2024. M80BC 2024L562G2EL

**Coimisiún na Scrúduithe Stáit**
*State Examinations Commission*

## *Leaving Certificate Examination, 2024*

# *Design & Communication Graphics*

## *Ordinary Level*
## *Section B and C (180 marks)*

**Thursday, 20 June**
**Morning, 9:30 - 12:30**

| **This examination has three sections:** | |
|---|---|
| Section A | Core - Short Questions |
| Section B | Core - Long Questions |
| Section C | Applied Graphics - Long Questions |

| | |
|---|---|
| **Section B** | • Three questions are presented.<br>• Answer **any two** questions on drawing paper.<br>• All questions in Section B carry **60 marks** each. |

| | |
|---|---|
| **Section C** | • Five questions are presented.<br>• Answer **one** question (i.e. the option you have studied) on drawing paper.<br>• All questions in Section C carry **60 marks** each. |

**General Instructions:**

- Construction lines must be shown on all solutions.
- The graphics presented are not necessarily drawn to scale and must not be used for scaling purposes.
- 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 in Section A and on all other sheets used.

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# Section B - Core

Answer **any two** questions from this section on drawing paper.

**B-1.** The image on the right shows an indoor electronic garden.

Fig. B-1 below shows an isometric view of a similar indoor garden. A 3D graphic is also given.

**(a)** Draw an elevation of the indoor garden looking in the direction of the arrow.

**(b)** Project a plan from the elevation.

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

**Scale 1:1**

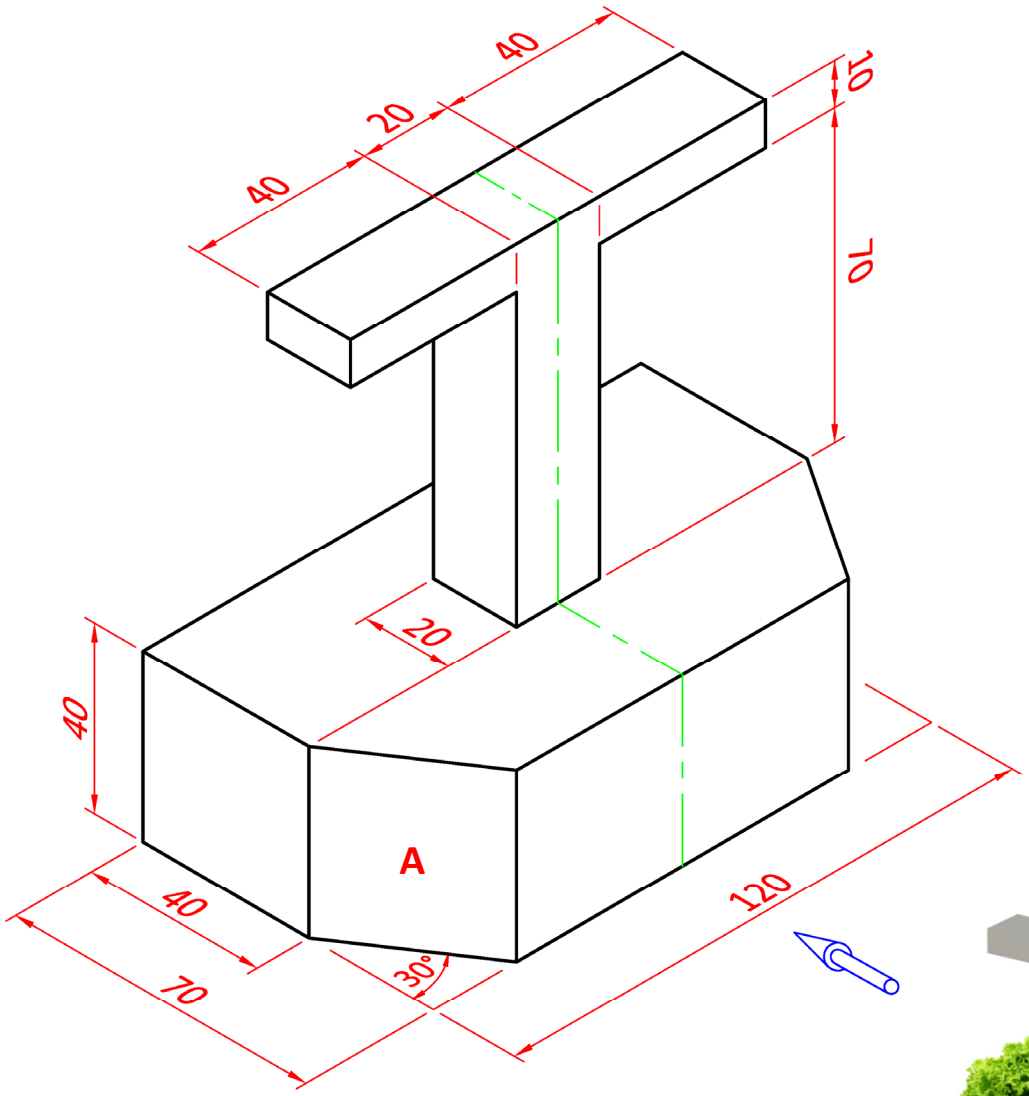



**Fig. B-1**

**B-2.** The image on the right shows a bridge on the Waterford Greenway.

Fig. B-2 below shows an incomplete isometric projection of a portion of a similar bridge.
A 3D graphic is also given.

The elevation and plan of the bridge are shown in their required positions.

**(a)** Draw the given equilateral triangle **abc** and the axonometric axes **X**, **Y**, and **Z**.

**(b)** Draw the elevation and plan positioned as shown.

**(c)** Draw the axonometric projection of the outline of the bridge and include the top cycle lane.

**(d)** Complete the axonometric projection of the inner semi-circular opening.

**Scale 1:1**

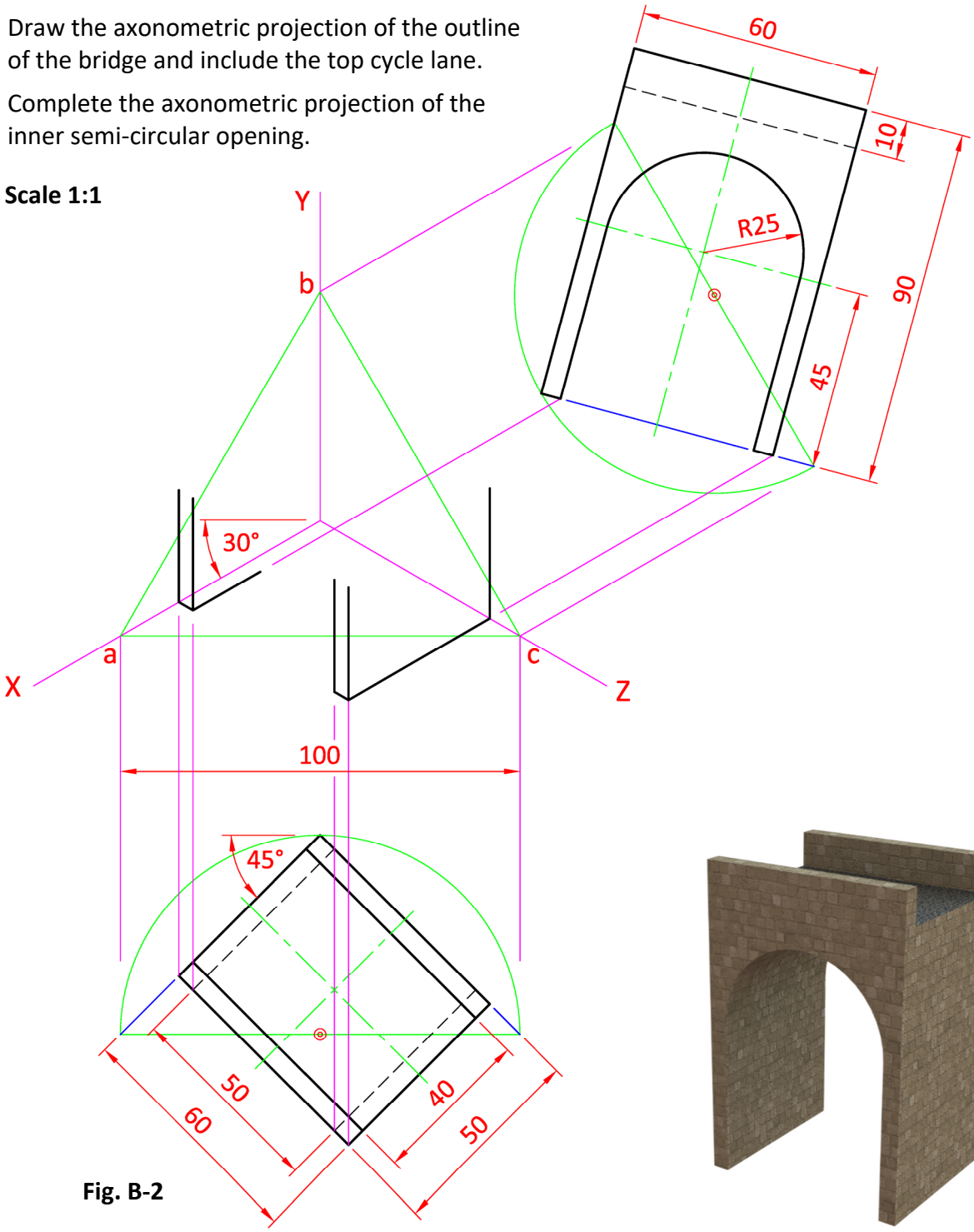



**Fig. B-2**

**B-3.** The image on the right shows the Céide Fields visitor center in Co. Mayo. The building is based on a square based pyramid which is set into the landscape.

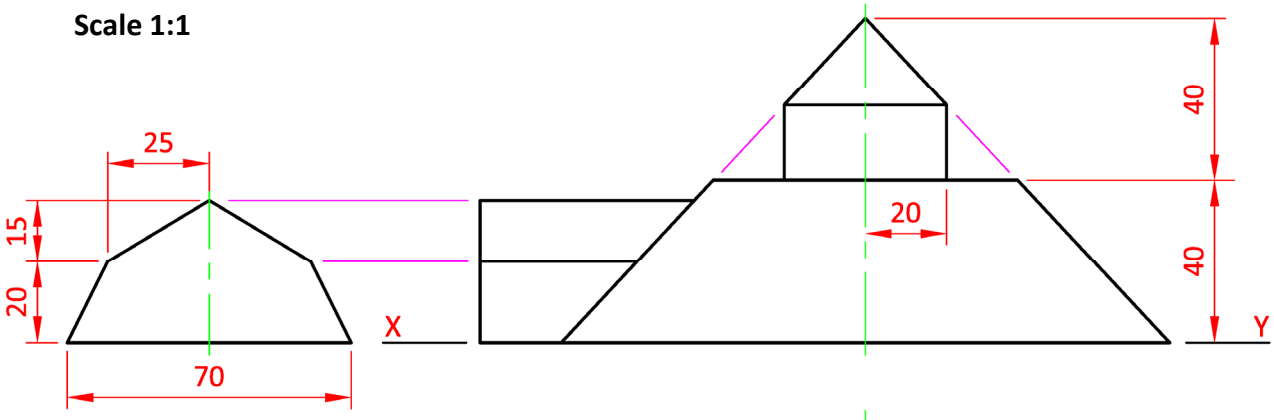
Fig. B-3 below shows the elevation and incomplete plan of a similar building. The outline profile of the entrance is shown on the left below. A 3D graphic is also given.

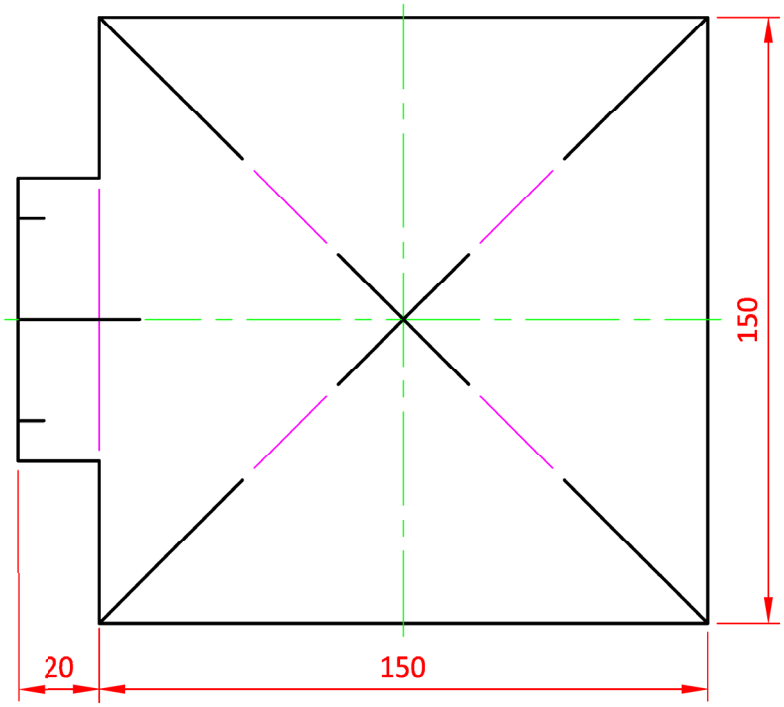
**(a)** Draw the given elevation and incomplete plan of the building.

**(b)** Complete the plan, showing all lines of interpenetration.

**(c)** Draw an end view of the building.

**Scale 1:1**



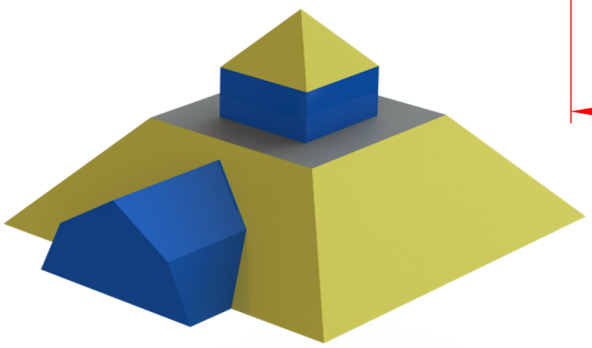



**Fig. B-3**

# Section C - Applied Graphics

Answer **one** question (i.e. the option you have studied) from this section on drawing paper.

## Geologic Geometry

**C-1.** The image on the right shows an open mine in operation.

The accompanying map, located on the back page of Section A, shows ground contours at five metre vertical intervals.

**(a)** On the map supplied, draw a vertical section (profile) on the line **AB**.

**(b)** Points **C**, **D**, and **E** are outcrop points on the surface of a stratum of ore.

Draw the plan and elevation of the triangle **CDE**.

**(c)** Determine the strike and dip of the stratum.

**Scale 1:1000**

**C-2.** The image on the right shows a 3D printed pencil holder. The shape of the pencil holder is based on a hyperboloid of revolution which is formed by straight line elements.

Fig. C-2 below shows the plan and elevation of a similar hyperboloid of revolution constructed using 12 equally spaced elements.

**(a)** Draw the two given circles in plan and locate 12 equally spaced points on the circumference of the inner circle as shown. Draw the 12 elements tangential to the inner circle at these points.

**(b)** Draw the elevation showing the elements projected from the plan.

**(c)** Complete the elevation by drawing the freehand curves tangential to the elements as shown.

**Scale 1:1**

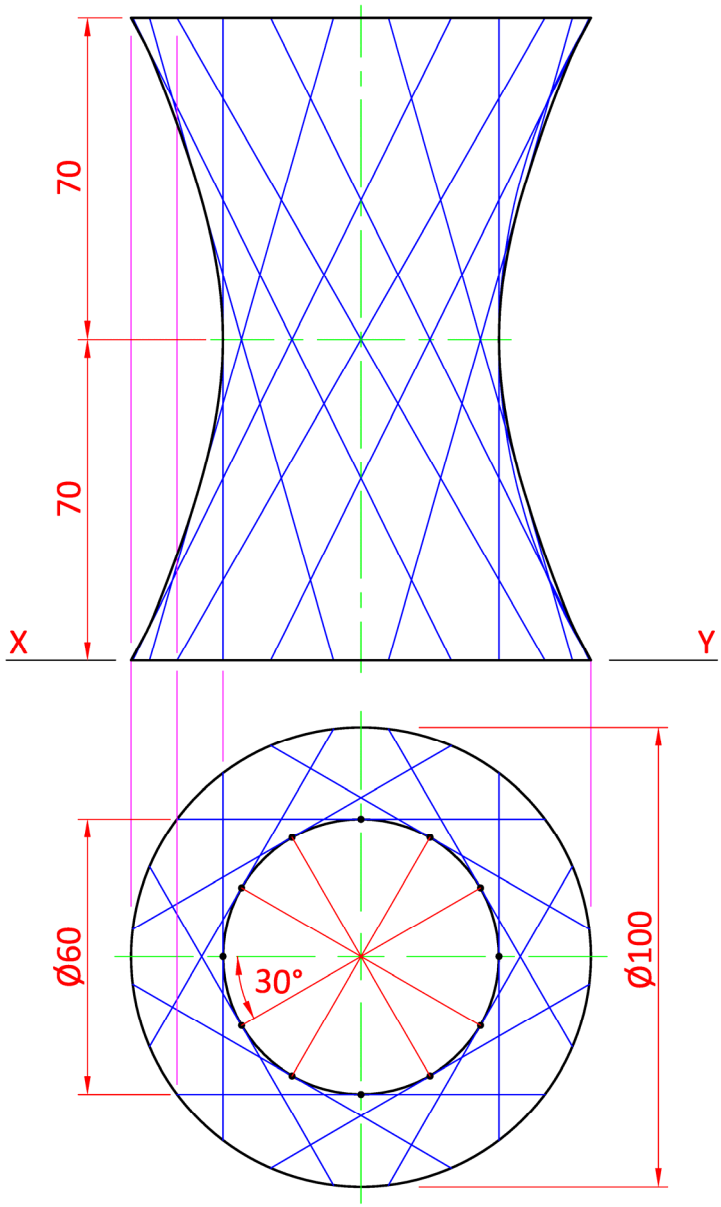



**Fig. C-2**

# Surface Geometry

**C-3.** The image on the right shows a car tissue box.


The projections of a similar tissue box are shown in Fig. C-3 below.

**(a)** Draw the given elevation and plan of the tissue box.

**(b)** Project an end view.

**(c)** Draw a one-piece surface development of the tissue box.

**Scale 1:1**

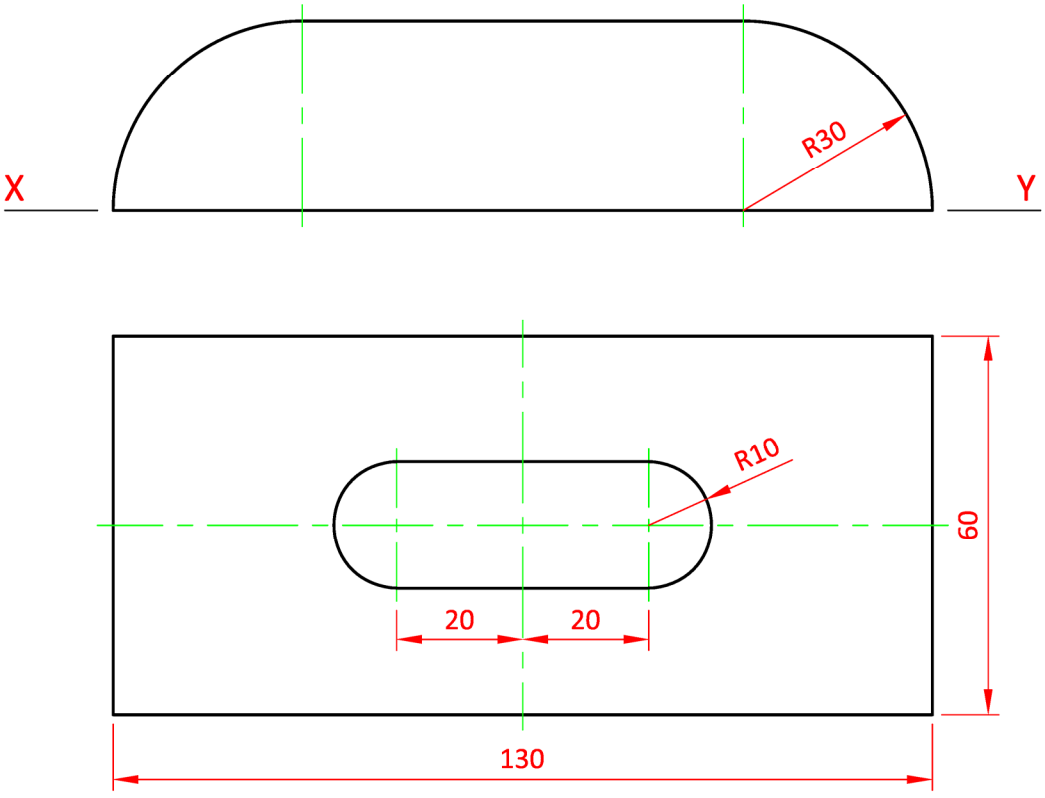



**Fig. C-3**

**C-4.** **(a)** The image on the right shows a cherry picker. The movement of the cherry picker arm is generated by a link mechanism.


Fig. C-4 shows a line diagram of a similar mechanism.

Crank **OA** and the rod **AC** are pin jointed at **A**. Point **B** is located on the rigid rod **AC** as shown.

Crank **OA** rotates in a clockwise direction, about point **O**, for one revolution. Point **C** moves on the horizontal axis as shown.

(i) Draw the given diagram.

(ii) Plot the locus of point **B** for this movement.

**Scale 1:1**

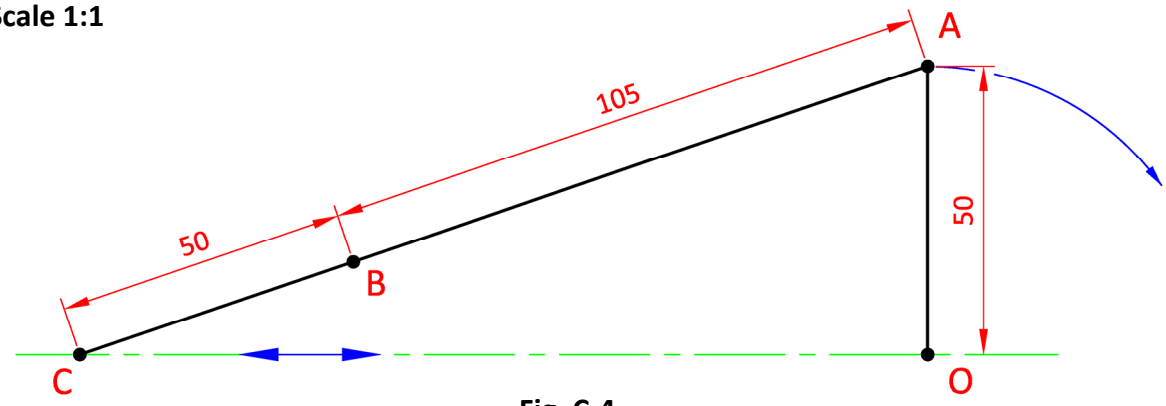
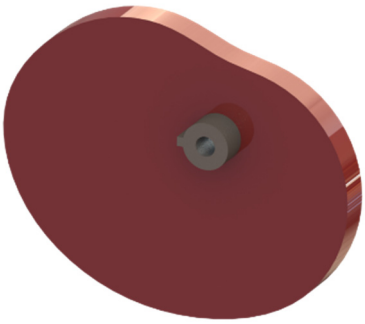



**Fig. C-4**

**(b)** The image on the right shows a cam from the fuel system of the cherry picker.



The cam imparts the following motion to the follower:

- 0° to 90° Rise 70 mm with uniform velocity
- 90° to 120° Dwell
- 120° to 180° Fall 20 mm with uniform velocity
- 180° to 360° Fall 50 mm with simple harmonic motion.

Draw the displacement diagram, using a distance of 15 mm to represent each 30° interval.

**Note:** It is not necessary to draw the cam profile.

**C-5.** The image on the right shows a number of solar lamps which can be used to illuminate pathways.

Details of a similar solar lamp are shown in Fig. C-5 below.

A parts list and a 3D graphic of the solar lamp are also shown.

Draw the **sectional elevation A-A** of the assembled solar lamp.

(*Any omitted dimensions may be estimated.)*

**Scale 1:1**

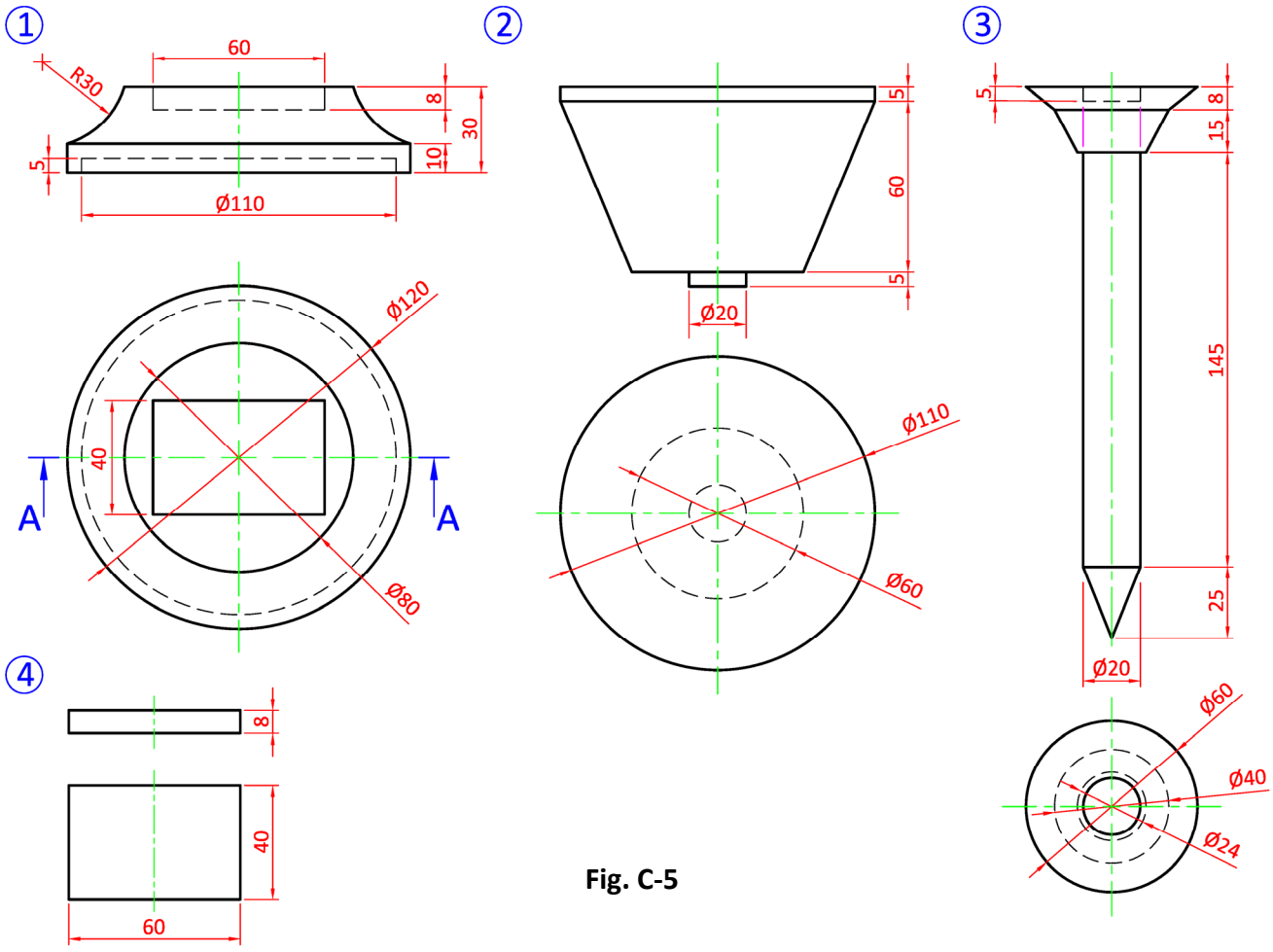
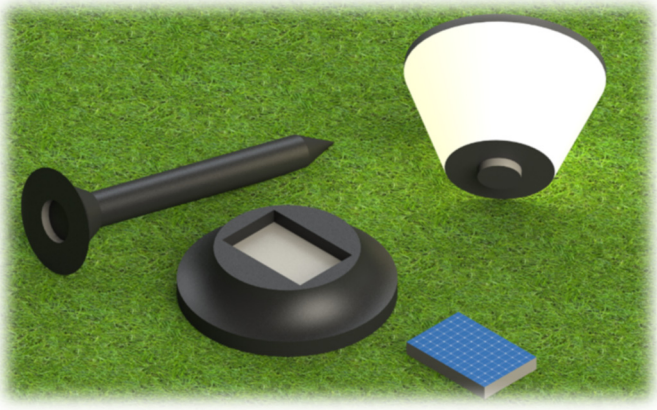



**Fig. C-5**

| Part | Name | Qty. |
|---|---|---|
| 1 | Top | 1 |
| 2 | Lamp | 1 |
| 3 | Pole | 1 |
| 4 | Solar panel | 1 |



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Leaving Certificate - Ordinary Level

# Design & Communication Graphics, Section B & C

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