

Leaving Certificate Examination

Design & Communication Graphics Ordinary Level Sections B and C (180 Marks)

Sample Examination Paper 3 Hours Duration

This examination is divided into three sections:

SECTION A(Core - Short Questions)SECTION B(Core - Long Questions)SECTION C(Applied Graphics - Long Questions)

SECTION A	 Four questions are presented Answer any three on the accompanying A3 examination paper All questions in Section A carry 20 marks

- Three questions are presented
- **SECTION B** Answer any two on A3 drawing paper
 - All questions in Section B carry **45 marks**

Five questions are presented
SECTION C
Answer any two (i.e. the options you have studied) on A3 drawing paper
All questions in Section C carry 45 marks

General Instructions:

- Construction lines must be shown on all solutions
- Write the question number distinctly on the answer paper in Sections B and C
- Work on one side of the drawing paper only
- All dimensions are given in metres or millimetres
- Write your Examination number in the box provided on section A and on all other sheets used

SECTION B - Core

Answer Any Two questions from this section on A3 drawing paper

Scale 1:1

B-1. The 3D graphic on the right shows part of a display stand from a jewellery shop. The drawing in Fig. B-1 below shows how the stand is cut to form the sloping display surface.

The stand consists of a truncated regular pentagonal pyramid of 40mm side. The pyramid stands inverted on a regular pentagonal prism, which is also of 40mm side.

(a) Draw the given plan and elevation.

(Use a vertical orientation for the A3 sheet to maximise space)

(b) Draw the projections of the jewellery stand when cut by the oblique plane VTH.





Fig. B-1

B-2. The 3D graphic on the right shows an arrangement of playground equipment consisting of intersecting geometric forms.

Fig. B-2 below shows the plan and elevation of part of the arrangement, where a rectangular based prism is intersected by an irregular pentagonal prism.

Note: The 3D graphic shows wall thickness but, for the purposes of your drawing, assume that the objects are solid.

Draw the given plan and elevation. Project an end elevation of the solids and complete the elevation showing all lines of interpenetration.







Fig. B-2

B-3. Fig. B-3 shows the projections of a piece of sculpture which has been designed for the entrance to a company which manufactures video games consoles.A 3D graphic is also shown.

The plan of the sculpture is in the form of an ellipse and two parabolas as shown.

Note: The pictorial view shows engraved text which may be ignored for the purpose of your drawing.

- (a) Draw the given plan and elevation.
- (b) Project an end view in the direction of the arrow.





Fig. B-3

SECTION C - Applied Graphics

Answer **Any Two** questions (i.e. the options you have studied) from this section on A3 drawing paper

Dynamic Mechanisms

- **C-1. (a)** Fig. C-1(a) shows two wheels of a steam train. The wheels are joined by a crank as shown. Point P is on the circumference of the front wheel and point M is the midpoint of the crank. The wheels roll forward along the track as shown.
 - (i) Draw the locus of point P for half of one revolution of the wheels.
 - (ii) Draw the locus of point M for the same movement.



(b) Scissor lifts are widely used to access heights. The diagram in fig C-1(b) shows the outline of such a lift. The upper platform CD is to be raised, with AB remaining on the ground.

All of the links are 1m long and all pivot joints are represented by circles. The pivot joint O, which is midway along the links, will always be halfway between the lower platform AB and the upper platform CD.

- (iii) Draw a line diagram to represent the mechanism at the initial height of 0.4m.
- (iv) Find the position of point P when the platform CD has been raised to a height of 2.4m.
- (v) Plot the locus of P for the upward movement.





Fig. C-1(b)

Page 5 of 9

Structural Forms

C-2. (a) Fig. C-2(a) shows the plan and elevation of a drinking glass. A 3D graphic of the glass is also shown.

The body of the glass is in the form of a hyperboloid of revolution and the base is shaped as shown.

Draw the given plan and elevation of the glass.

Scale 1:1



Fig. C-2(a)

100

65

- (b) The plan and elevation of the outline of a metal pendant are shown in Fig. C-2(b). A 3D graphic is also shown. The pendant is in the form of a hyperbolic paraboloid.
 - (i) Draw the given plan and elevation.
 - (ii) Determine the curvature along the line BD.

Scale 1:1





Page 6 of 9

Surface Geometry

- **C-3.** The 3D graphic shows an electric lamp and shade. The shade is a regular tetrahedron of 300mm side which has been truncated as shown.
 - (a) Draw the plan and elevation of the lampshade as given in Fig. C-3 below and project an end view.
 - (b) Determine the dihedral angle between the surfaces A and B.
 - (c) The shade is made from hammered copper. Draw a one-piece surface development of the shade.
 - (d) Draw and indicate, in millimetres, the minimum size of a rectangular sheet which would contain the development.





Geologic Geometry

- **C-4.** The accompanying map, located on the back page of Section A, shows ground contours at five metre vertical intervals.
 - (a) On the drawing supplied, draw a vertical section (profile) on the line AB.
 - (b) CD is the centreline of a proposed roadway which is level at an altitude of 60m.Using side slopes of 1 in 1 for the embankments, complete the earthworks necessary to accommodate the roadway.

(Note: The earthworks on the southern side of the roadway have already been completed)

(c) E, F and G are outcrop points on the surface of a stratum of ore.Determine the line of outcrop between points E and G.

Assemblies

C-5. Details of a Cat's Eye road stud assembly are given in Fig. C-5 with the parts list tabulated on the right. A 3D graphic of the assembly is also shown.

Draw the plan and elevation of the assembly and project an end view.

PART	NAME	REQUIRED
1	Main Body	1
2	M10 Bolt	4
3	Glass Insert	4
4	Rubber Housing	2
5	Anchor Plate	1



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