LEAVING CERTIFICATE EXAMINATION, 1986

TECHNICAL DRAWING - HIGHER LEVEL - PAPER II (B)

BUILDING APPLICATIONS

THURSDAY, 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 building. The plan of the building is a regular hexagon and the lower parts of the roof surfaces have pitches of 30°.

(a) Draw the given plan and elevation.

(b) Determine the dihedral angle between the lower roof surfaces.

(c) Develop the true shape of any one of the roof surfaces.

Scale 1 : 200.

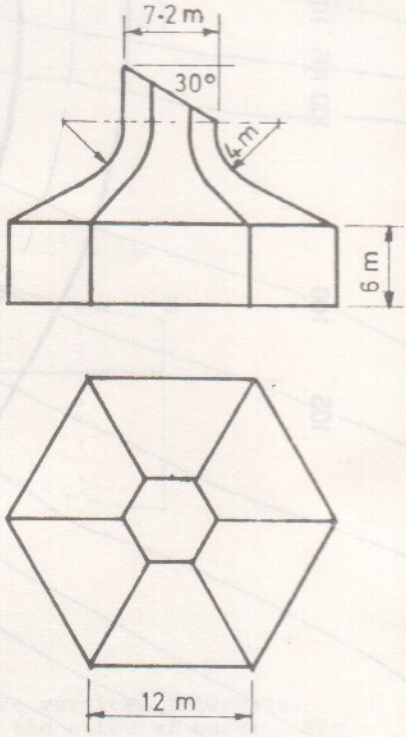


Fig. 1

2. Fig. 2 shows the outline plan of a hyperbolic paraboloid roof shell having AB and CD as directrices. Six elements in one direction are also shown. The corners A, B, C and D are 7 m, 37 m, 7 m and 27 m above ground level, respectively.

(a) Draw the plan and elevation to show elements in both directions.

(b) Show the curvature of the roof along the diagonal BD.

(c) Draw an elevation of the roof in which the true length of the element BC will be seen.

(d) Determine the plane director for the six elements shown in the diagram.

Scale 1 : 500.

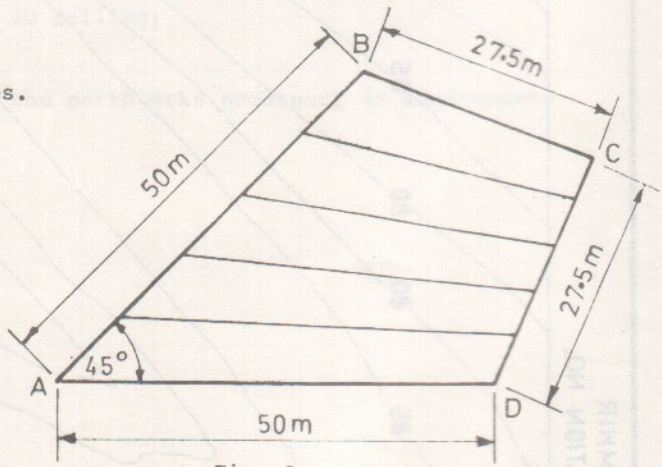


Fig. 2

3. Fig. 3 shows a sketch of a shell structure. All vertical cross-section of the structure are parabolas. The curves AB and DC are hyperbolas with BC as the transverse axis. The curve EF on the summit of the structure is a semi-parabola with its vertex at F.

Draw the elevation, plan and end view of the structure.

Scale 1 : 200.

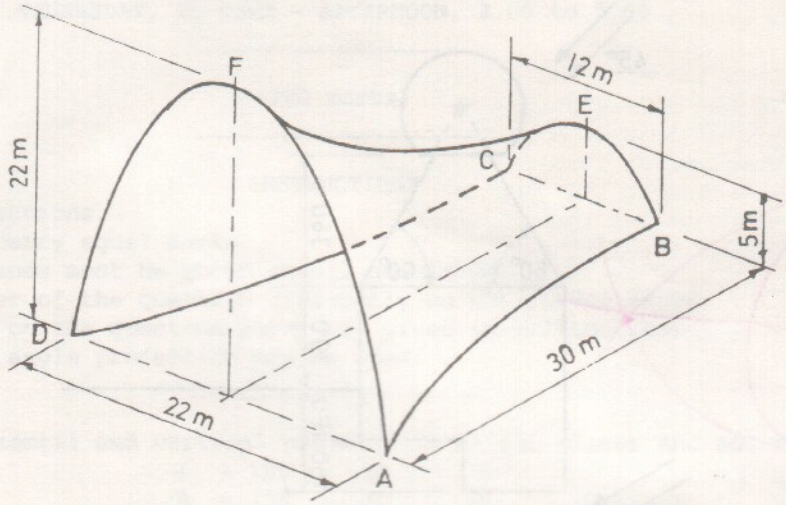
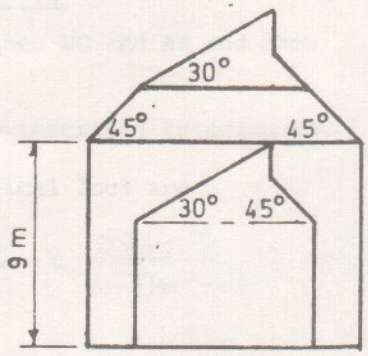


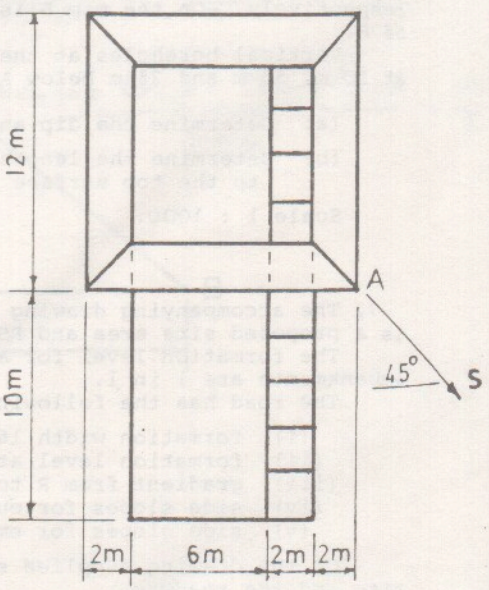
Fig. 3



4. Fig. 4 shows the outline plan and elevation of a building.

Draw a perspective view of the building when the picture plane touches the corner A and the spectator is 25 m from the picture plane. The horizon line is 5 m above the ground line.

Scale 1 : 200.



5. Fig. 5 shows the projections of a gate pier and entrance steps to a building.
Draw the given views and determine the shadows cast in plan when the direction of the light is as shown.
Also determine the outline of the shade on the spherical part in plan and elevation.

Scale 1 : 10.

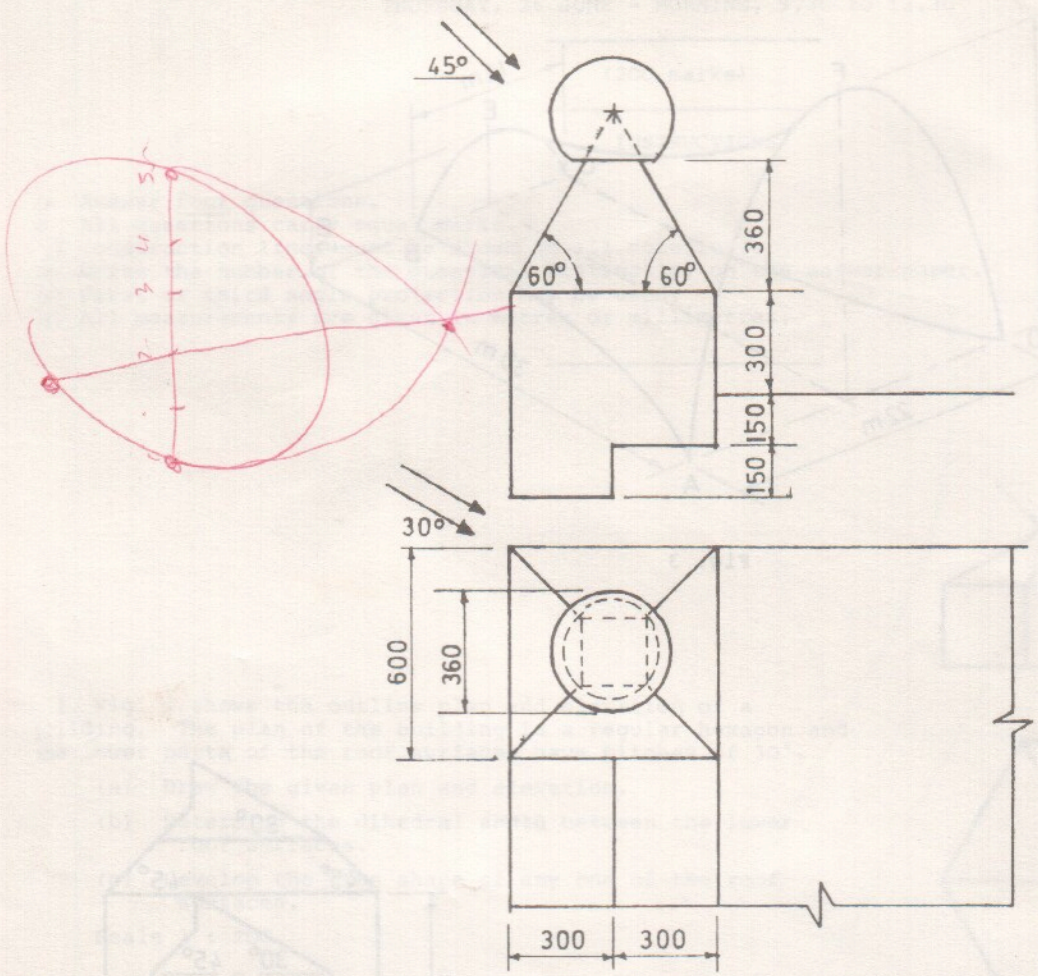


Fig. 5

6. On a contour map, A, B and C are three points whose altitudes are 110 m, 95 m and 80 m, respectively. On the map B is located 80 m south-east of A and C is located 55 m north-east of B.
Vertical boreholes at these three points reveal the top surface of a stratum of ore at 10 m, 55 m and 25 m below A, B and C, respectively.

(a) Determine the dip and strike of the stratum.

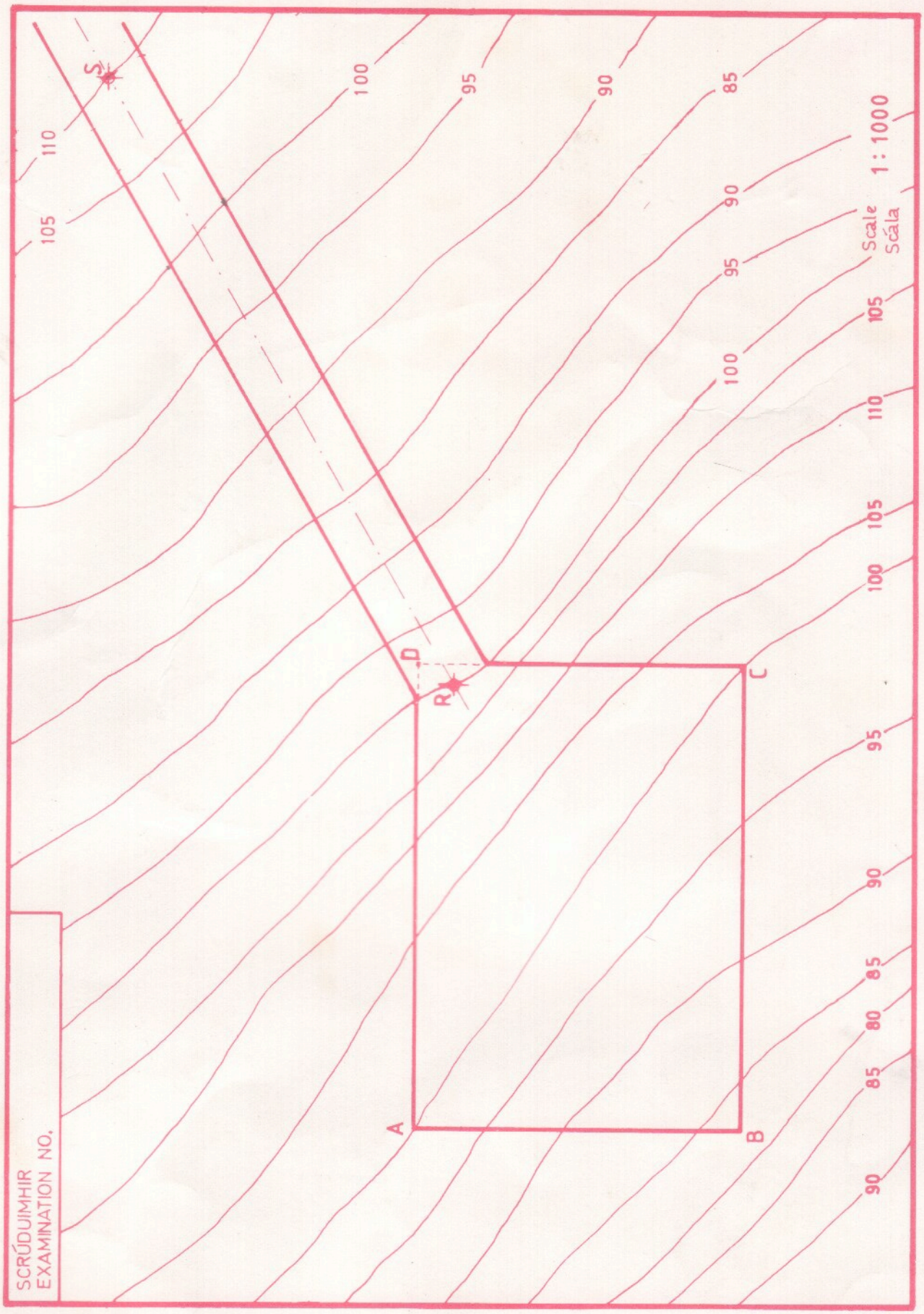
(b) Determine the length and the direction of the shortest skew borehole from B to the top surface of the stratum.

Scale 1 : 1000.

7. The accompanying drawing shows ground contours at five-metre vertical intervals. ABCD is a proposed site area and RS is the centre line of a proposed access road.
The formation level for ABCD is 100 m and the side slopes for cuttings and embankments are 1 in 1.
The road has the following specification:-

(i) formation width 16 m;
(ii) formation level at R 100 m;
(iii) gradient from R to S 1 in 25 rising;
(iv) side slopes for cuttings 1 in 1.
(v) side slopes for embankments 1 in 2.

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


SCRÚDUIMHIR
EXAMINATION NO.
Scale
Scála 1:1000
S
R
D
A
B
C
110
105
100
95
90
85
80