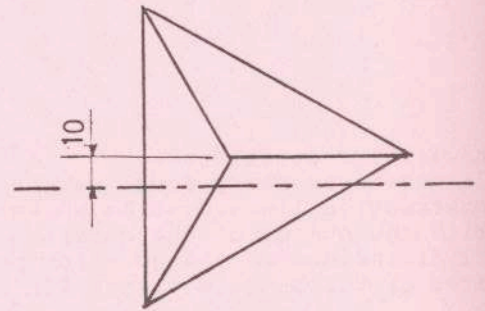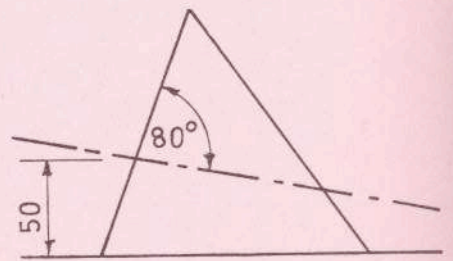

Fig. 2

OVER →

4. Fig. 3 shows the plan and elevation of a regular
   tetrahedron of 150 mm side. The figure also
   shows the projections of the centre-line of a
   circular hole of 50 mm diameter which is bored
   through the tetrahedron.
   Draw the given figure showing the projections
   of the hole.

Fig. 3

5. (a) Draw a straight line AFB where AF = 40 mm and FB =50 mm. If A and B be two
       points on the curve of an ellipse whose focus is F and whose eccentricity
       is 0.6, draw the curve. Find the centre of curvature at the point A.

   (b) The asymptotes of a hyperbola meet at an angle of 60°. The vertex of the
       curve is 35 mm from each asymptote. Draw a portion of the curve.
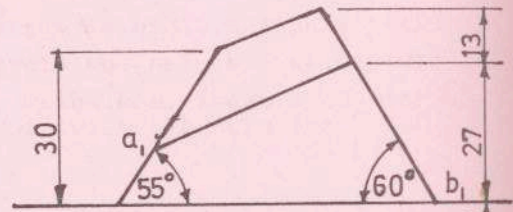
6. Fig. 4 shows the plan and elevation of a solid.

   (a) Draw the given figure.

   (b) On a separate diagram show the development
       of the sloping surfaces of the solid.

   (c) Find the shortest distance from A to B
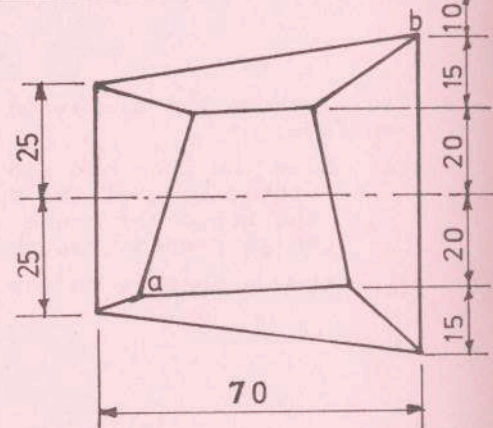   along the sloping surfaces of the solid.

Fig. 4

7. Fig. 5 shows the elevation of a cone and sphere in contact.

   (a) Draw the elevation, end view and plan of the solids showing the point of contact.

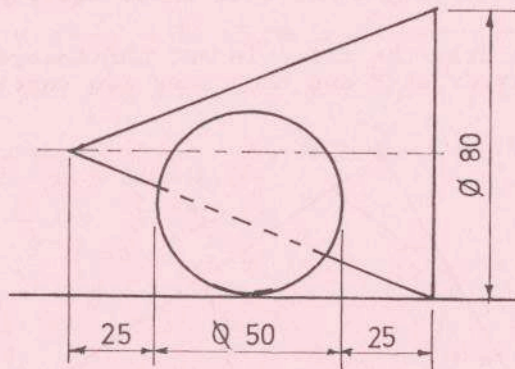   (b) Determine the traces of a tangent plane to the cone and sphere.

Fig. 5.