



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

*Leaving Certificate Examination, 2010*

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

**Friday, 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

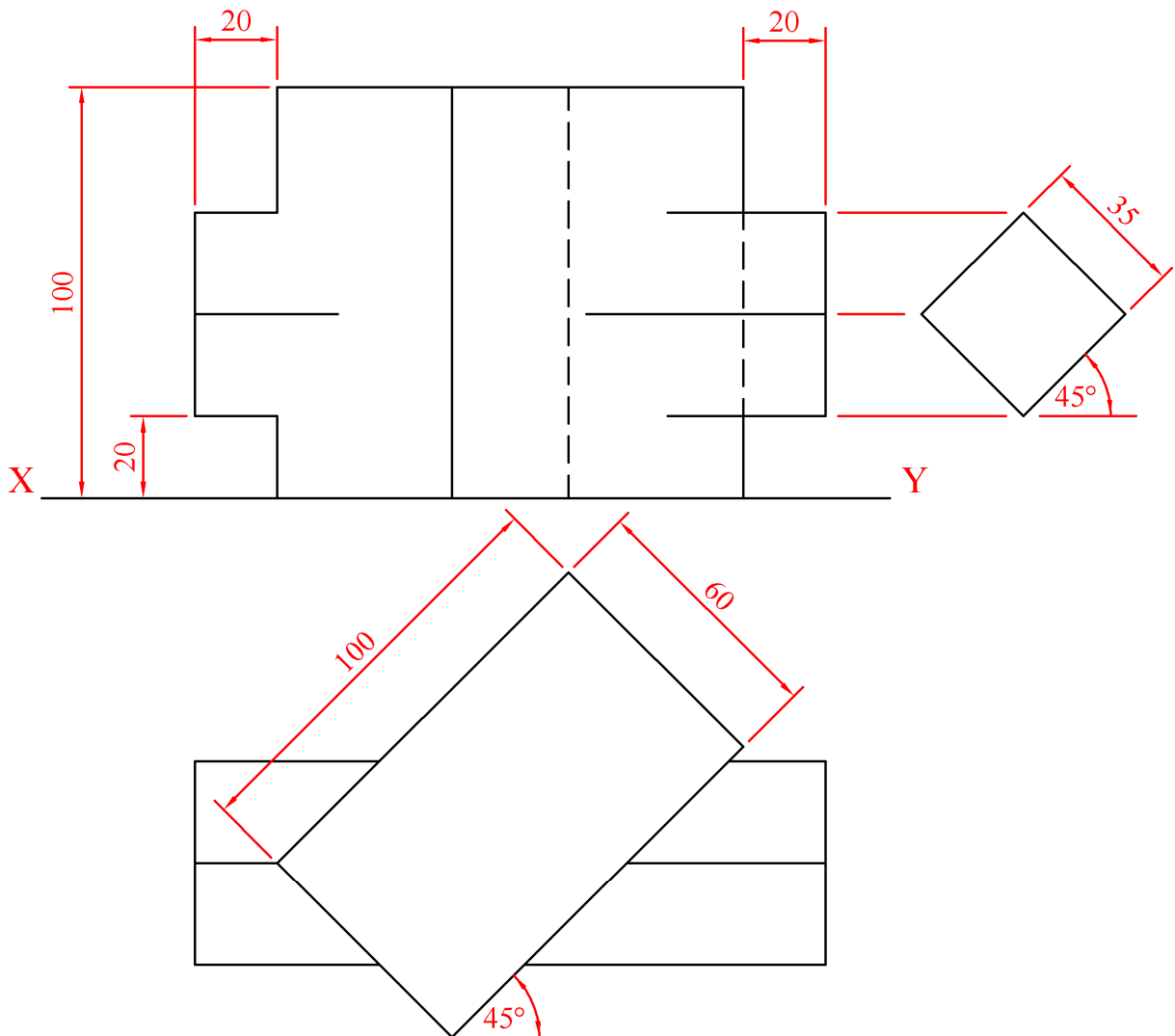
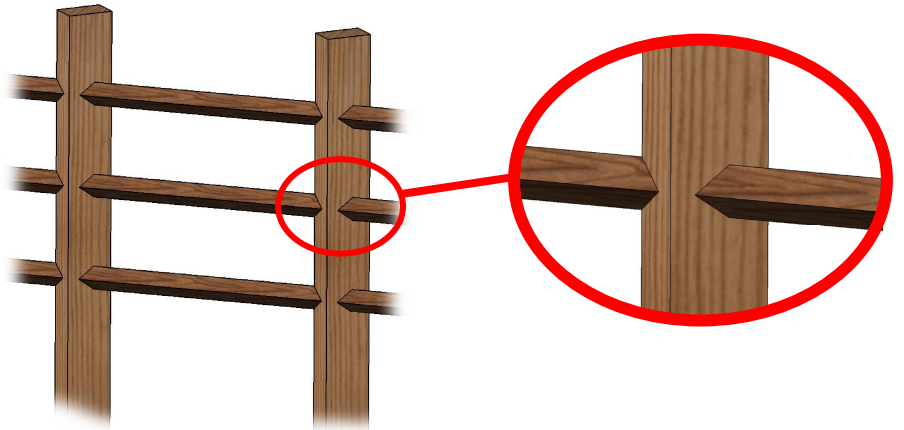
**B-1.** The 3D graphic and the enlarged balloon detail shows part of a wooden fence which surrounds a patio.

Fig. B-1 below shows a portion of one of the rectangular posts and one of the square rails from the fence.

Draw the given plan and elevation and project an end view of the post and rail.

Show all lines of interpenetration.

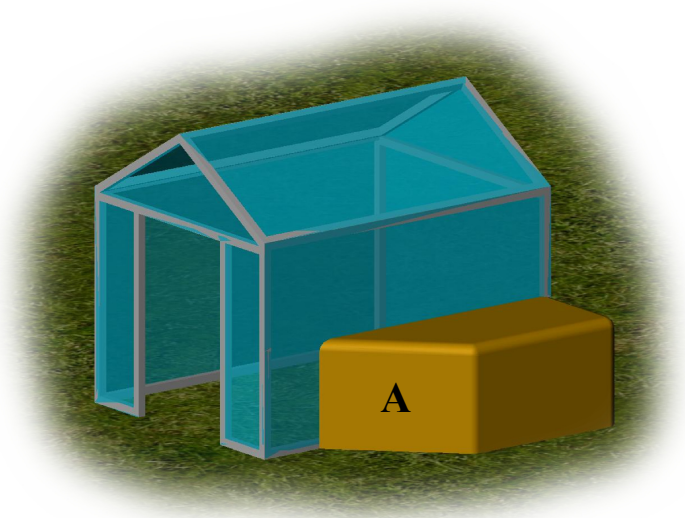
**Scale 1:1**



**Fig. B-1**

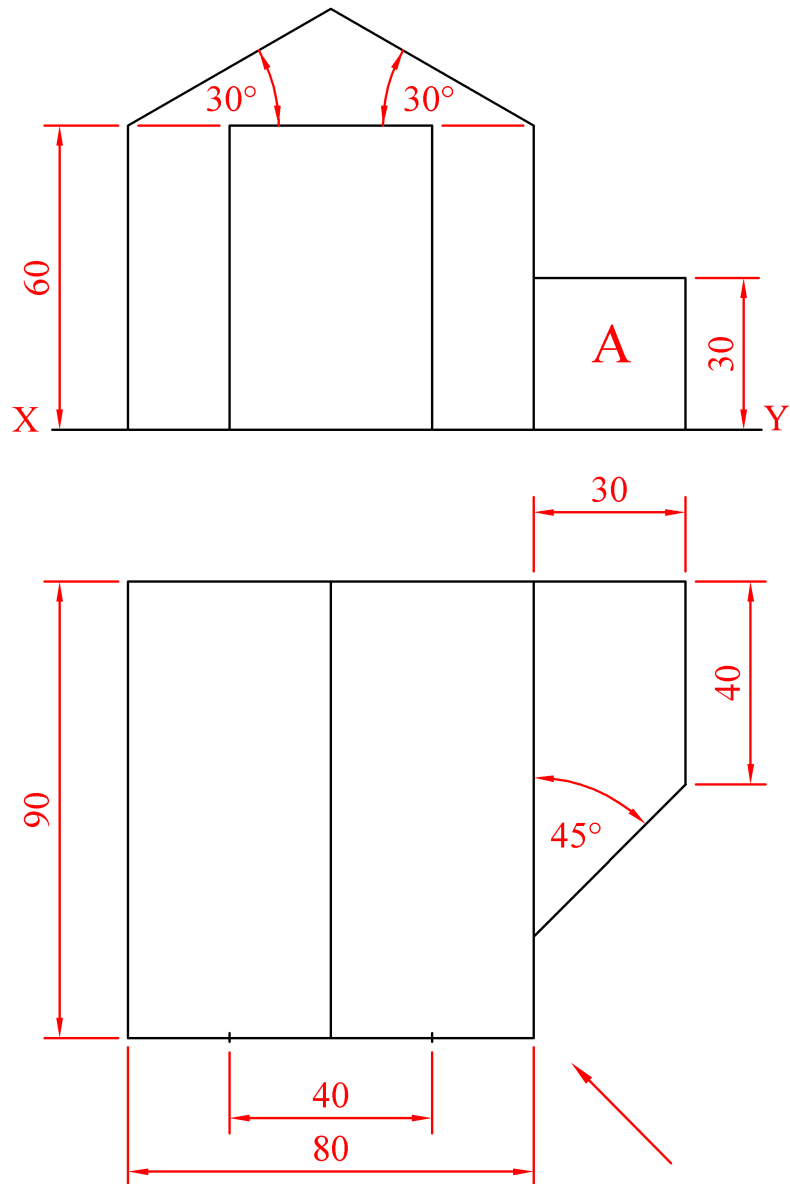
**B-2.** The 3D graphic on the right shows a model of a greenhouse with a compost bin attached.

Fig. B-2 shows the plan and elevation of the greenhouse and the bin.



- (a) Draw the given plan and elevation.
- (b) Draw an auxiliary elevation of the greenhouse and compost bin, projected from the plan, which will show the true shape of surface A of the bin.

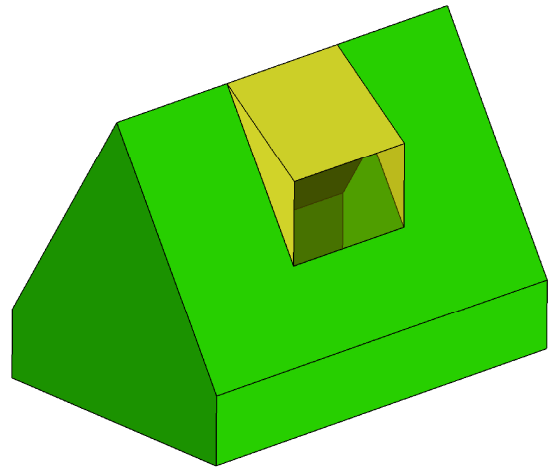
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**Fig. B-2**

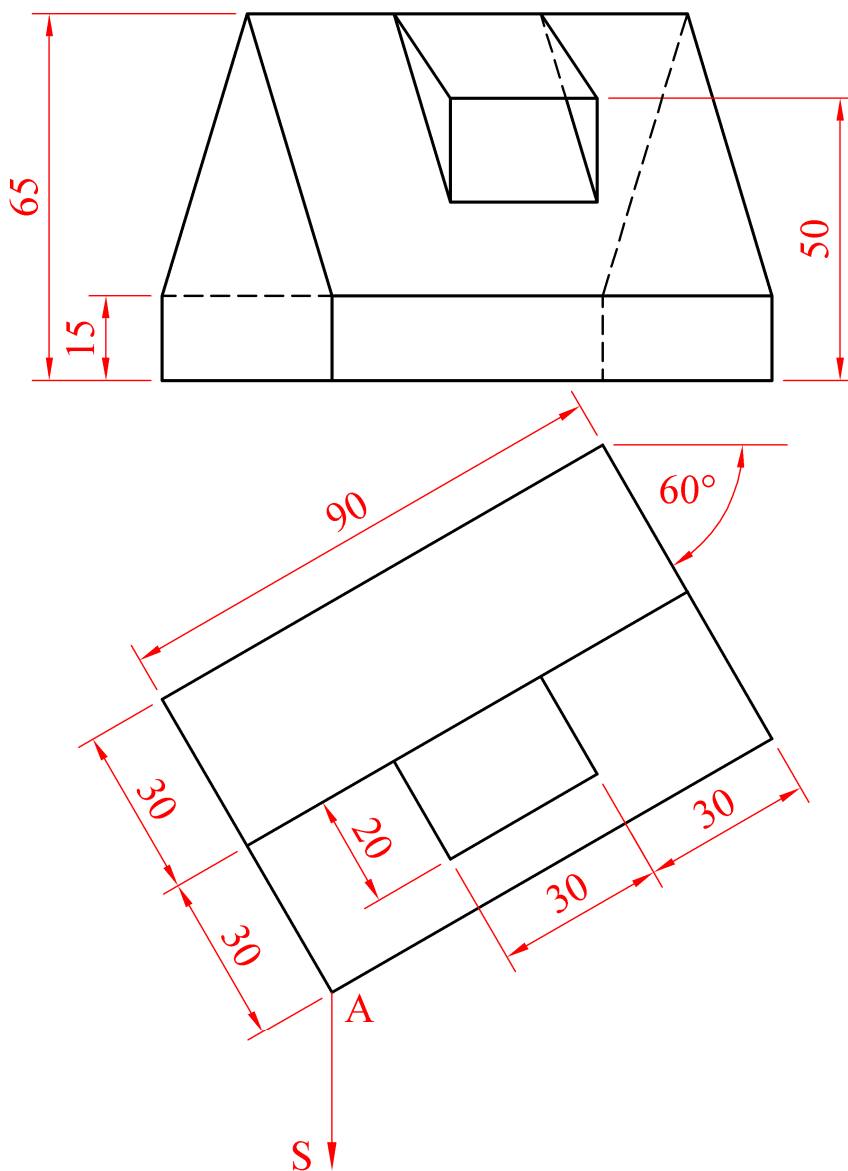
**B-3.** The 3D graphic on the right shows a model of a tent which has a side window.

Fig. B-3 shows the plan and elevation of the tent.



- (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 30mm above the ground line.

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 five metre vertical intervals.
- (a)** On the drawing supplied, draw a vertical section (profile) on the line AB.
  - (b)** Determine and indicate, in metres, the maximum difference in altitude recorded along the line AB.
  - (c)** 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.** Hyperbolic paraboloid surfaces are often used in the construction of buildings such as the aircraft hanger shown in the 3D graphic on the right.

Fig. C-2 below shows the plan and elevation of a typical hyperbolic paraboloid surface, ABCD. The outline of the surface is a rectangle in plan.



- (a) Draw the given plan and elevation of the hyperbolic paraboloid surface.
- (b) Project an end view.

Scale 1:1

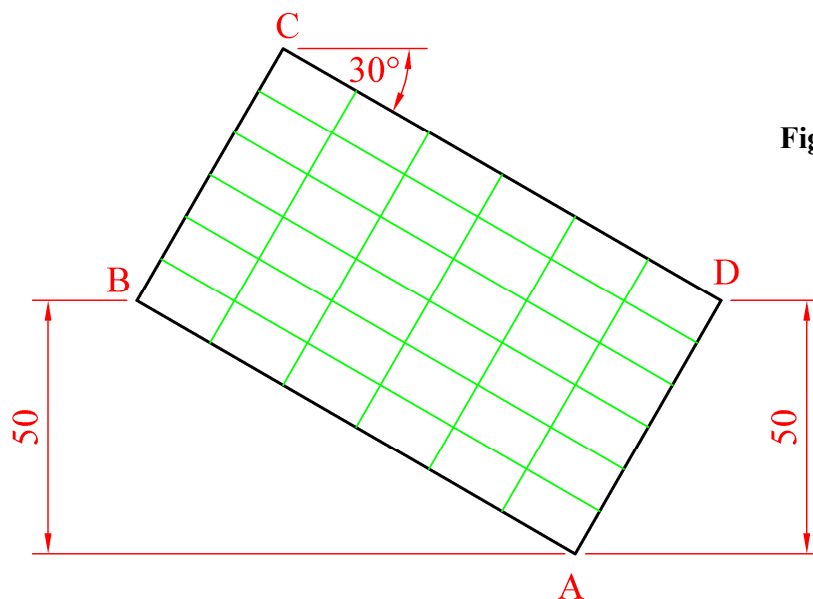
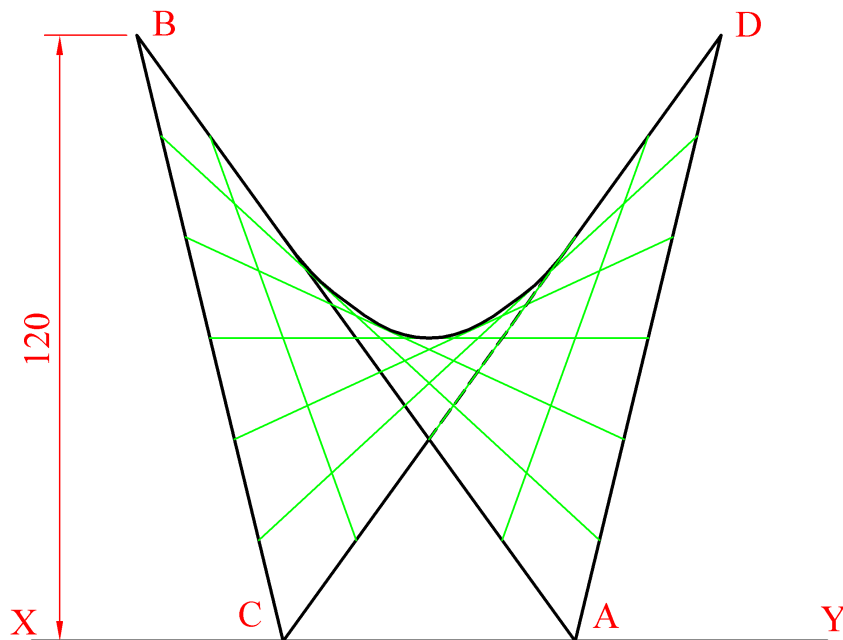


Fig. C-2

# Surface Geometry

C-3. The 3D graphic on the right shows a design for a money box.  
The plan, elevation and end view of the box are shown in Fig. C-3.

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



Scale 1:1

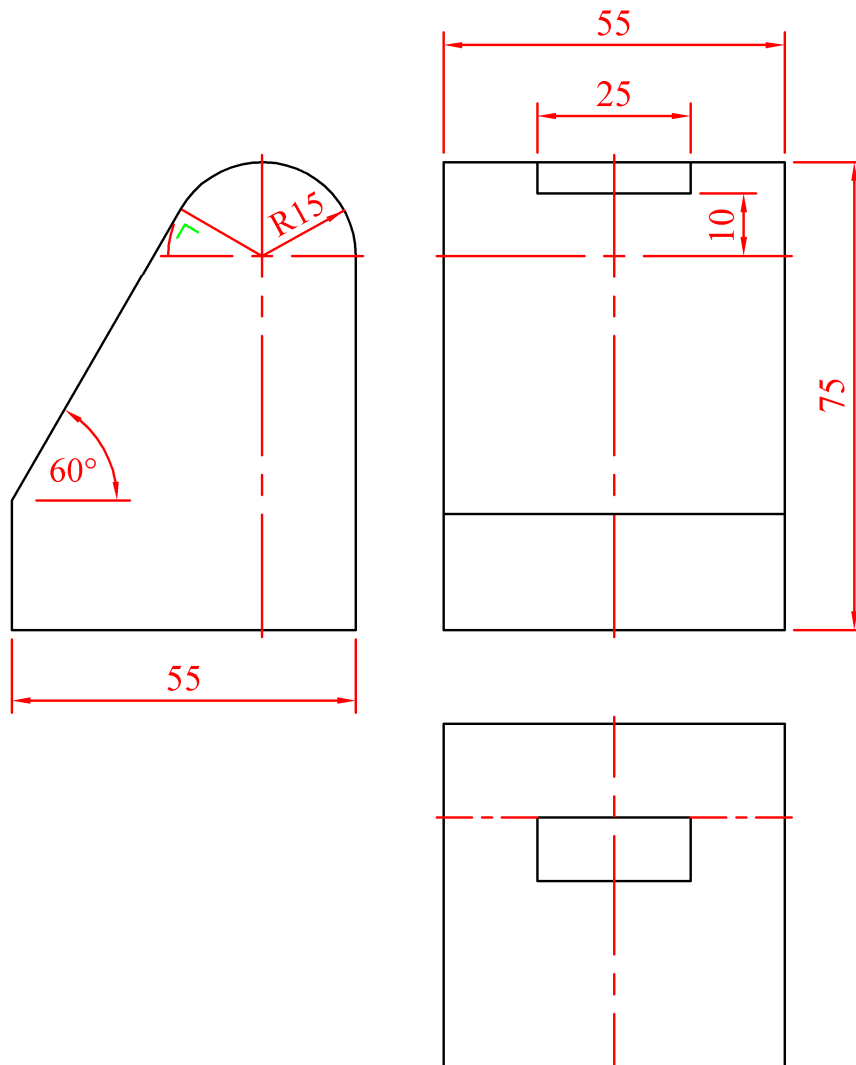


Fig. C-3

# Dynamic Mechanisms

**C-4. (a)** The 3D graphic on the right shows a pull along toy. A cam and in-line knife-edge follower are used inside the toy to move the head up and down as the toy rolls.

The cam has a minimum radius of 30mm, a camshaft diameter of 20mm and rotates in an anti-clockwise direction.

The cam imparts the following motion to the follower:

- $0^\circ$  to  $120^\circ$  Rise 40mm with uniform velocity
- $120^\circ$  to  $180^\circ$  Dwell
- $180^\circ$  to  $360^\circ$  Fall 40mm with simple harmonic motion.



Draw the displacement diagram **and** the profile of the cam.

**Scale 1:1**

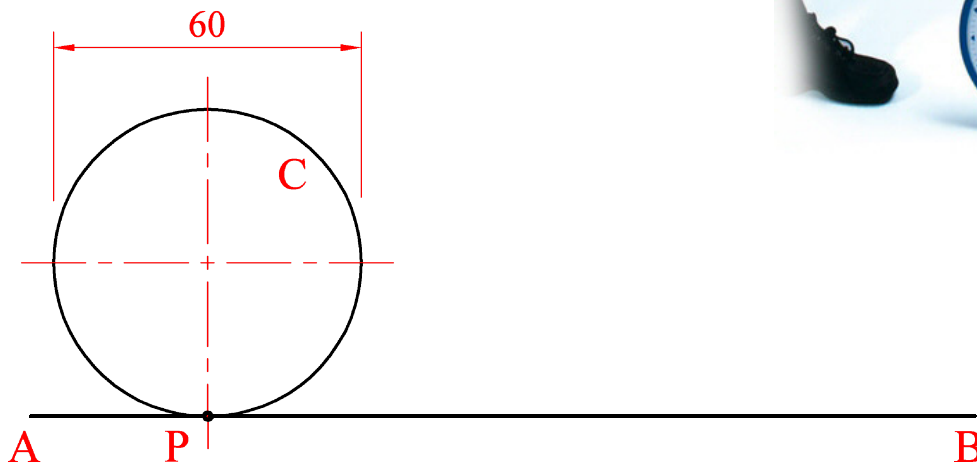
**(b)** A Trundle Wheel, as shown in the 3D graphic on the right, is often used to measure distances by rolling it along the ground.

In Fig C-4(b) below, circle C represents the wheel. In the diagram circle C rolls clockwise along the line AB for one full revolution.

Plot the locus of point P for this movement.



**Scale 1:1**



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



# Assemblies

**C-5.** The 3D graphic on the right shows a Data Projector which is often mounted on the ceiling in a DCG classroom.

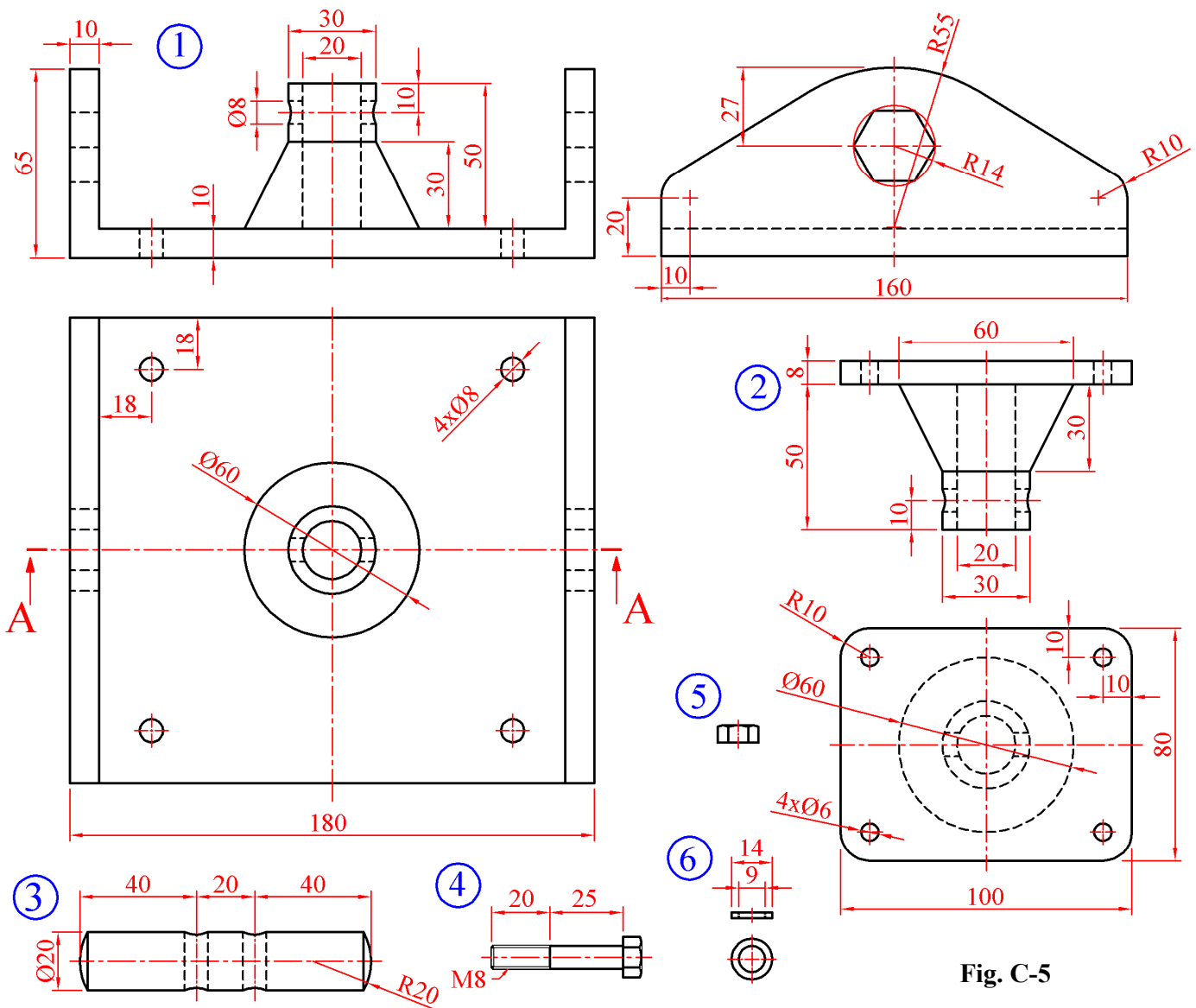


Details of a Mounting Bracket are given in Fig. C-5 with the parts list tabulated below. A 3D graphic of the individual parts is also shown.

*Note:* For clarity, some detail has been omitted from the End View of Part 1.

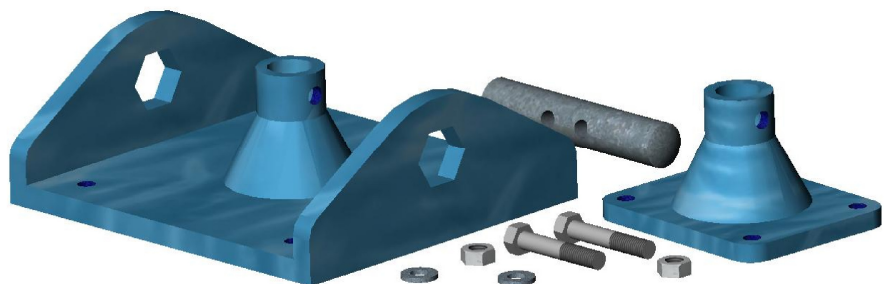
Draw the sectional elevation A-A of the assembled Mounting Bracket. (Any omitted dimensions may be estimated.)

Scale 1:1



**Fig. C-5**

Part	Name	Qty.
1	Mounting Bracket	1
2	Fixing Plate	1
3	Connecting Pin	1
4	M8 Bolt	2
5	M8 Nut	2
6	M8 Washer	2



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