Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination 2006

Technical Drawing
Paper II(B) – Higher Level
(Building Applications)

(200 Marks)

Friday 16 June
Afternoon, 2.00 - 5.00

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) Work on one side of the paper only.
(f) All dimensions on the question paper are given in metres or millimetres.
(g) First or third angle projection may be used.

1. Draw a perspective view of the structure shown in Fig. 1. The picture plane passes through the corner A, the spectator S is 10m from the corner A and the horizon line is 9m above the ground line.

Use auxiliary vanishing points where appropriate.
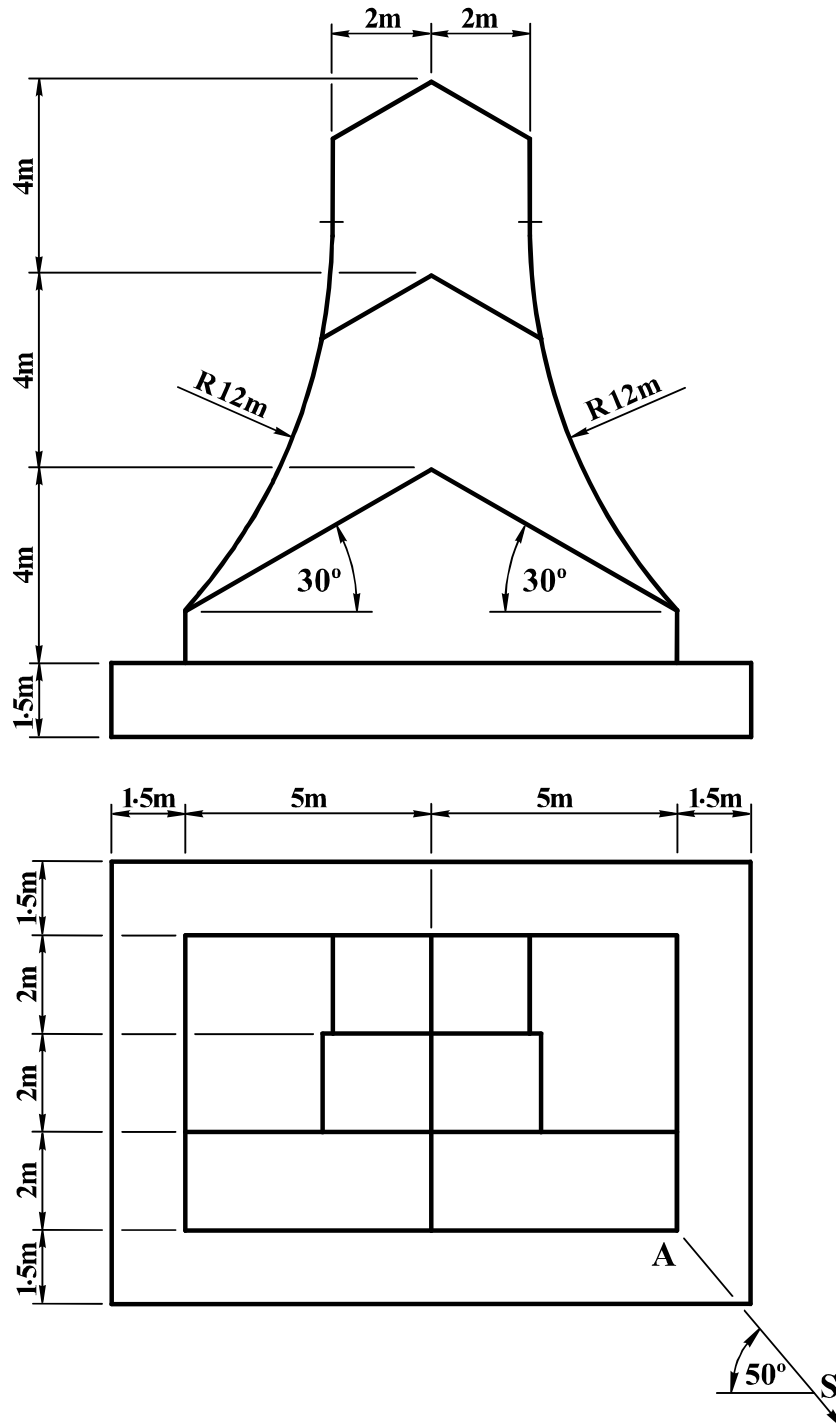
Scale 1 : 100

Fig. 1

2. Fig. 2 shows the outline plan, elevation and end elevation of roof surfaces and a dormer window.

    (a) Surfaces A and B have pitches of 40° and 35° respectively. Draw the plan, elevation and end elevation of these two surfaces and determine the dihedral angle between them.

    (b) Develop the surface A.

    (c) The dihedral angle between the surfaces B and C is 135°.

        Complete the plan and elevation of surface C.

    (d) The dormer surfaces D and E have pitches of 40° and 55° respectively.

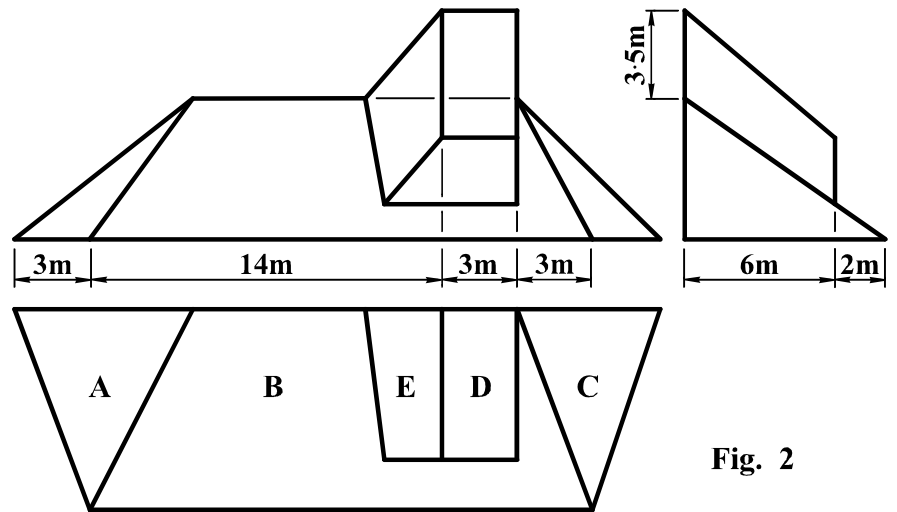   Complete the plan, elevation and end elevation of the roof and dormer window.

            Scale 1 : 100

3·5m
3m | 14m | 3m | 3m | 6m | 2m

A   B   E D   C

Fig. 2

3. Fig. 3 shows the plan, elevation and pictorial sketch of a sculpture.

Draw the given plan and elevation. Determine the shadows and shade in plan when the direction of the light is as shown.
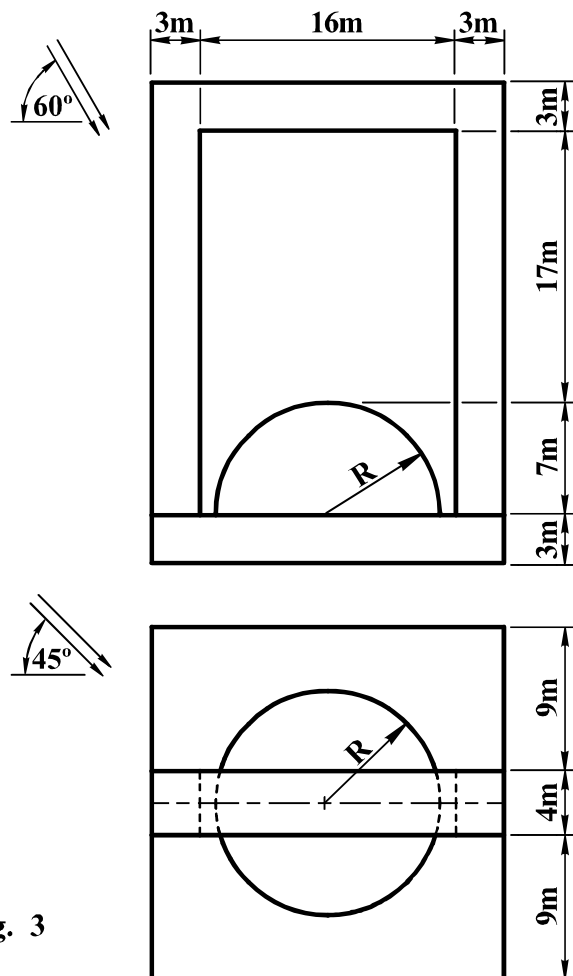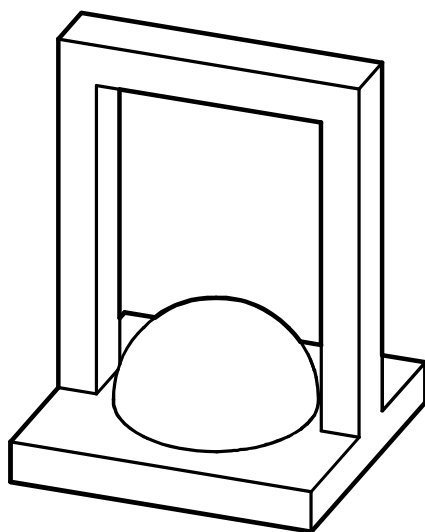
        Scale 1 : 200

60°

3m | 16m | 3m

3m

17m

R

7m

3m

45°

9m

R

4m

9m

Fig. 3

4. Fig. 4 shows the plan, elevation and pictorial sketch of a building in the form of a portion of a hyperboloid of revolution which is surmounted by a dome. The true lengths of the straight line elements for the complete hyperboloid of revolution are 40m. The outline of the entrance to the building, which is a parabola in elevation, is also shown.

    (a) Draw the given plan and elevation.
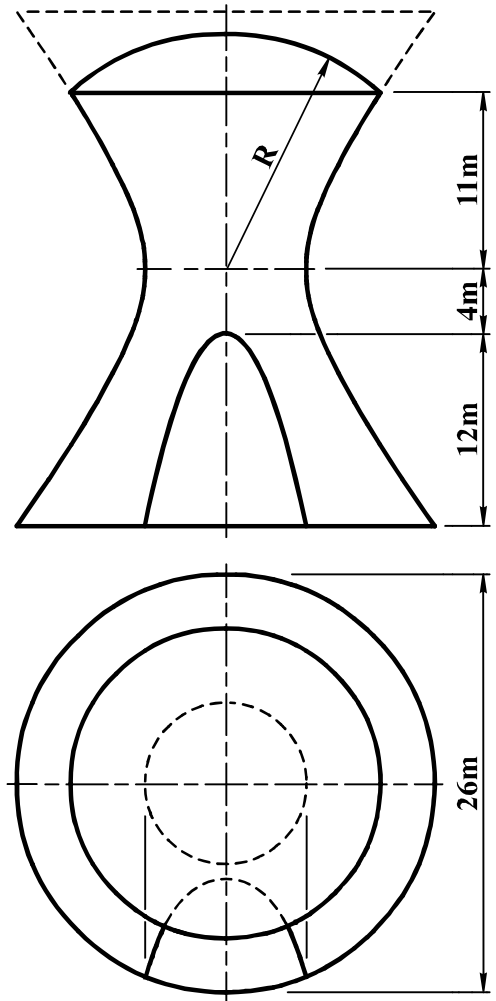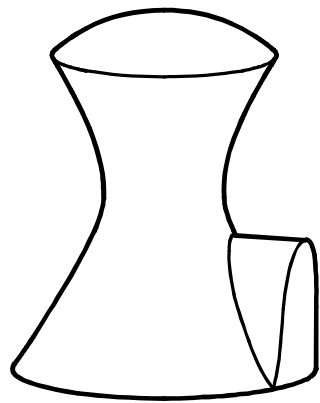
    (b) Project an end elevation.

    Scale 1 : 200

Fig. 4

5. (a) On a contour map A and B are two points whose altitudes are 105m and 95m respectively. On the map B is located 90m south-east of A. A skew bore-hole at A is drilled in a south-westerly direction in plan and has an actual inclination of 50° to the horizontal plane. It reveals the top and bottom surfaces of a stratum at distances of 50m and 90m, respectively, from A.

    A skew bore-hole at B is drilled in a north-westerly direction in plan and has an actual inclination of 60° to the horizontal plane. It reveals the top and bottom surfaces of the stratum at distances of 20m and 100m, respectively, from B.

    Determine the dip, strike and thickness of the stratum.

    (b) On a seperate contour map R and S are two points whose altitudes are 115m and 100m respectively. On the map S is located 90m north-east of R. A skew bore-hole at R is drilled in a northerly direction in plan and has an actual inclination of 55° to the horizontal plane. It reveals the top and bottom surfaces of a stratum at altitudes of 80m and 35m, respectively. A vertical bore-hole at S reveals the top surface of the stratum at an altitude of 50m. The strike of the stratum is north 65° west (i.e. 65° west of north).

    Determine the dip and thickness of the stratum.

    Scale 1 : 1000

6. Fig. 5 shows the outline plan and elevation of a hyperbolic paraboloid canopy for use over an outdoor swimming pool. The canopy is formed by shaping and extending the hyperbolic paraboloid surface ABCD.

(a) Draw the given plan and elevation.

(b) A plane director for the elements AD and BC is positioned so that it contains point P. Draw the traces for this plane director.
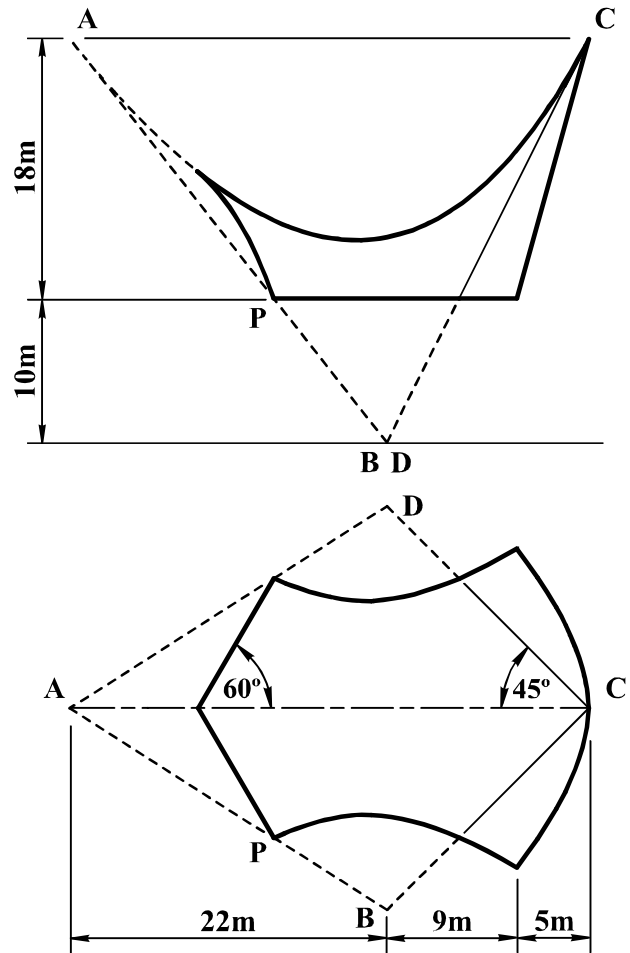
Scale 1 : 200

Fig. 5

7. The accompanying drawing shows ground contours at five-metre vertical intervals. ABC is the line of a proposed roadway which is shaped as shown. A is the centre of the circular arc.

The roadway has the following specification:-

(i) formation widths are as shown;

(ii) formation level at B is 65m;

(iii) A to B is level;

(iv) gradient B to C is 1 in 11 rising;

(v) side slope for cuttings is 1 in 1·5;

(vi) side slope for embankments is 1 in 2.

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

BLANK PAGE