



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

*Leaving Certificate Examination, 2014*

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

**Wednesday, 18 June**  
**Afternoon, 2:00 - 5:00**

**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** each.

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

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

**General Instructions:**

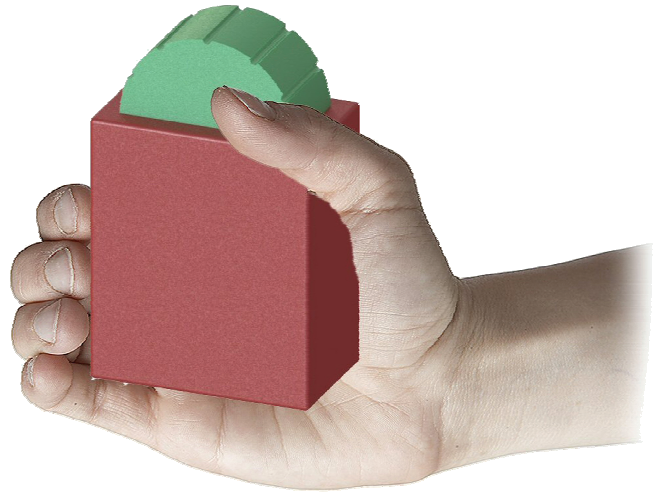
- *Construction lines must be shown on all solutions.*
- *Write the question number distinctly on the answer paper in Sections B and C.*
- *Work on one side of the drawing paper only.*
- *All dimensions are given in metres or millimetres.*
- *Write your Examination number in the box provided on section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

## SECTION B - Core

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

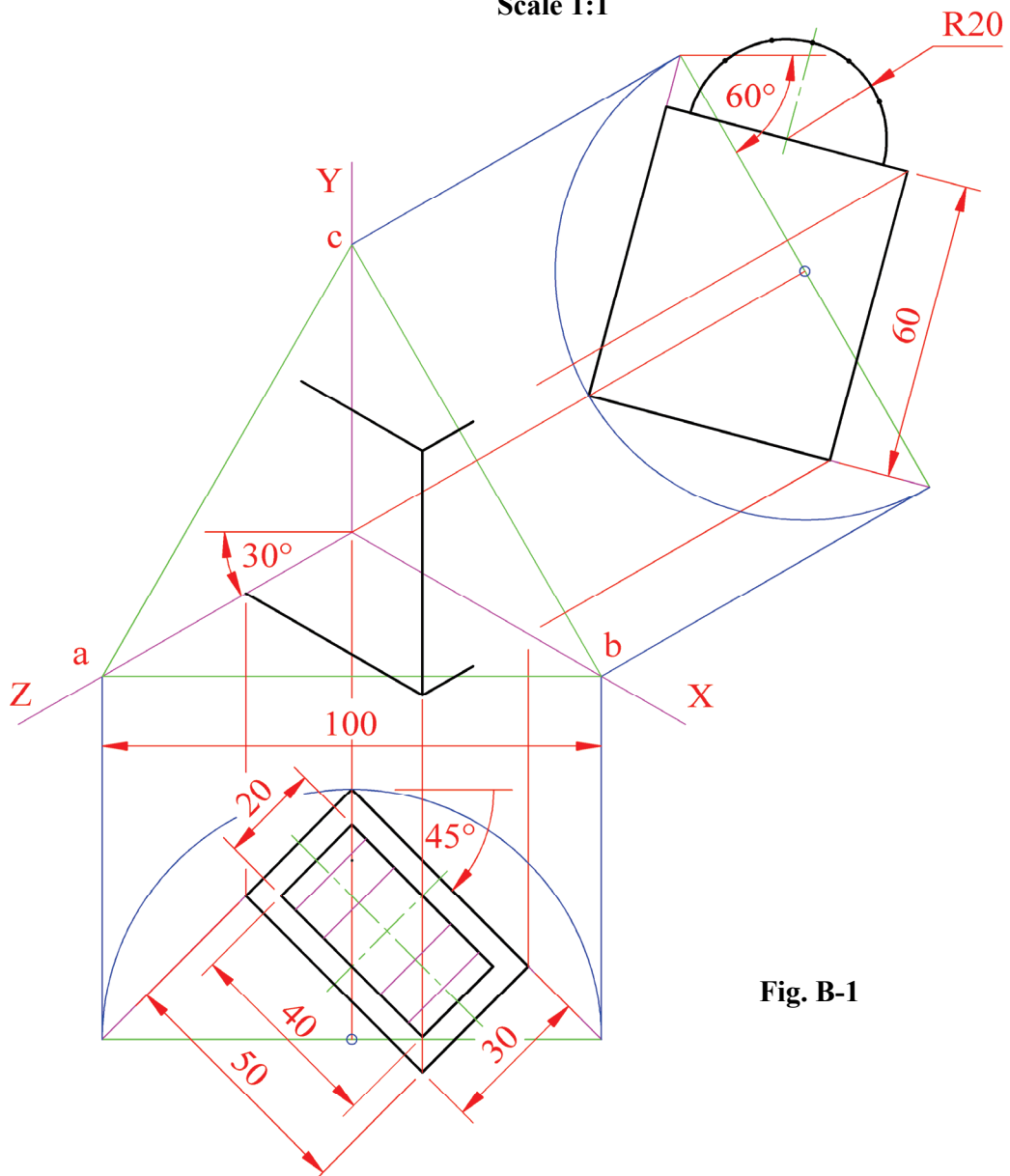
**B-1.** The 3D graphic on the right shows a lotion bottle.

Fig. B-1 below shows an incomplete isometric projection of the bottle. The elevation and plan of the bottle are also 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 rectangular prism representing the body of the bottle.
- (d) Draw the axonometric projection of the semi-circular lid.

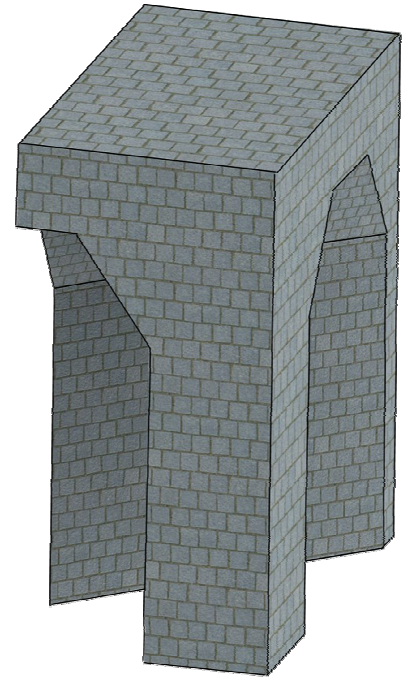
Scale 1:1



**Fig. B-1**

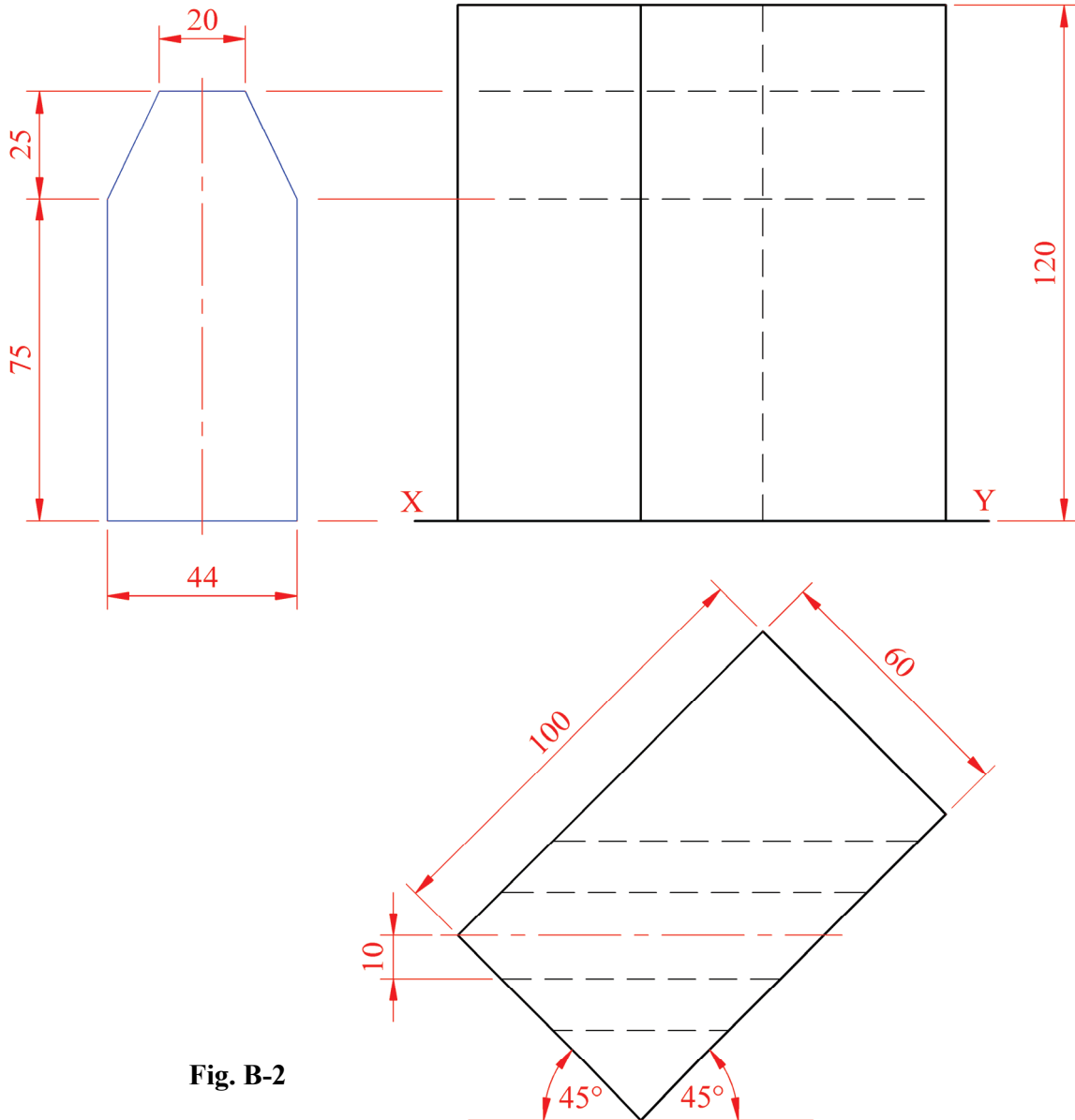
**B-2.** The 3D graphic on the right shows a structure in the form of a rectangular prism. A tunnel has been cut through the structure to accommodate a motorway as shown.

Fig. B-2 below shows the plan and incomplete elevation of the structure.



- (a) Draw the given plan and elevation of the structure and tunnel showing all lines of interpenetration.
- (b) Draw an end view of the structure.

Scale 1:1

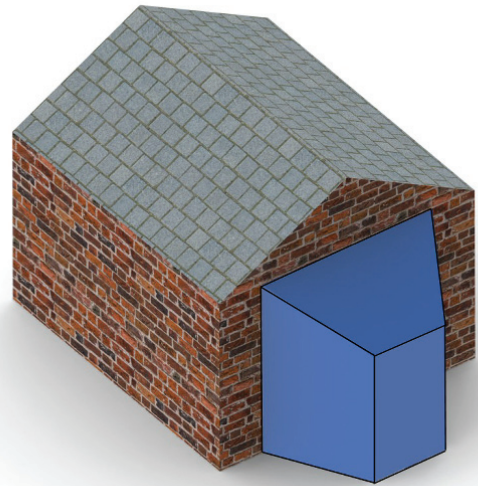


**Fig. B-2**

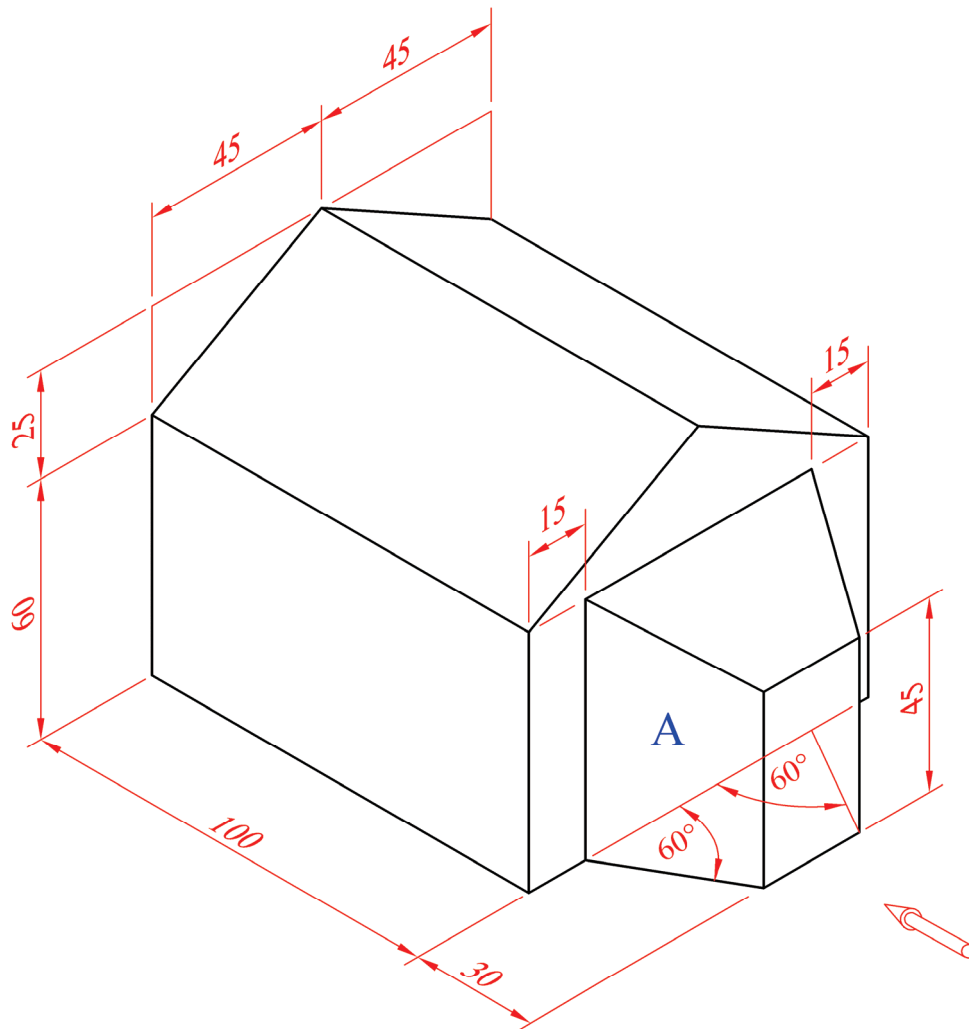
**B-3.** The 3D graphic on the right shows the outline of a house and conservatory.

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

- (a) Draw an elevation of the structure in the direction of the arrow.
- (b) Project a plan from the elevation.
- (c) Draw an auxiliary elevation of the *structure*, projected from the plan, which will include the true shape of surface A.



**Scale 1:1**



**Fig. B-3**

## SECTION C - Applied Graphics

Answer **any two** questions (i.e. the options you have studied)  
from this section on drawing paper.

### Geologic Geometry

**C-1.** The accompanying map, located on the back page of Section A, shows ground contours at 5 metre vertical intervals.

- (a) On the drawing supplied, draw a vertical section (profile) on the line **AB**.
- (b) **C**, **D** and **E** are outcrop points on the surface of a stratum of ore.  
Determine the strike and dip of the stratum.

**Scale 1:1000**

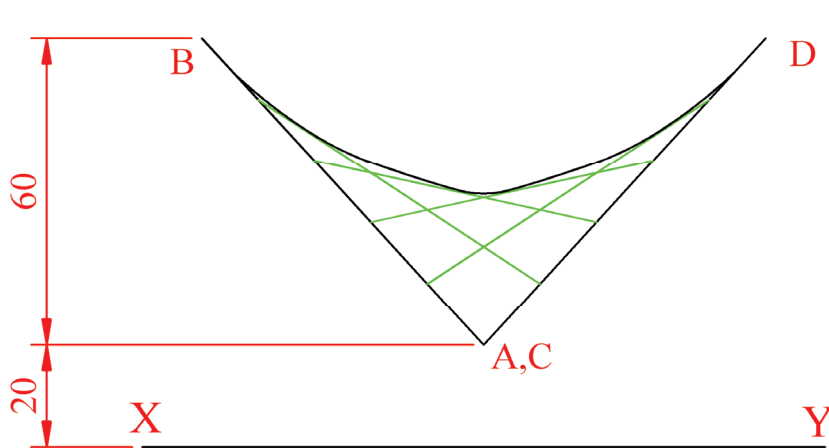
# Structural Forms

**C-2.** The graphic on the right shows a multimedia player for streaming TV over the Internet. The hyperbolic paraboloid shape on the top of the unit is designed to prevent users from placing objects on it.

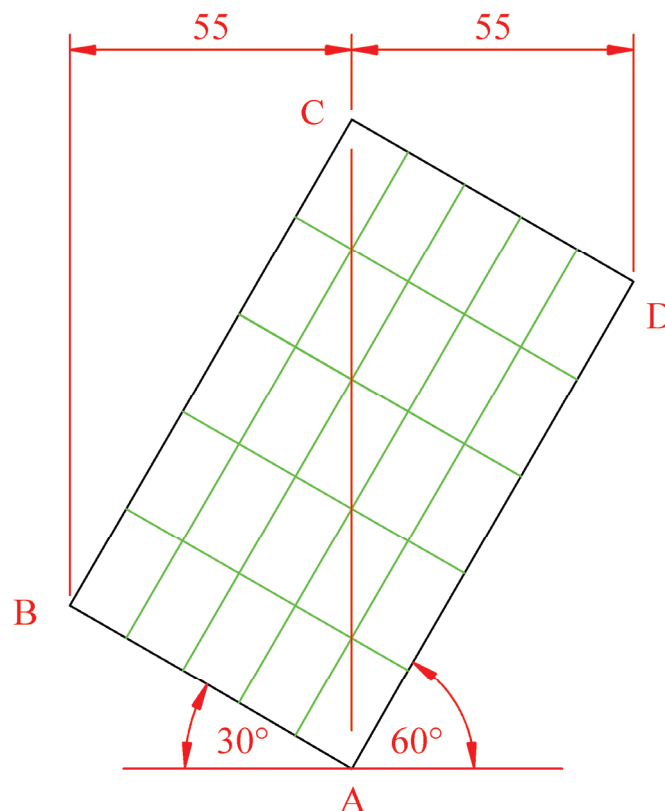


Fig. C-2 shows the projections of a typical hyperbolic paraboloid surface, **ABCD**, which is rectangular in plan.

- (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



**Fig. C-2**

# Surface Geometry

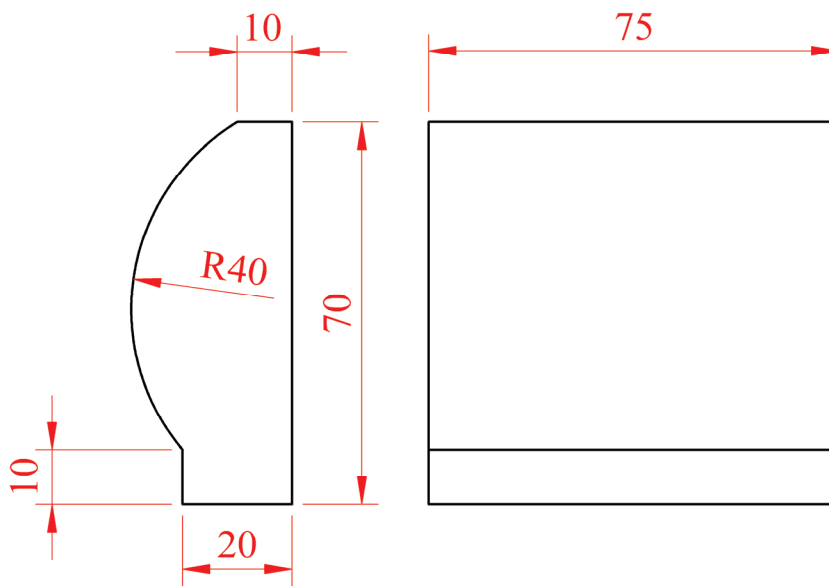
**C-3.** The 3D graphic on the right shows a headrest for a sports car. The headrest is covered in leather.

The projections of the headrest are shown in Fig. C-3 below.

- (a) Draw the given views.
- (b) Draw a one-piece surface development of the leather cover for the headrest.



Scale 1:1



**Fig. C-3**

# Dynamic Mechanisms

**C-4. (a)** A Piston, like the one shown in the 3D graphic on the right, is often found in machines.

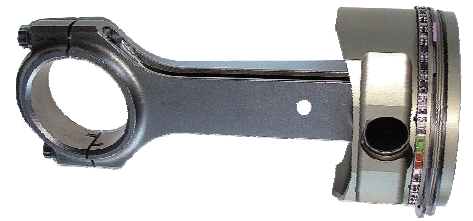
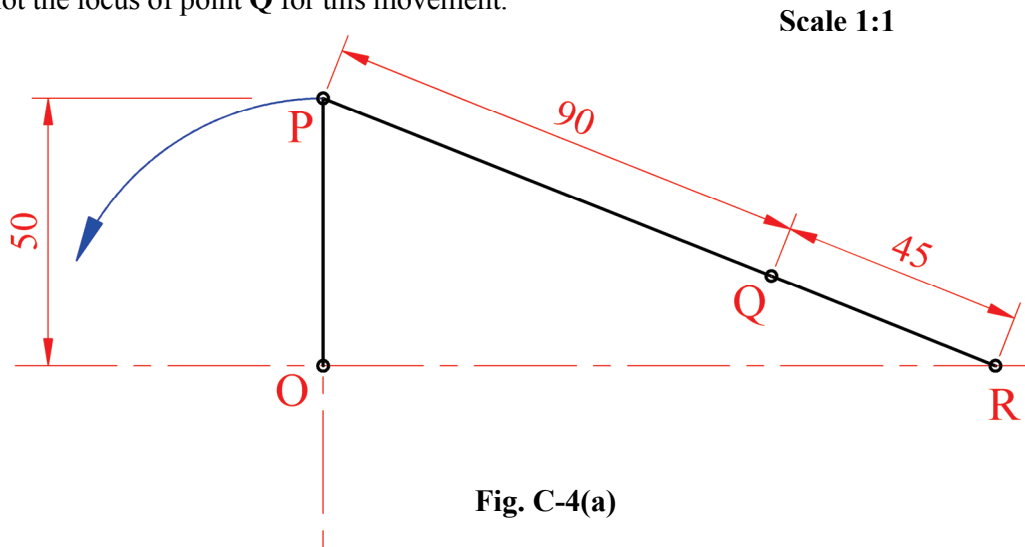


Fig. C-4(a) below is a line-diagram representation of a piston mechanism, consisting of a crank and a connecting rod which are pin jointed at **P**.

Crank **OP** rotates anticlockwise about **O**, as shown, for one revolution and point **R**, at the end of the connecting rod, moves along the horizontal axis.

Plot the locus of point **Q** for this movement.

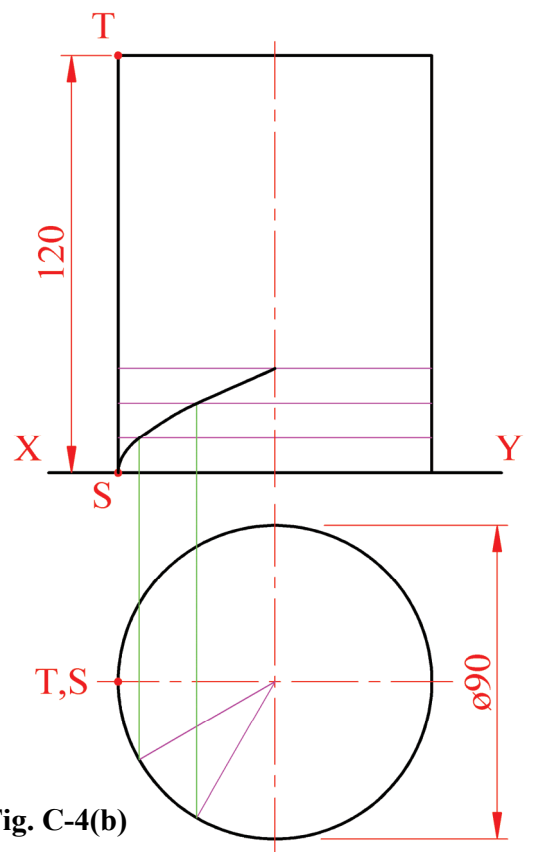


**Fig. C-4(a)**

**(b)** The 3D graphic below shows a helical sculpture which was unveiled in the Botanic Gardens in Dublin in 2013 to mark the 60th anniversary of the discovery of DNA by Dr James Watson, a scientist of Irish descent.

Fig. C-4(b) on the right shows the projections of a partially completed helix.

The helix moves from point **S** to point **T** in one revolution. Draw the projections of the cylinder and complete the elevation of the helix.



**Fig. C-4(b)**



# Assemblies

**C-5.** Details of a Hitch Mechanism for a toy tractor and trailer, as shown on the right, are given in Fig. C-5 below.

A parts list and a 3D graphic of the parts are also given.

Draw the elevation of the assembled Hitch Mechanism.

(Any omitted dimensions may be estimated.)

Scale 1:1

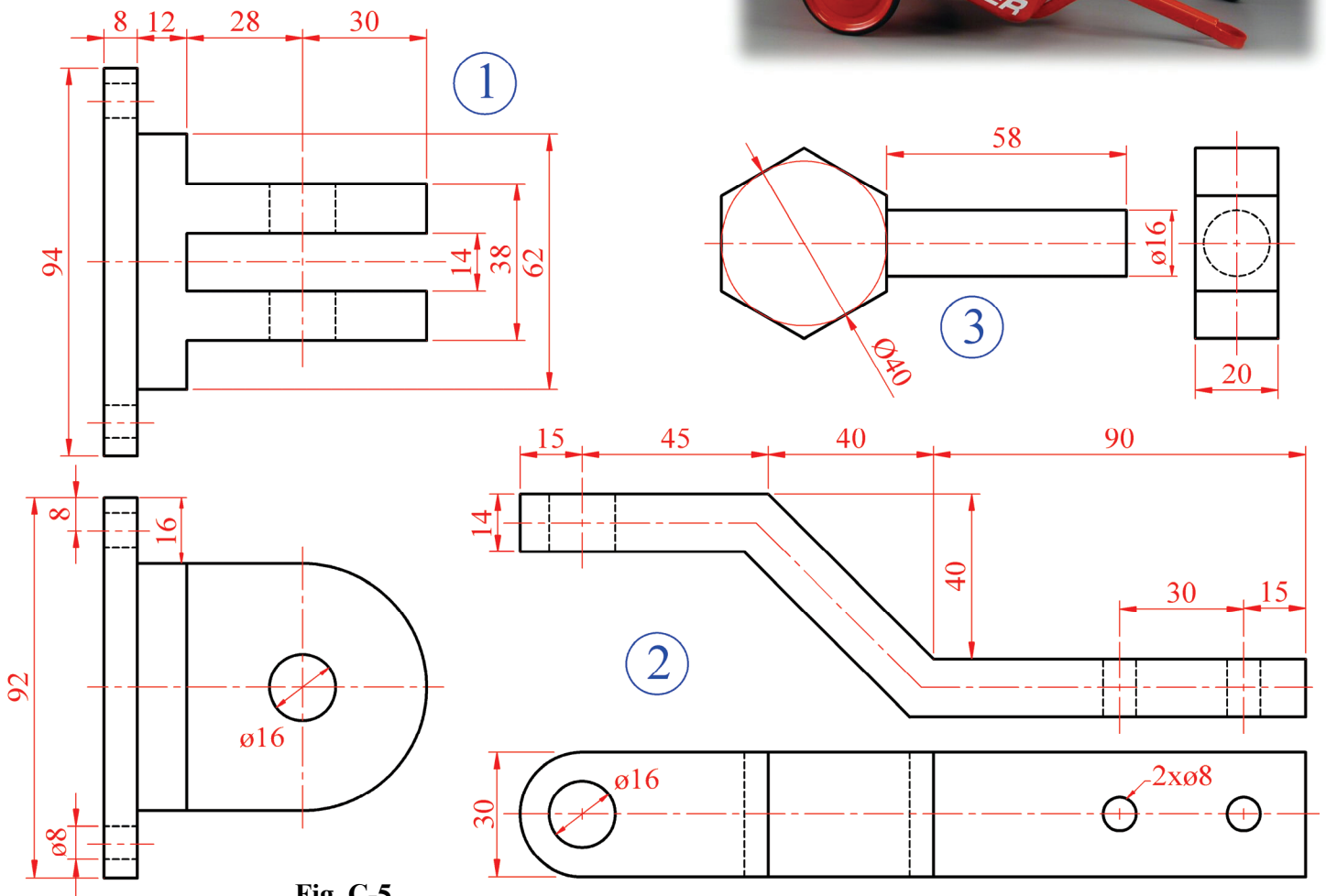
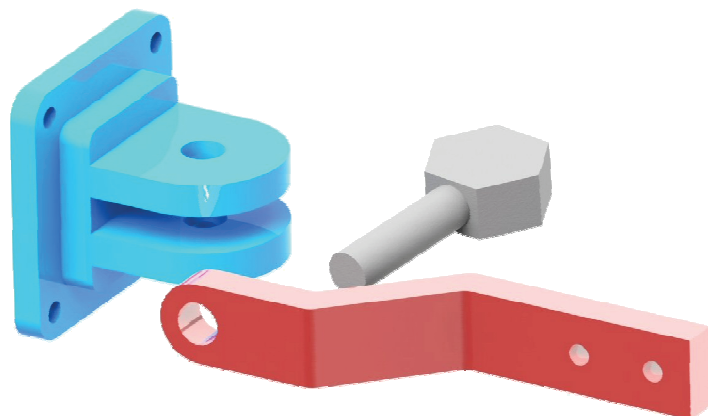


Fig. C-5

Part	Name	Qty.
1	Tractor Bracket	1
2	Trailer Hitch	1
3	Connecting Pin	1



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