

## LEAVING CERTIFICATE EXAMINATION, 1993

## TECHNICAL DRAWING - HIGHER LEVEL - PAPER I

(Plane and Solid Geometry)

FRIDAY 18 JUNE - AFTERNOON, 2.00 to 5.00

(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.

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

|   |   |     |   |    |   |    |
|---|---|-----|---|----|---|----|
| A | = | 185 | - | 95 | - | 20 |
| B | = | 170 | - | 5  | - | 55 |
| C | = | 250 | - | 20 | - | 65 |
| D | = | 175 | - | 55 | - | 90 |
| E | = | 230 | - | 25 | - | 30 |

- (a) Determine the line of intersection between the planes.  
 (b) Determine the dihedral angle between the planes.  
 (c) Find the angle between the lines AB and AE.  
 (d) On a separate diagram, draw the projections of the skew lines BC and DE and show the projections of the shortest distance between them.

2. (a) Draw the diagram shown in Fig. 1.  
 (b) Divide the area of the triangle ABC into three equal parts by drawing a straight line from D and another straight line from E.

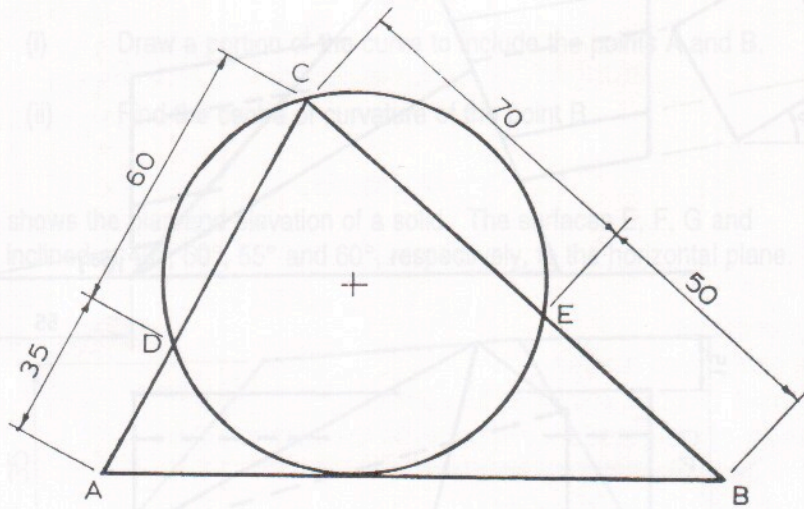


Fig. 1

3. (a) Draw the plan and elevation of a regular tetrahedron whose edges are 80 mm long and show the projections of the sphere which circumscribes it.

- (b) Fig 2. shows the elevation of two spheres and a right cone in contact with one another. Draw the elevation and plan of the solids in contact.

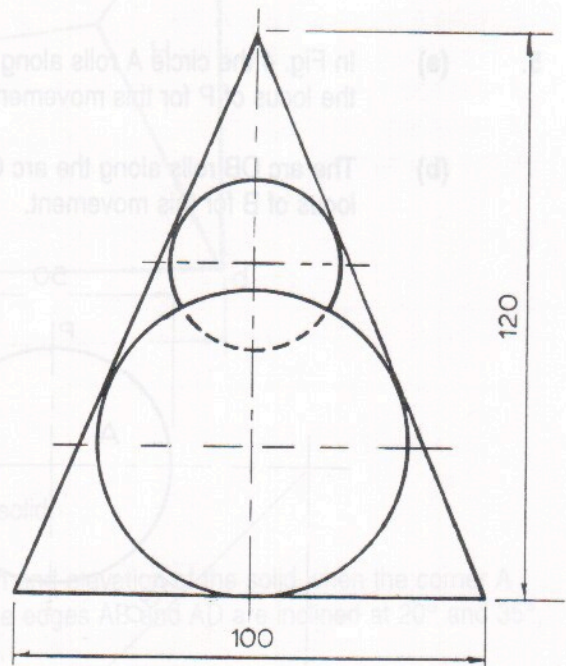


Fig. 2

4. A regular pentagonal right pyramid has a side of base 70 mm and an altitude of 120 mm and rests with one of its triangular faces on the horizontal plane as shown in Fig. 3. Also shown are the projections of a square prism of 40 mm side which penetrates the pyramid.

Draw the projections of the solids showing all lines of interpenetration.

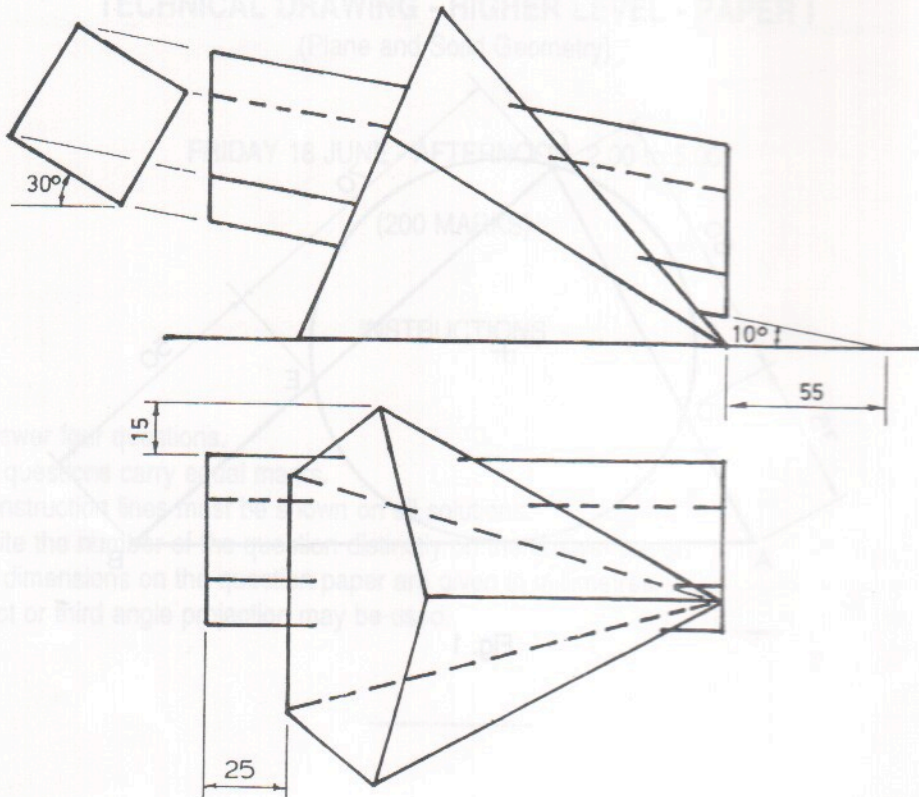


Fig. 3

5. (a) In Fig. 4 the circle A rolls along the arc OB until the point P reaches the point B. Plot the locus of P for this movement.
- (b) The arc OB rolls along the arc OC until the point B reaches the point C. Plot the locus of B for this movement.

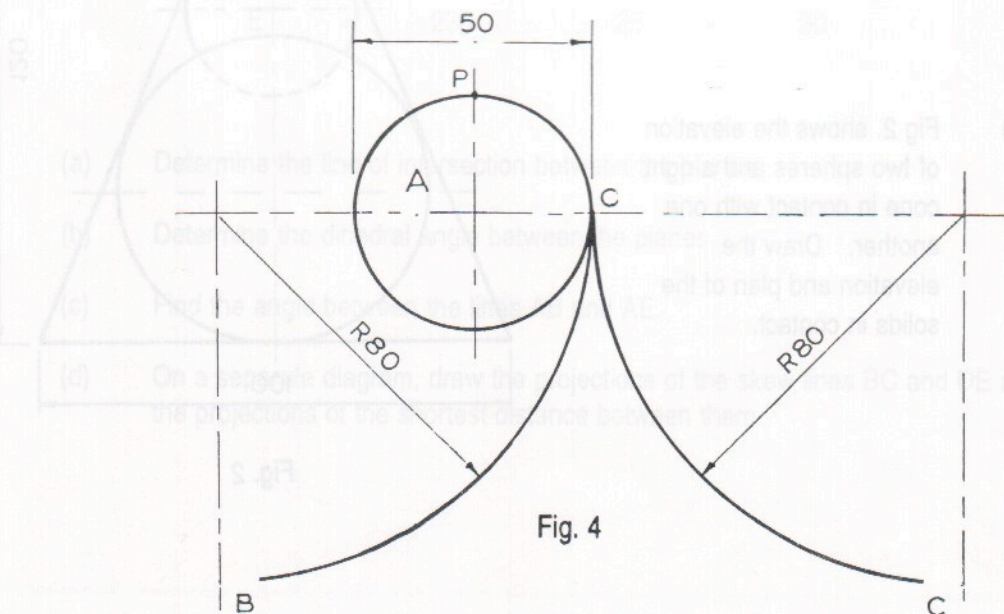


Fig. 4

6. (a) AB and AC are two tangents to a parabola and they meet at an angle of  $75^\circ$ . The focus of the parabola is 50 mm from AB and 30 mm from AC. Draw a portion of the curve.
- (b) Draw a straight line AFB where  $AF = 35$  mm and  $FB = 55$  mm. F is one of the focal points of an ellipse, A and B are points on the curve and the directrix is 55 mm from A.
- (i) Draw a portion of the curve to include the points A and B.
- (ii) Find the centre of curvature of the point B.

7. Fig. 5 shows the plan and elevation of a solid. The surfaces E, F, G and H are inclined at  $40^\circ$ ,  $50^\circ$ ,  $55^\circ$  and  $60^\circ$ , respectively, to the horizontal plane.

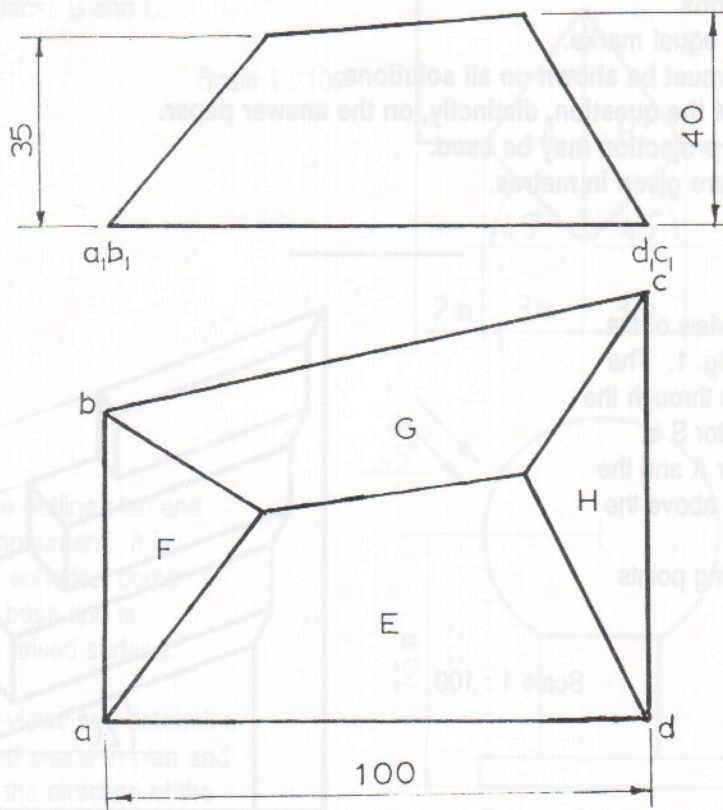


Fig. 5

- (a) Draw the plan and elevation of the solid.
- (b) On a separate diagram, draw a plan and elevation of the solid when the corner A rests on the horizontal plane and the edges AB and AD are inclined at  $20^\circ$  and  $35^\circ$ , respectively, to the horizontal plane.