



*Leaving Certificate Examination, 2009*

***Design & Communication Graphics  
Ordinary Level***

***Section A (60 Marks)***

**Time: 3 Hours**

**This examination is divided into three sections:**

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

- Four questions are presented
- SECTION A** • Answer **any three** on the A3 sheet overleaf
- 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 the A3 drawing paper
- All questions in Section C carry **45 marks**

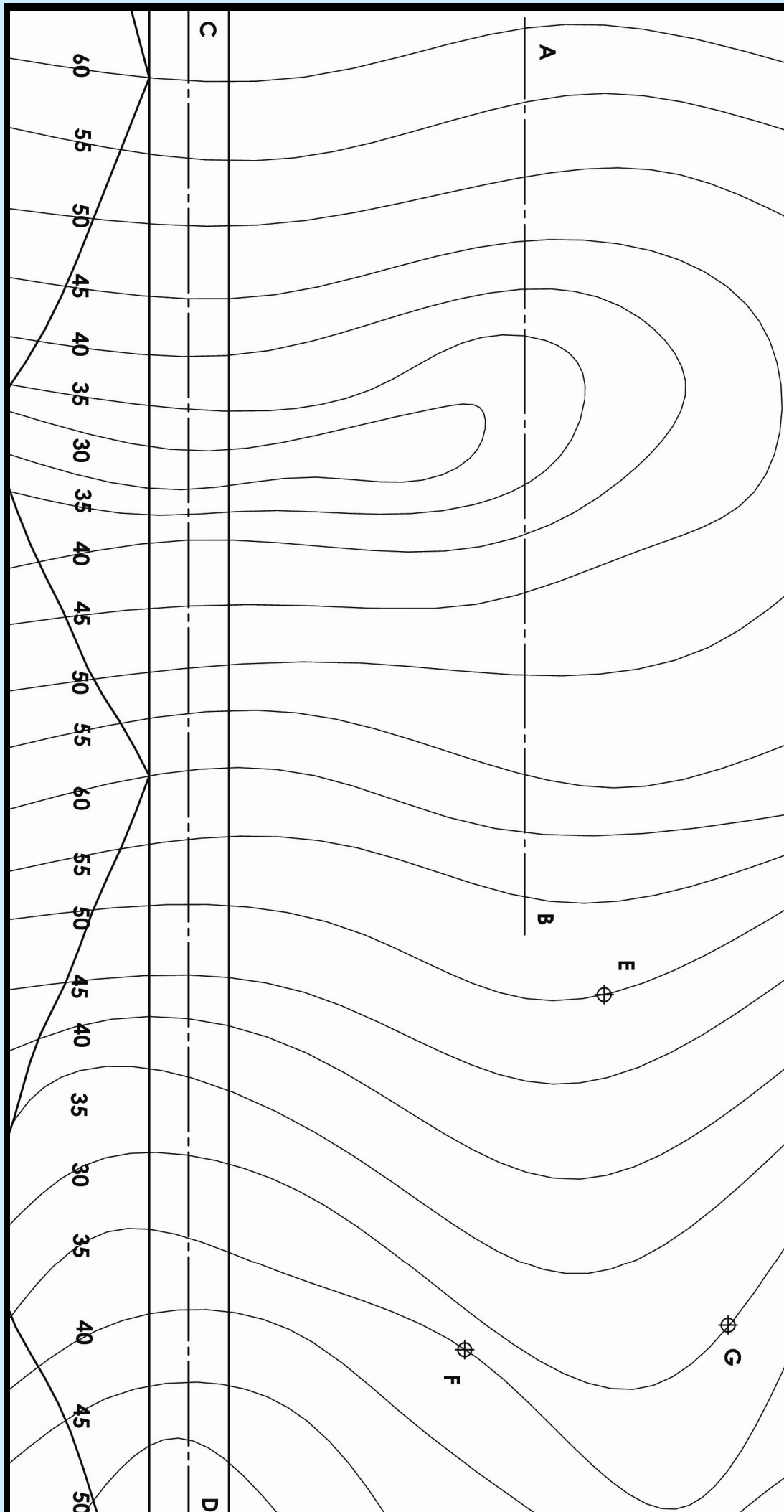
**General Instructions:**

- *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 paper only*
- *All dimensions are given in metres or millimetres*
- *Write your name, school name and teacher name in the box below and on all other sheets used*

**Name:**

**School Name:**

**Teacher Name:**

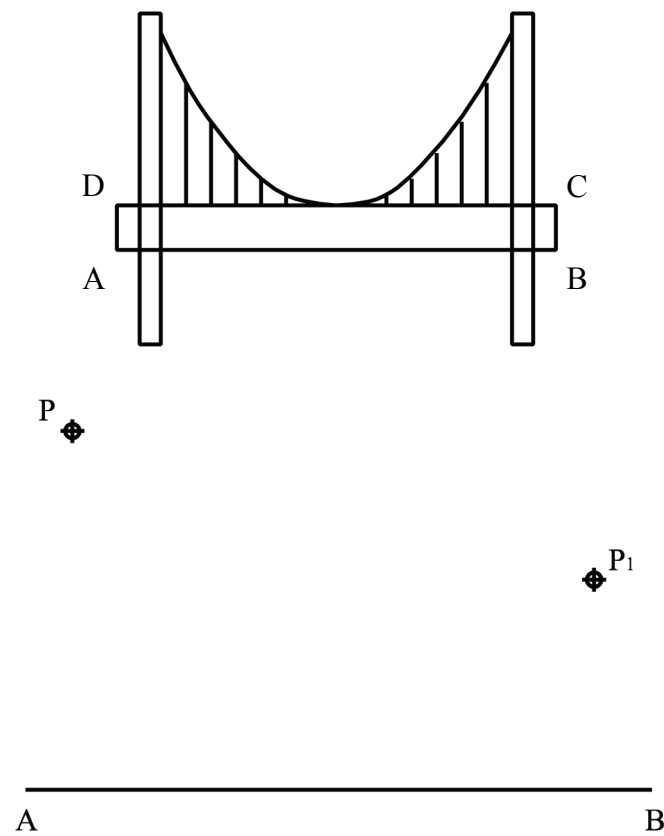
**This Contour Map is part of Section C  
and should only be used for the  
answering of the Geologic Geometry  
Option (Question C-4)**

## SECTION A - Core - Answer Any Three of the questions on this A3 sheet

**A-1.** A photograph of a parabolic bridge is shown. The drawing shows its directrix AB and a tangent CD to the curve at the vertex. The incomplete diagram shows the directrix AB and two points on the curve.

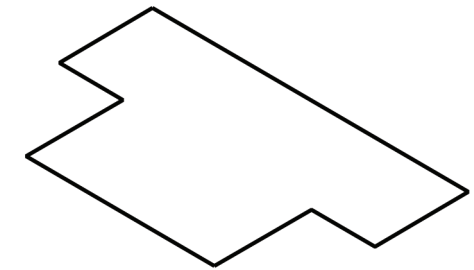
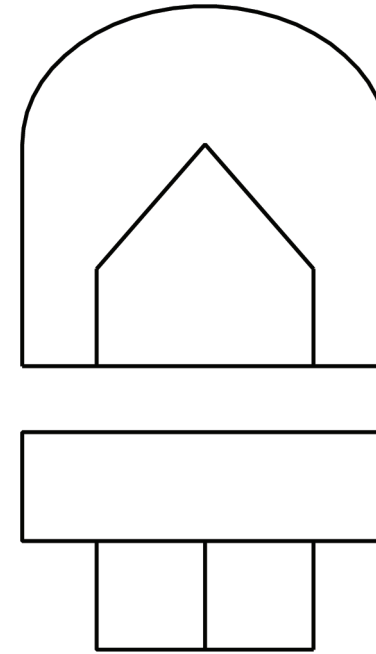


Locate the focus and vertex and draw the parabola.



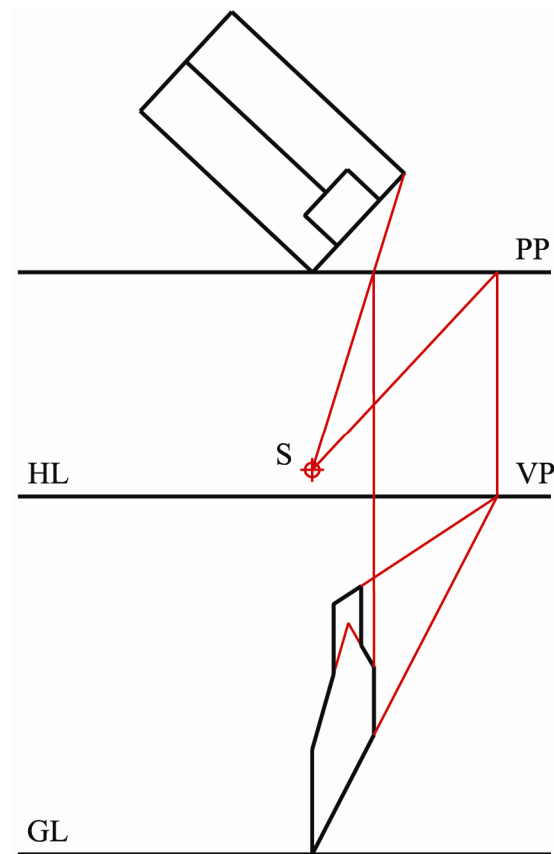
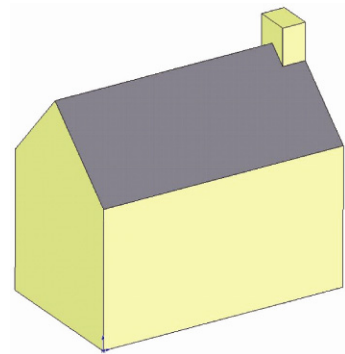
**A-3.** The drawing shows the plan and elevation of a building. The outline of the base is shown in isometric.

Complete the isometric drawing of the building.



**A-2.** The drawing shows the plan and partially completed perspective drawing of a house. The house is also shown in the 3D graphic below.

Complete the perspective drawing.

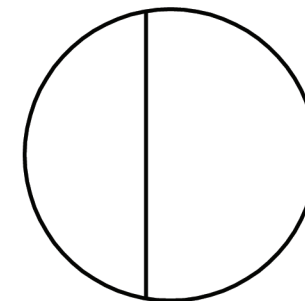
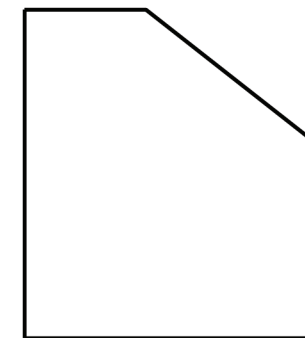
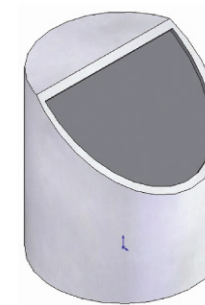


**A-4.** The drawing shows the plan and elevation of a litter bin.

A 3D graphic is also shown below.

Find the true shape of the opening by:

- (i) Using an auxiliary plan.
- OR
- (ii) Rotating the cut surface.



**This examination paper must be returned at the end of the Examination – You must include your Name, School Name and Teacher's Name on the front cover**

*Leaving Certificate Examination, 2009*

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

**Time: 3 Hours**

**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**

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

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

**General Instructions:**

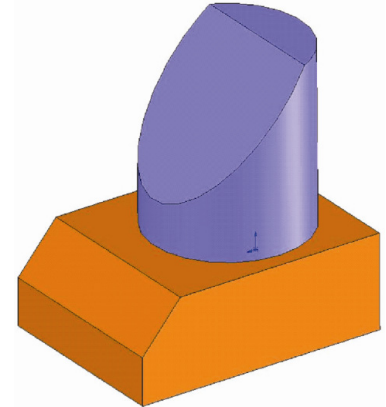
- *Construction lines must be shown on all solutions*
- *Write the question number distinctly on the answer paper in Sections B and C*
- *Work on one side of the paper only*
- *All dimensions are given in metres or millimetres*
- *Write your name, school name and teacher name in the box provided on Section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

## SECTION B - Core

Answer **Any Two** questions from this section on A3 drawing paper

- B-1.** The 3D graphic on the right shows a tee-box marker as used in a golf club. The drawing in Fig. B-1 below shows how the tee-box marker is cut to form the sloping surfaces.

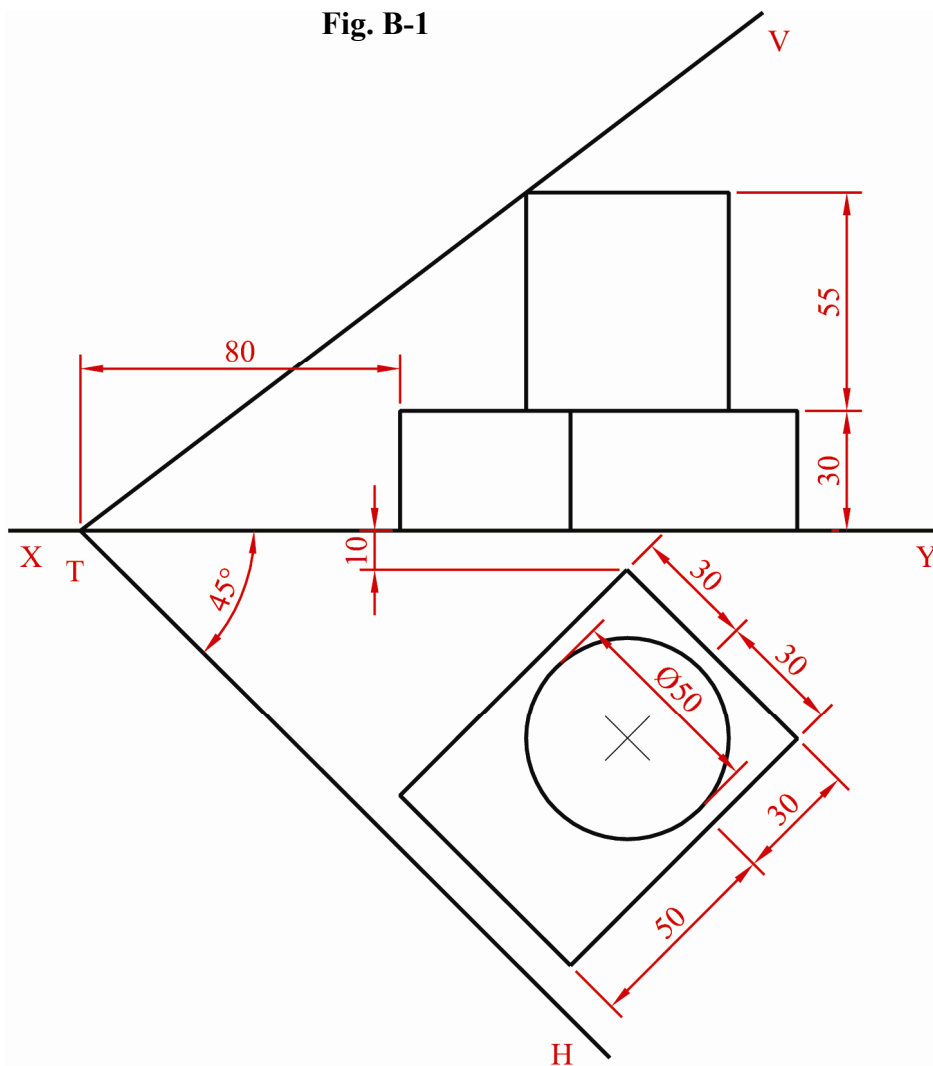
The tee-box marker consists of a cylinder of 50mm diameter and 55mm altitude. The cylinder stands on a cuboid as shown.



- (a) Draw the given plan and elevation.  
(Use a vertical orientation for the A3 sheet to maximise space.)
- (b) Draw the projections of the tee-box marker when cut by the oblique plane VTH.

Scale 1:1

Fig. B-1



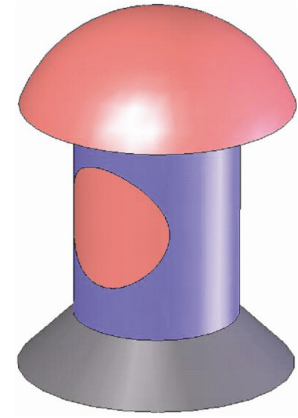
**B-2.** The 3D graphic on the right shows a traffic direction bollard which is used in a car park.

Fig. B-2 below shows the plan and elevation of the bollard. It consists of a part spherical top and a truncated conical base. The middle portion is a cylinder. The sign which includes an arrow appears as a circle in elevation.

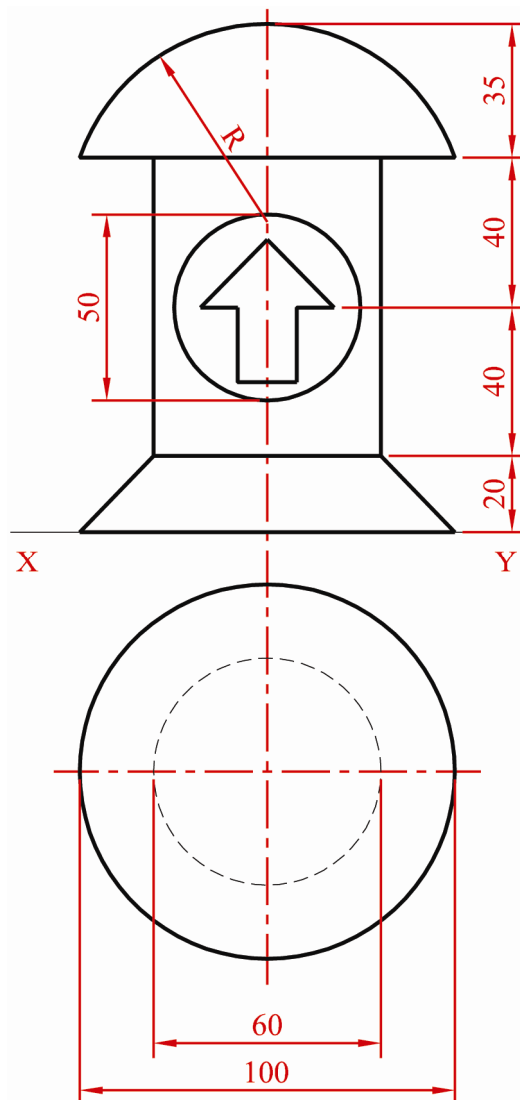
Draw the given plan and elevation.

Project an end elevation of the bollard which will include the outline of the sign.

*Note:* The elevation shows an arrow on the sign which may be ignored for the purpose of your drawing.



**Scale 1:1**



**Fig. B-2**

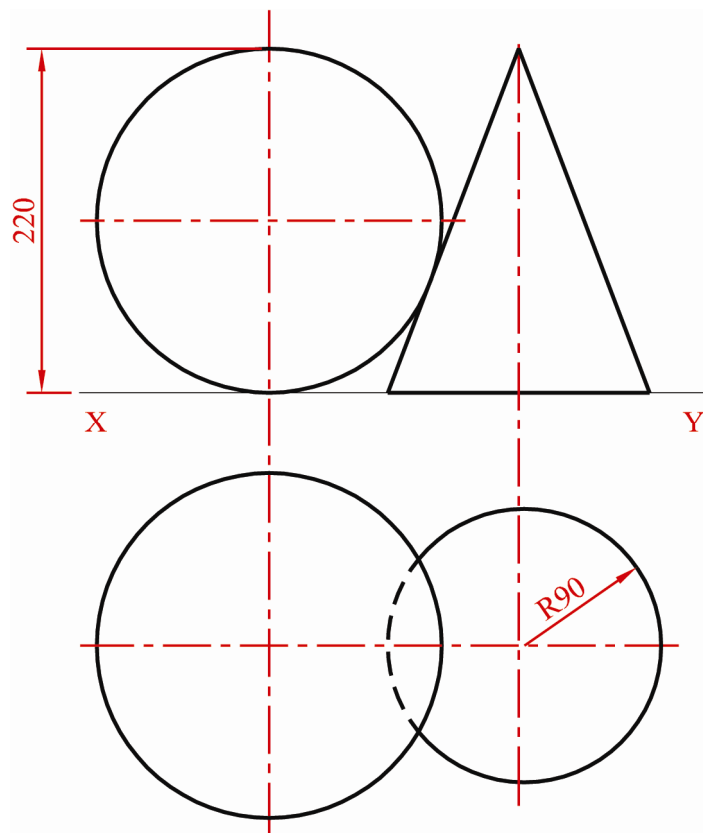
**B-3.** The photograph shows a football, a child's basketball and a training cone sitting on a horizontal surface. All three solids are in contact with each other.



Fig. B-3 below shows the plan and elevation of the training cone and the football which are in contact as shown.

- (a) Draw the given plan and elevation.
- (b) Draw the plan and elevation of the basketball which has a diameter of 160mm, in contact with the cone and the football as shown in the photograph.

**Scale 1:2**



**Fig. B-3**

# SECTION C - Applied Graphics

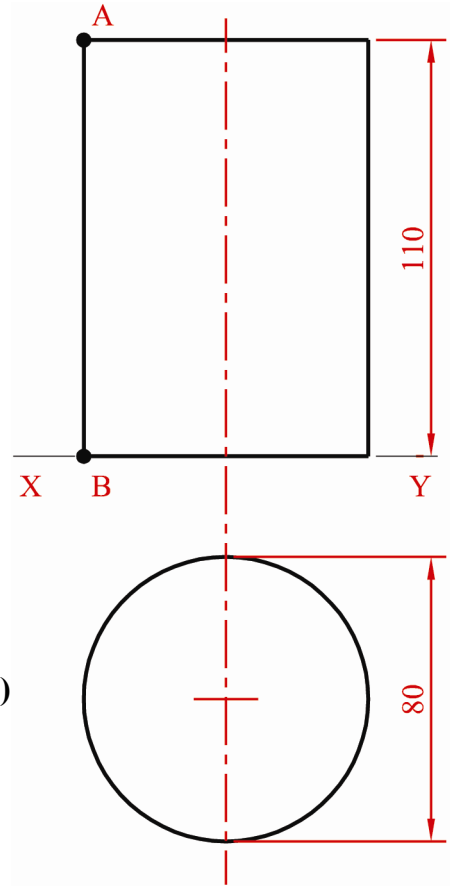
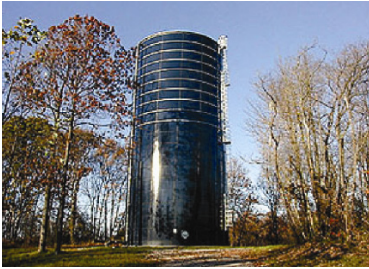
Answer **Any Two** questions (i.e. the options you have studied)  
from this section on A3 drawing paper

## Dynamic Mechanisms

**C-1. (a)** Fig. C-1(a) shows the elevation and plan of a model water storage tower. A staircase is required to travel from point A at the top of the water tower to point B at the base. To maintain gradient and minimise distance a helical path is proposed.

- (i) Draw the plan and elevation of the water tower.
- (ii) Draw the path of the helix which travels from point A to point B in one revolution.

Scale 1:1

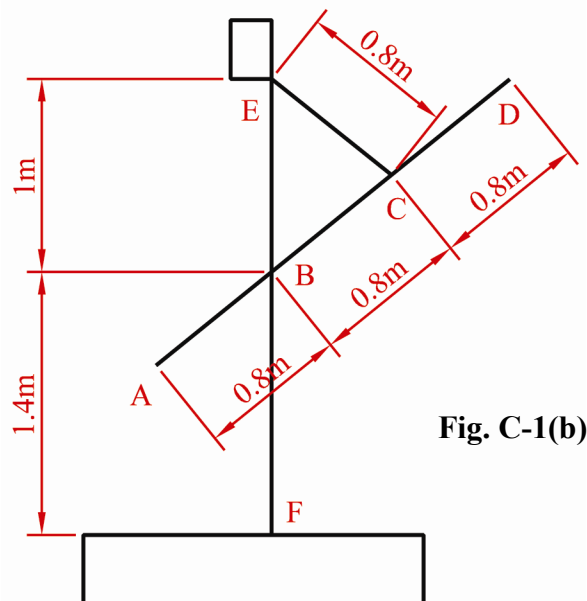
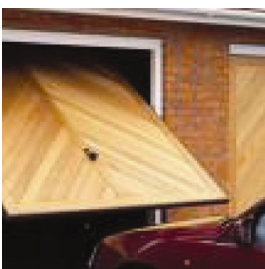


**Fig. C-1(a)**

**(b)** The diagram in Fig. C-1(b) shows the outline of an up and over garage door in a partially open position. Point B moves along the line EF while points E and C pivot as the door opens and closes.

- (i) Draw a line diagram to represent the garage door in the given position.
- (ii) Find the position of point A when the door is fully opened (when point B has reached point E).
- (iii) Plot the locus of point A as the door closes from an opened position.

Scale 1:20



**Fig. C-1(b)**



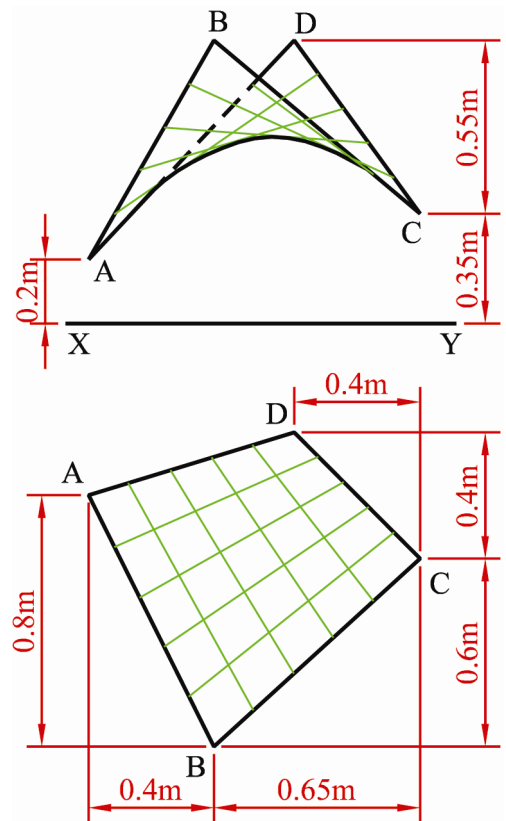
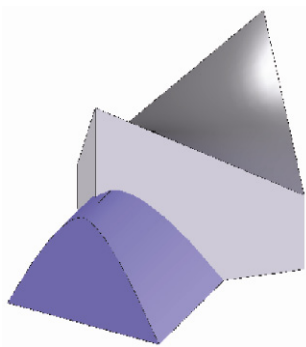
# Structural Forms

**C-2. (a)** Fig. C-2(a) shows the plan and elevation of the roof of a model church. A 3D graphic of the model is also shown.

The roof of the main building is in the form of a hyperbolic paraboloid and the front surface of the entrance porch is a parabola.

- (i) Draw the given plan and elevation.
- (ii) Determine the curvature along the line BD.

**Scale 1:10**

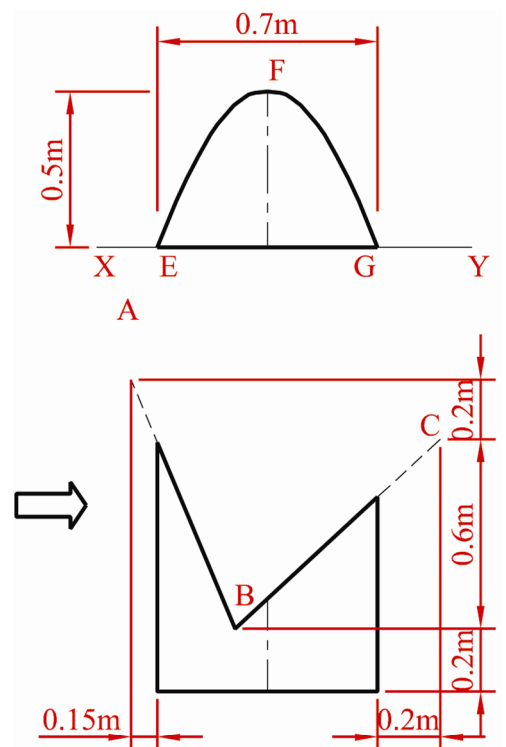


**Fig. C-2(a)**

**(b)** The plan and elevation of the entrance to the church is shown in Fig. C-2(b). The curve EFG is a parabola in elevation.

- (i) On a separate diagram draw the given plan and elevation.
- (ii) Project an end elevation in the direction of the arrow.

**Scale 1:10**



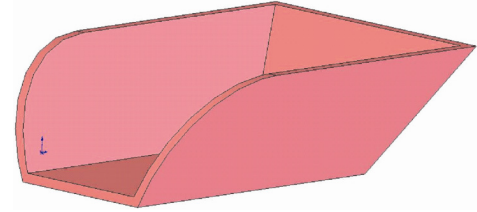
**Fig. C-2(b)**



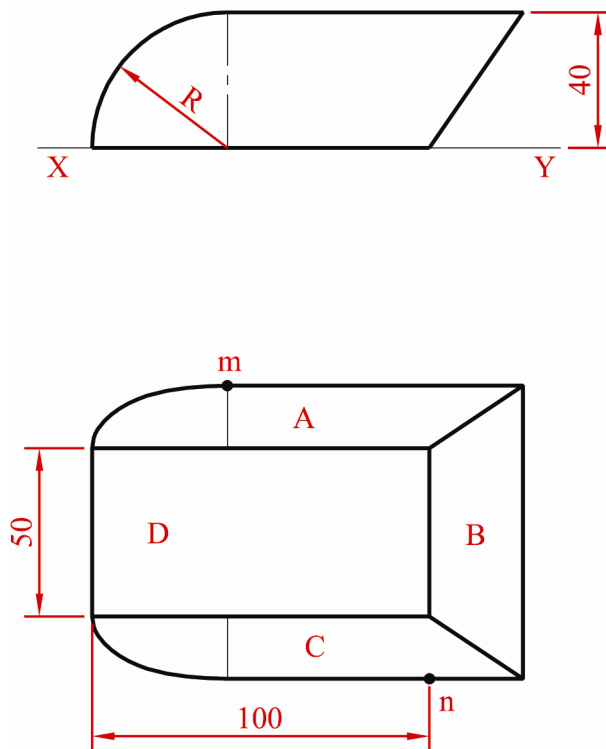
# Surface Geometry

**C-3.** The 3D graphic shows a scoop used in a pick-and-mix sweet shop. It consists of four plane surfaces. Surfaces A and C are inclined at  $65^\circ$  to the horizontal plane and the surface B is inclined at  $55^\circ$  to the horizontal plane.

- (a) Draw the plan and elevation of the scoop as given in Fig. C-3 below.
- (b) Determine the dihedral angle between the surfaces A and B.
- (c) Draw a one-piece surface development of the surfaces A, B, C and D.
- (d) Show the plan of the shortest path that can be plotted between points m and n along the surfaces A, D and C.



**Scale 1:1**



**Fig. C-3**

## 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 dip and strike of the stratum.

**Scale 1:1000**

# Assemblies

C-5. Details of a Pizza Cutter assembly are given in Fig. C-5 with the parts list tabulated on the right. A photograph of the assembled Pizza Cutter is also shown.

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

PART	NAME	REQUIRED
1	Wheel	1
2	Prong	1
3	Handle	1
4	Insert	1
5	Safety Plate	1
6	M10 Bolt	1

Scale 1:1

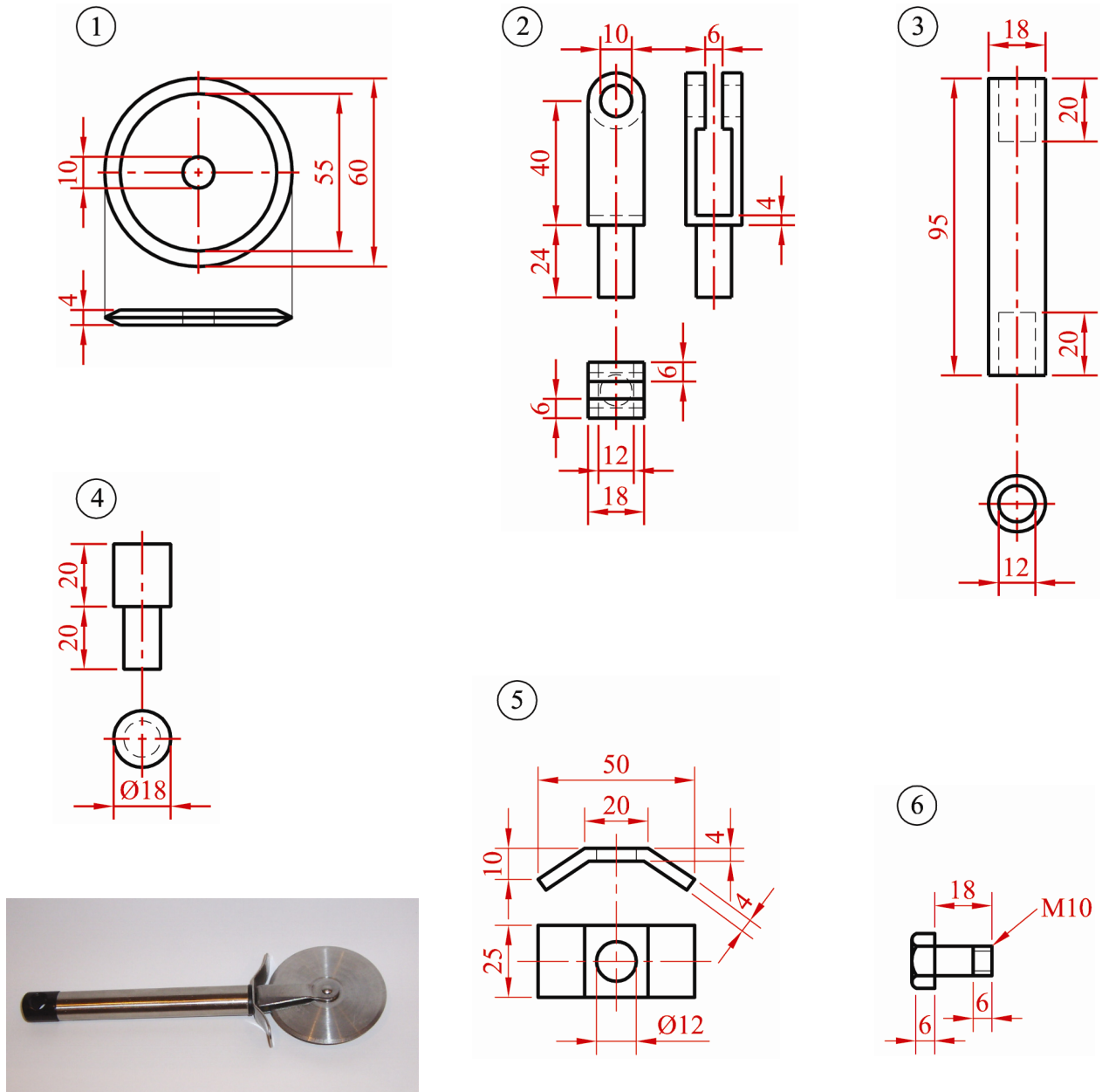


Fig. C-5

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