**Leaving Certificate Examination, 2012**

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

**Wednesday, 20 June**  
**Afternoon, 2.00 - 5.00**

This examination is divided into three sections:

<table>
<thead>
<tr>
<th>SECTION A</th>
<th>(Core - Short Questions)</th>
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<tbody>
<tr>
<td>Four questions are presented.</td>
<td>Answer any three on the accompanying A3 examination paper.</td>
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<tr>
<td>All questions in Section A carry 20 marks each.</td>
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<table>
<thead>
<tr>
<th>SECTION B</th>
<th>(Core - Long Questions)</th>
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<tbody>
<tr>
<td>Three questions are presented.</td>
<td>Answer any two on drawing paper.</td>
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<td>All questions in Section B carry 45 marks each.</td>
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<table>
<thead>
<tr>
<th>SECTION C</th>
<th>(Applied Graphics - Long Questions)</th>
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<tbody>
<tr>
<td>Five questions are presented.</td>
<td>Answer any two (i.e. the options you have studied) on drawing paper.</td>
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<tr>
<td>All questions in Section C carry 45 marks each.</td>
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</table>

**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.*
B-1. The 3D graphic on the right shows a design for a podium for this year’s Olympic Games.

Fig. B-1 below shows the plan and elevation of the podium.

(a) Draw the given plan and elevation of the podium and show all lines of interpenetration.

(b) Draw an end view of the podium.

Scale 1:1
B-2. The 3D graphic on the right shows a table tennis table.

Fig. B-2 below shows the plan and elevation of a model of the table and net.

(a) Draw the given plan.

(b) Make a perspective drawing of the structure given the following:
   - The spectator point is 70mm from corner A
   - The picture plane is touching corner A
   - The horizon line is 80mm above the ground line.

Scale 1:1

Fig. B-2
B-3. The 3D graphic on the right shows an MP3 player docking station.

Fig. B-3 below shows an isometric view of the device.

(a) Draw an elevation of the device looking in the direction of the arrow.

(Note: Only the docking station needs to be drawn. The MP3 player, shown in the 3D graphic should be ignored.)

(b) Draw a plan projected from the elevation.

(c) Draw an auxiliary elevation of the device, projected from the plan, which will include the true shape of surface A.

Scale 1:1

Fig. B-3
C-1. 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) It is proposed to use the valley at V as a reservoir for the generation of hydro-electricity. Draw a line on the profile to indicate the maximum depth of water this valley will hold.

(c) CD is the centreline of a proposed roadway which is level at an altitude of 75m. Using side slopes of 1 in 1 for the embankments, complete the earthworks on the northern side, that are necessary to accommodate the roadway.

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

Scale 1:1000
C-2. The 3-D graphic on the right shows an Irish hotel with a modern roof structure.

Hyperbolic paraboloid surfaces are often used in structures such as this.

Fig. C-2 below shows the plan and elevation of a typical hyperbolic paraboloid surface ABCD.

(a) Draw the given plan and elevation of the hyperbolic paraboloid surface.

(b) Project an end view of the hyperbolic paraboloid surface.

Scale 1:1
C-3. The 3D graphic on the right shows a design for a sweet box. The plan and elevation of the box are shown in Fig. C-3 below.

(a) Draw the given views.

(b) Draw a one-piece surface development of the box.

(The 3D graphic shows text and a clear window opening, which should be ignored for the purpose of your drawing.)

Scale 1:1
C-4. (a) The graphic on the right shows a cam which forms part of a quick release mechanism for a bicycle wheel.

A similar cam imparts this motion to a follower:
- $0^\circ$ to $90^\circ$ Rise 60mm with uniform velocity
- $90^\circ$ to $180^\circ$ Dwell
- $180^\circ$ to $360^\circ$ Fall 60mm with simple harmonic motion.

Draw the displacement diagram.
**Note:** *It is not necessary to draw the profile of the cam.*

Scale 1:1

(b) The graphic on the left below shows a waterslide which is in the form of a helix.

Fig C-4 on the right shows the plan and elevation of a partially completed helix.

The helix moves from point A at the bottom of the cylinder, to point B at the top of the cylinder, in one revolution.

Draw the given plan and elevation of the cylinder and complete the remainder of the helix.

**Scale 1:1**
Assemblies

C-5. Details of a Soap Holder are given in Fig. C-5 with the parts list tabulated below. A 3D graphic of the individual parts is also shown.

Note: Some of the parts have been shown when sectioned by plane A-A.

Draw the sectional elevation A-A of the assembled Soap Holder.

(Any omitted dimensions may be estimated.)

Scale 1:1

![Diagram of Soap Holder](image)

<table>
<thead>
<tr>
<th>Part</th>
<th>Name</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wall Mount</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Stem</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Countersunk Screw</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Soap Dish</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Dish Support</td>
<td>1</td>
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</tbody>
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Fig. C-5
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