TECHNICAL DRAWING - COMMON LEVEL - PAPER I

(Plane and Solid Geometry)

TUESDAY, 14 JUNE - AFTERNOON, 2 to 4.30

INSTRUCTIONS

(a) Answer <u>four</u> 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) <u>All dimensions on the question paper are given in millimetres.</u>
(f) First or third angle projection may be used.

1. Fig. 1 shows a solid in which the surface ABCD rests on the horizontal plane and the edge BC is perpendicular to the vertical plane. The line EK makes an angle of 30° with the edge EF.

   (a) Draw the plan and elevation of the solid showing the line EK on both views.

   (b) Draw the plan and elevation of a line on the surface EFGH which shall pass through the point F and shall be inclined at 15° to the horizontal plane. Scale 1 : 1.

2. (a) The line AB in fig. 2(a) is the axis of a parabola and the line DD is the directrix. P is a point on the curve and F shows the position of the focus.
Show how to locate the focus and draw the curve. Draw two tangents to the curve from Q showing clearly how to find the points of contact.

   (b) Fig. 2(b) shows the direction of the major axis of an ellipse, F_1 being a focal point. Line TS is a tangent to the curve at N.
Find the other focal point, the length of the major axis and one directrix. Scale 1 : 1.

3. Fig. 3 shows the plan and elevation of a solid cut by the oblique plane VTH. Draw the plan and elevation of the intersection of the solid and the oblique plane. Determine the angle between the surface A and the oblique plane. Scale 1 : 1.

4. The elevation and incomplete plan of a solid are given in Fig. 4.

   (a) Draw the elevation, complete the plan and find the true shape of the surface A.

   (b) Draw a new plan and elevation of this solid when the surface B rests on the horizontal plane. Scale 1 : 1.

5. Construct a diagonal scale of 1 : 50 which may be used to read metres and hundredths of metres up to 5 metres.
Using the scale for all measurements, construct the pentagon ABCDE shown in Fig. 5 given that the triangle ADE is similar to the triangle ABC.
With AB as base construct a rectangle which shall have an area equal to the pentagon ABCDE.

6. The incomplete elevation and incomplete plan of two square-based prisms of side 35 mm penetrating a truncated regular pentagonal pyramid are given in fig. 6.
Draw the plan and elevation of the solids and show clearly all lines of interpenetration. Scale 1 : 1.

7. Fig. 7 shows a plate cam which rotates clockwise at constant speed and which lifts the rod AB vertically for a distance of 28 mm before it falls. During this movement the crank OC makes a full clockwise rotation about O at constant speed. The rods BD and CD are pivoted at B and C respectively.

   (a) Draw the locus of D during one revolution of the crank OC and the corresponding rise in the rod AB.

   (b) The outline of the cam is an Archimeadean Spiral. Show clearly how to find the centre for the spiral and draw the curve. Scale 1 : 1.

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LEAVING CERTIFICATE EXAMINATION   TECHNICAL DRAWING—1   PLANE & SOLID GEOMETRY

1

G, H, K, C, F, D, E, B, A
55, 20, 30°, 90, 70

2(a)

A, F, D, P, Q, D, B
50°, 35

2(b)

T, N, S, H
82, 30°
Major axis
Mór ais
F_1, 65

3

V
90, 60, 25
30°, 45°, T, 10, 15°, A, 85, H

4

30, 40, 30
65
15, Ø 70, 15
50, B
30, A

5

D, 3480, C
90°
E
A, B
4740, 2770, 720

6

55, 20
30°
60
10
55
60

7

C
65, 25
D, O, 90
75
28, 20
B
50, A, R6