

LEAVING CERTIFICATE EXAMINATION, 1988

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

WEDNESDAY, 22 JUNE - AFTERNOON, 2.00 to 5.00

(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.

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

A	=	190	-	10	-	15
B	=	240	-	55	-	95
C	=	130	-	70	-	35
D	=	250	-	5	-	80
E	=	205	-	90	-	25
F	=	140	-	25	-	55

- Determine the line of intersection between the planes.
- Find the dihedral angle between the planes.
- Draw the plan and elevation of the perpendicular from E to the plane ABC. Hence, determine the inclination of EF to the plane ABC.
- On a separate diagram, draw the projections of the skew lines AB and DF and determine the shortest horizontal distance between them.

- In Fig. 1 the triangle ACD is similar to the triangle ABC. Draw the given figure.
 - Draw a figure similar to ABCD and having an area equal to a square of 80 mm side.
 - In Fig. 1 the lines AB, AC and AD may be considered as the lengths of consecutive radii at 30° intervals of a logarithmic spiral. On a separate diagram show a construction for finding subsequent radii and show the length of the tenth radius.

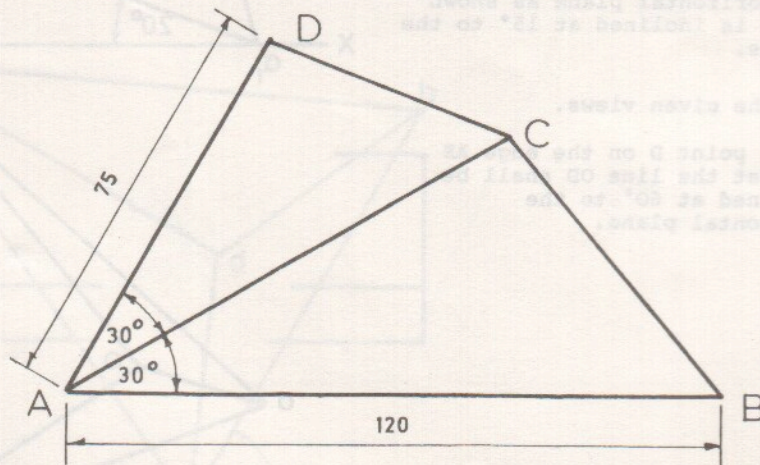


Fig. 1

3. Fig. 2 shows the elevation of a right cone of diameter 100 mm standing on the horizontal plane. Also shown is a generator OA having two points B and C marked on it.

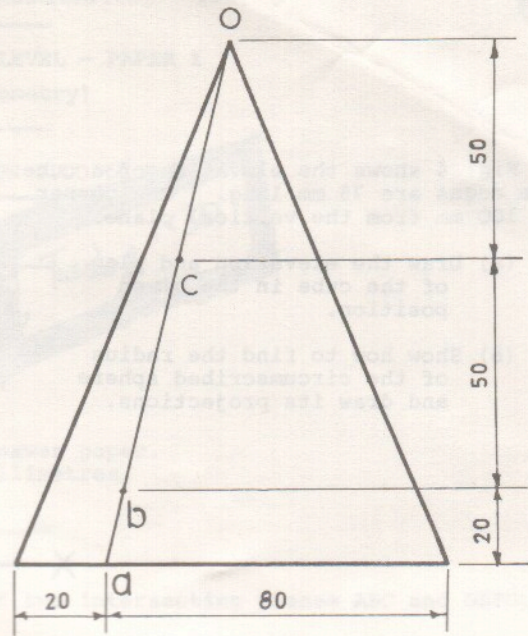


Fig. 2

(a) Draw the elevation and plan of the cone and show the projections of the spiral which moves from the apex to the base of the cone and which passes through the points B and C. The spiral makes one complete revolution in going from B to C.

(b) On a separate diagram show:-

- (i) the projections of a sphere S which rests on the horizontal plane and touches the cone at the point B,
- (ii) the projections of another sphere which touches the cone at the point C and is in contact with sphere S.

4. Fig. 3 shows the incomplete projections of a solid with a square base of 80 mm side and an equilateral triangular prism of 60 mm side which penetrate each other. Complete the projections of the solids showing all lines of interpenetration.

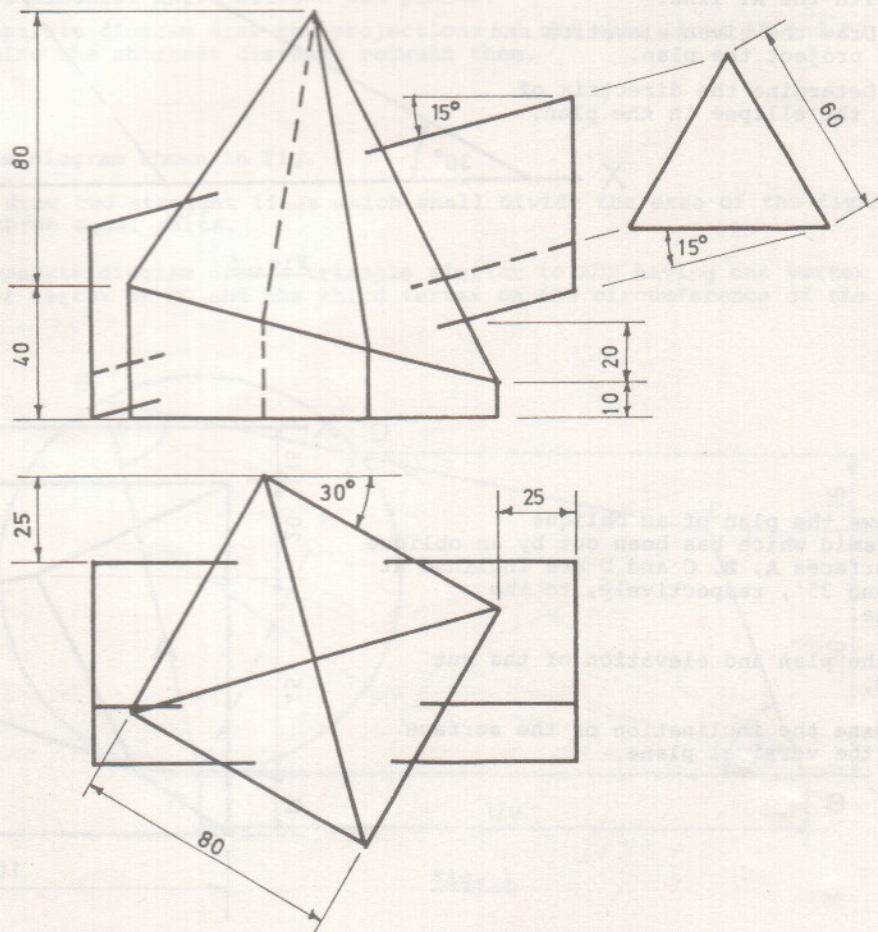


Fig. 3

5. Fig. 4 shows the elevation of a cube whose edges are 75 mm long. The corner A is 100 mm from the vertical plane.

- (a) Draw the elevation and plan of the cube in the given position.
- (b) Show how to find the radius of the circumscribed sphere and draw its projections.

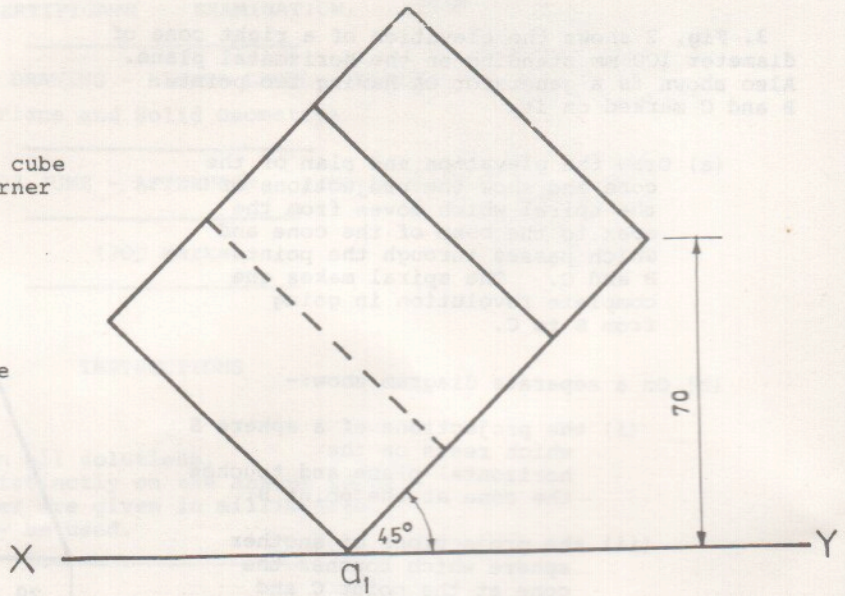


Fig. 4

6. (a) Two lines, AB and AF, meet at an angle of 35° and AF is 80 mm long. AB is the tangent to a parabola, F is the focus and A is on the directrix. Draw a portion of the parabola.

(b) Fig. 5 shows the elevation of a right cone which has been cut by the horizontal plane. The plan of the axis OA makes an angle of 45° with the XY line.

- (i) Draw the given elevation and project the plan.
- (ii) Determine the directrix of the ellipse in the plan.

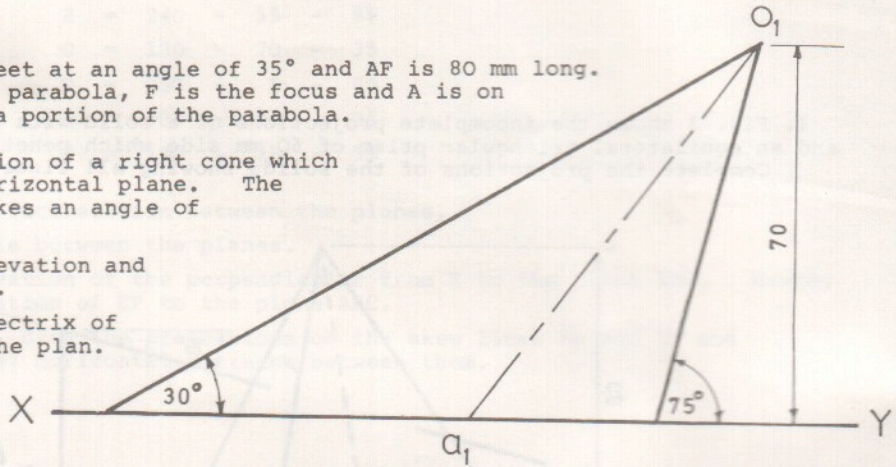


Fig. 5

7. Fig. 6 shows the plan of an oblique rectangular pyramid which has been cut by an oblique plane. The surfaces A, B, C and D are inclined at 50° , 60° , 70° and 35° , respectively, to the horizontal plane.

- (a) Draw the plan and elevation of the cut solid.
- (b) Determine the inclination of the surface D to the vertical plane.

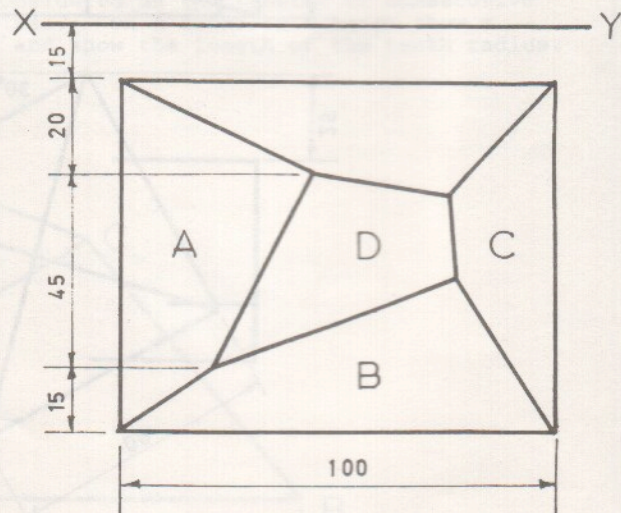


Fig. 6