LEAVING CERTIFICATE EXAMINATION. 1987

TECHNICAL DRAWING - HIGHER LEVEL - PAPER II(B)

BUILDING APPLICATIONS

FRIDAY, 26 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) First or third angle projection may be used.
(f) All measurements are given in metres or millimetres.

1. Fig. 1 shows the outline plan and elevation of a hyperbolic paraboloid roof shell system.
   (a) Draw the given plan and elevation showing the nine elements in each direction on the surfaces.
   (b) Draw an elevation of the roof in which the true length of the element AD will be seen.
   (c) Determine the plane director for one set of elements on the surface ABCD.

   Scale 1 : 500

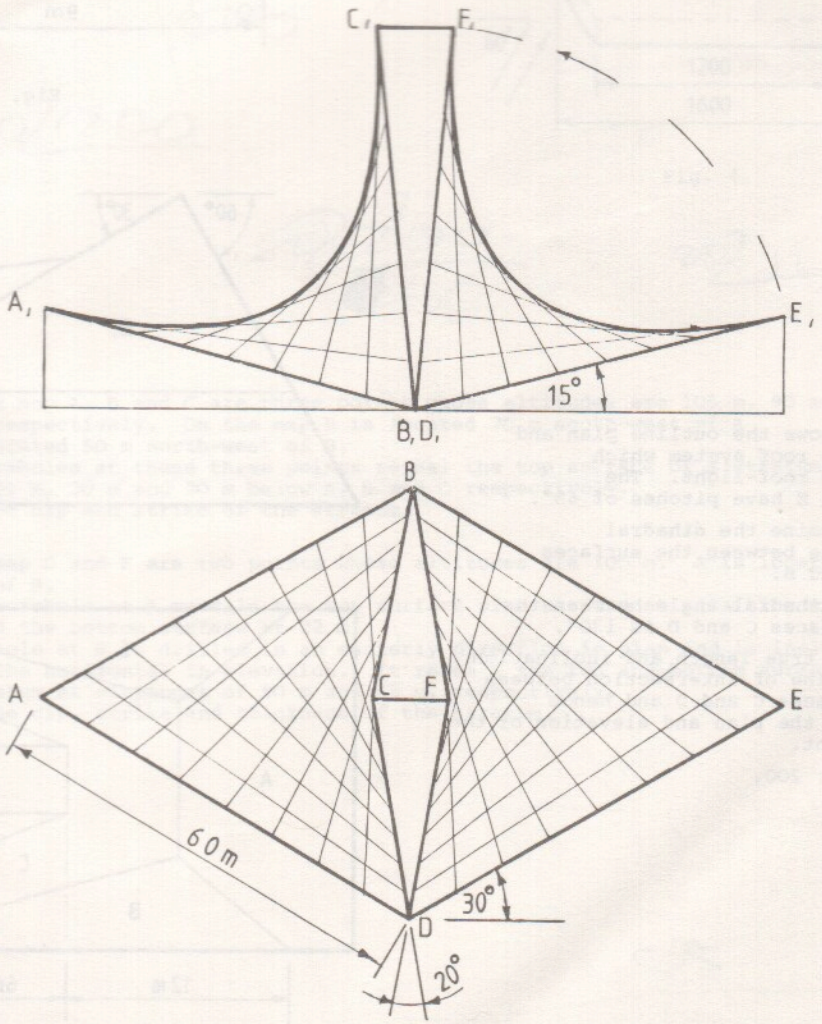

Fig. 1.

2. Draw a perspective view of the structure shown in plan and elevation in Fig. 2.

The picture plane touches the corner A and the spectator is 10 m from the picture plane. The horizon line is 7 m above the ground line.

Use auxiliary vanishing points where appropriate.

Scale 1 : 100

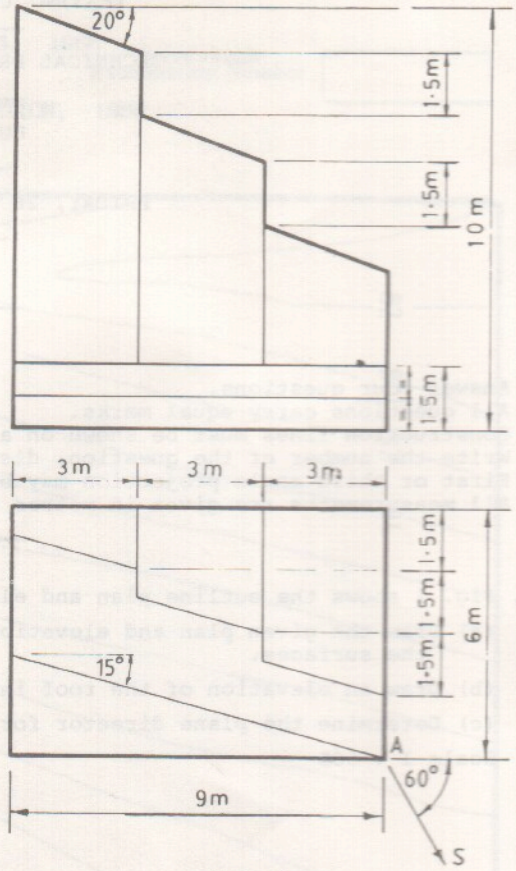

Fig. 2.

3. Fig. 3 shows the outline plan and elevation of a roof system which incorporates a roof-light. The surfaces B and E have pitches of 65°.

(a) Determine the dihedral angle between the surfaces A and B.

(b) The dihedral angle between the surfaces C and D is 130°.

Find the true length and inclination of the line of intersection between the surfaces C and D and hence complete the plan and elevation of the roof-light.

Scale 1 : 200.

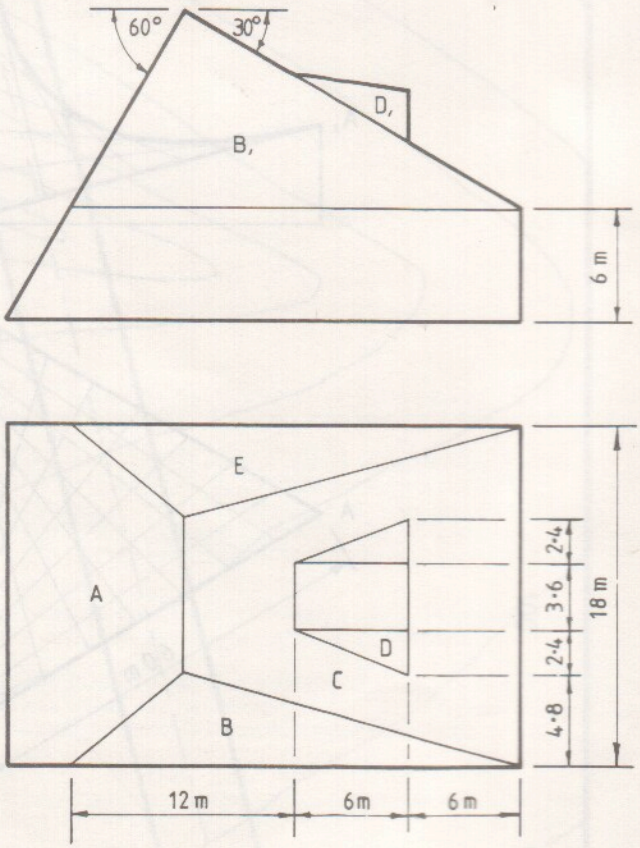

Fig. 3.

4. Fig. 4 shows the outline plan and elevation of a shelter.
Draw the given views and determine the shadows and shade on the shelter in plan and elevation when the direction of the light is as shown in the figure.

Scale 1 : 20.

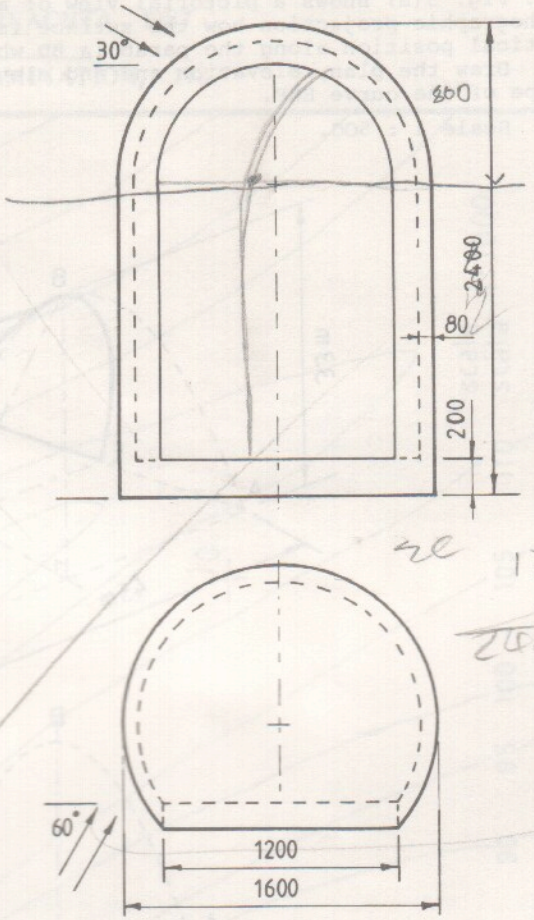

Fig. 4.

5. (a) On a contour map A, B and C are three points whose altitudes are 105 m, 90 m and 50 m, respectively. On the map B is located 70 m south-west of A and C is located 50 m north-west of B.
Vertical boreholes at these three points reveal the top surface of a stratum of ore at 92 m, 30 m and 20 m below A, B and C respectively.
Determine the dip and strike of the stratum.

(b) On another map D and E are two points whose altitudes are 100 m. A is located 60 m west of B.
A vertical borehole at A reveals the top surface of a stratum at an altitude of 65 m and the bottom surface at 22 m.
A skew borehole at B is drilled in an easterly direction in plan and is inclined at 75° to the horizontal in elevation. It reveals the top and bottom surfaces of the stratum at altitudes of 80 m and 45 m, respectively.
Determine the dip, strike and thickness of the stratum.

Scale 1 : 1000.

6. Fig. 5(a) shows a pictorial view of a shell structure. Fig. 5(b) shows in orthographic projection how the surface is generated by moving the parabola ABC in a vertical position along the parabola BD whose vertex is at D (broken lines).

Draw the plan, elevation and end elevation of the structure and determine the true shape of the curve EBF.

Scale 1 : 500.

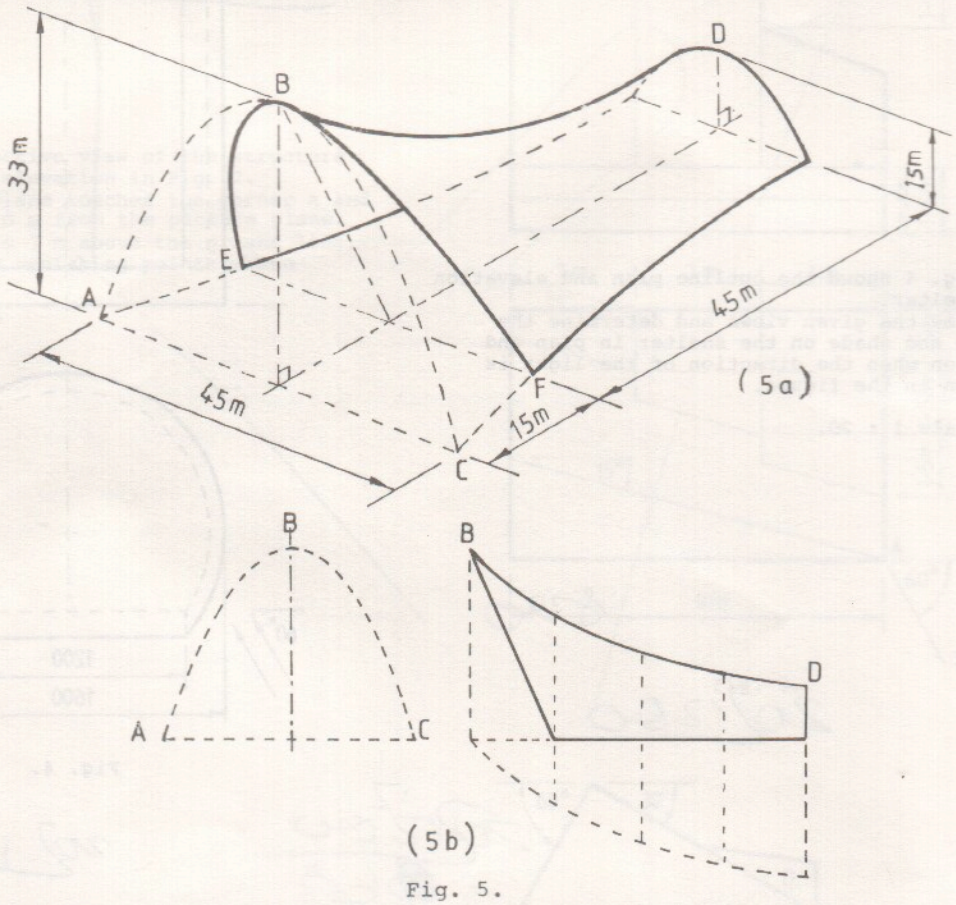

Fig. 5.

. The accompanying drawing shows ground contours at five metre vertical intervals. ABC is the line of a proposed roadway having O as the centre of the circular curve. The roadway has the following specification:

(i) formation width 16 m;
(ii) formation level at A 95 m;
(iii) A to B is level, gradient B to C is 1 in 20 falling;
(iv) side slopes for cuttings 1 in 1.5;
(v) side slopes for embankments 1 in 2;

On the drawing supplied, show the outline of the earthworks necessary to accommodate the roadway.

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