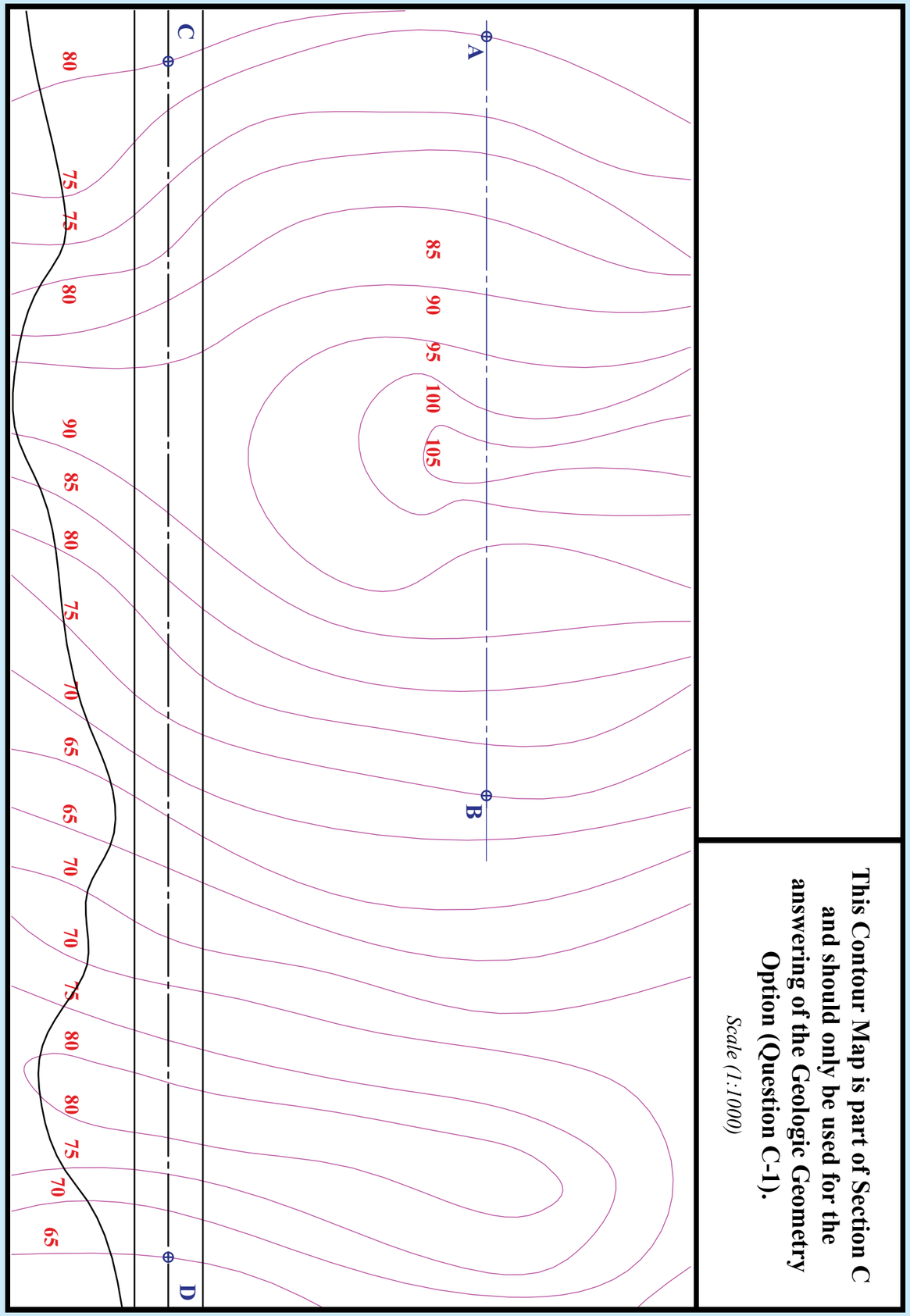


This Contour Map is part of Section C and should only be used for the answering of the Geologic Geometry Option (Question C-1).

Scale (1:1000)

L.84A

Pre-Leaving Certificate Examination, 2016

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)

SECTION A
- Four questions are presented.
- Answer **any three** on the A3 sheet overleaf.
- 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 Name, School Name and Teacher's Name in the box below and on all other sheets used.*

Name:

School Name:

Teacher's Name:

SECTION A - Core - Answer **any three** of the questions on this A3 sheet.

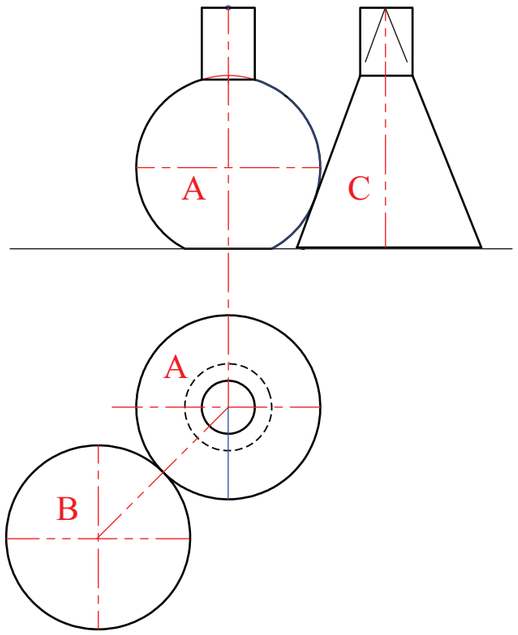
A-1. The 3D graphic below shows glassware used in a science laboratory. Solid **A** is based on a sphere, solid **B** is based on a cylinder and solid **C** is based on a cone.

The drawing on the right shows the plan and elevation of solid **A**. Solid **B** is also shown in the plan and solid **C** is shown in the elevation; both are in contact with solid **A**.

All solids rest on the horizontal plane and have the same altitude.

(a) Draw the elevation of solid **B**.

(b) Draw the plan of solid **C**.

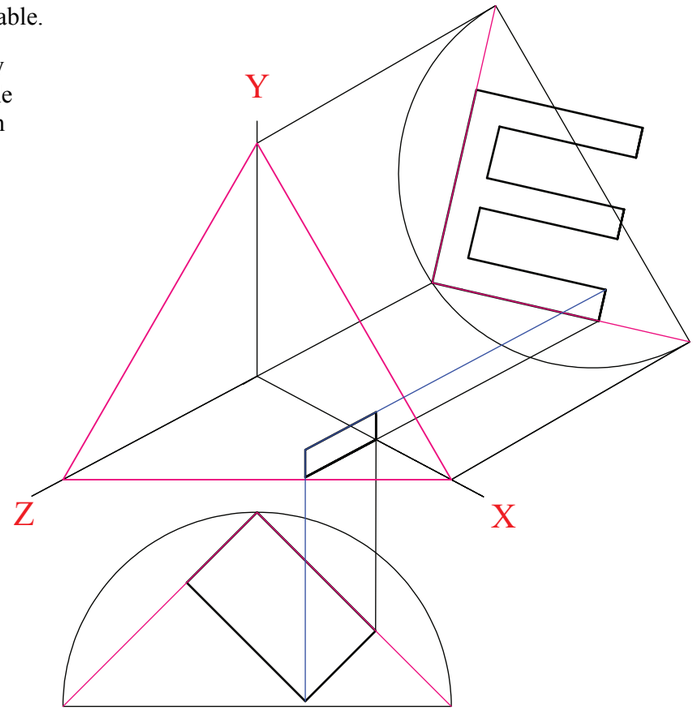


A-2. The 3D graphic below shows a side table.

A set of isometric axes and a partially completed outline drawing of the table are shown on the right. The elevation and partially completed plan of this table have been positioned relative to the axes as shown.

(a) Complete the plan of the table.

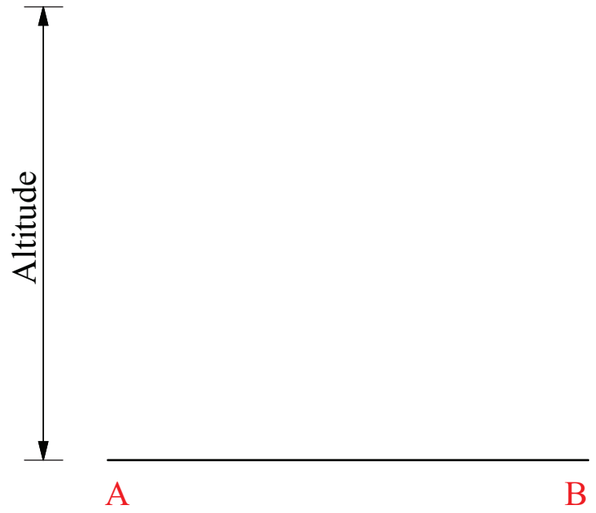
(b) Complete the axonometric projection of the table.



A-3. The 3D graphic below shows the flight path of a golf ball when hit with a club. The curve is in the shape of a parabola. The drawing on the right shows point **A** where the ball is hit, point **B** where the ball hits the ground and the altitude the ball reaches along its flight path.

(a) Locate the axis and the vertex of the parabola.

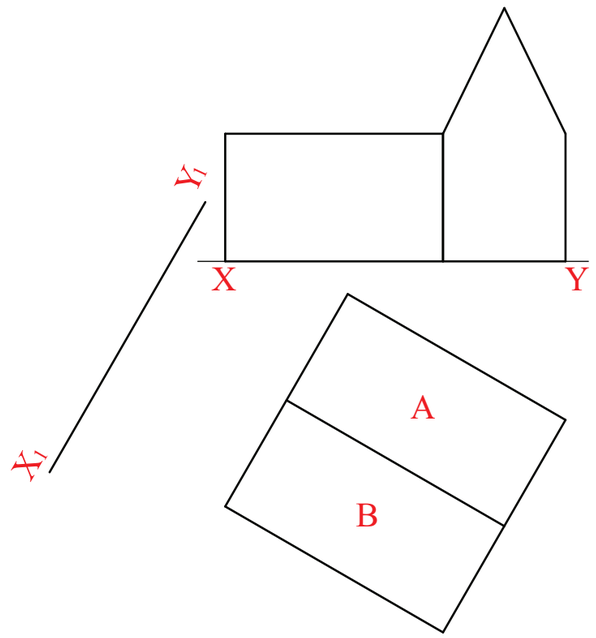
(b) Locate at least four additional points on the parabola and draw a portion of the curve.



A-4. The 3D graphic below shows a greenhouse. The plan and incomplete elevation are also shown.

(a) Complete the elevation of the greenhouse.

(b) Draw an auxiliary view of the greenhouse, on the given X_1 Y_1, which will show the true angle between the surfaces **A** and **B**.



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

Pre-Leaving Certificate Examination, 2016

Design & Communication Graphics
Ordinary Level
Sections 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** 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 Name, School Name and Teacher's 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 drawing paper.

B-1. The 3D graphic on the right shows a dog kennel.

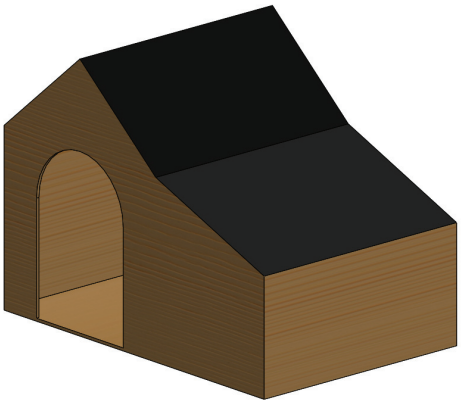


Fig B-1 below shows the plan and elevation of the dog kennel.

(a) Draw the given plan and elevation.

(b) Draw an auxiliary elevation of the structure, projected from the plan in the direction of the arrow.

Scale 1:1

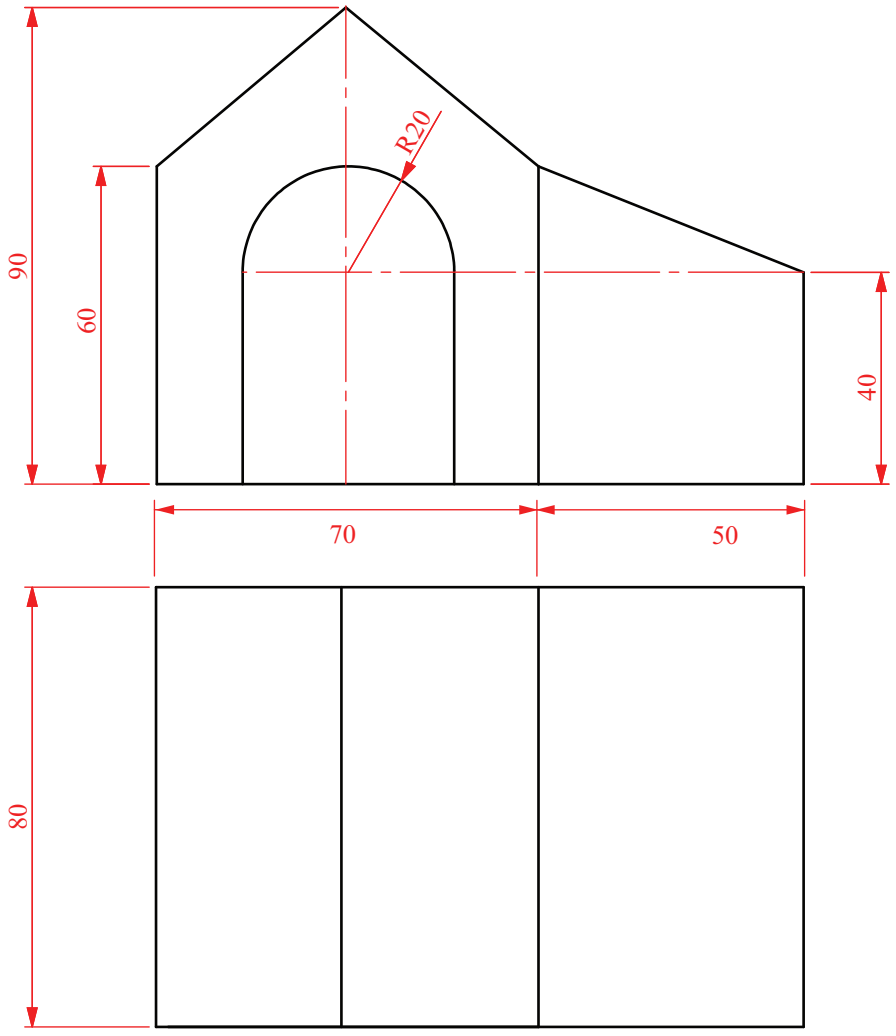
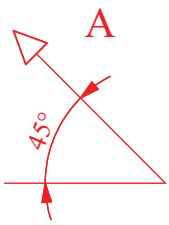


Fig. B-1



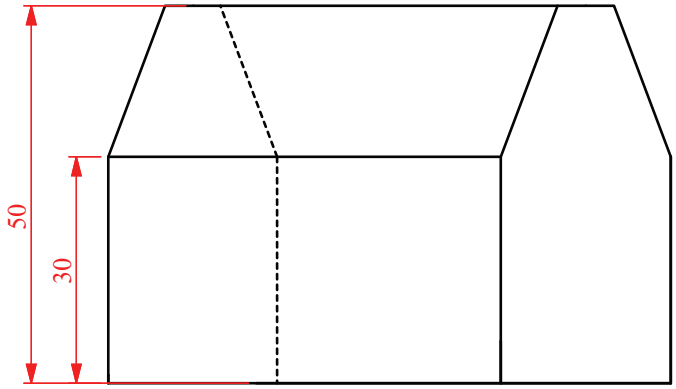
B-2. The 3D graphic on the right shows a bouncy castle.

Fig. B-2 below shows the plan and elevation of the bouncy castle.

Make a perspective drawing of the structure given the following:

- The spectator point **S** is 100mm from corner **A**
- The picture plane passes through corner **A**
- The horizon line is 60mm above the ground line.

Scale 1:1



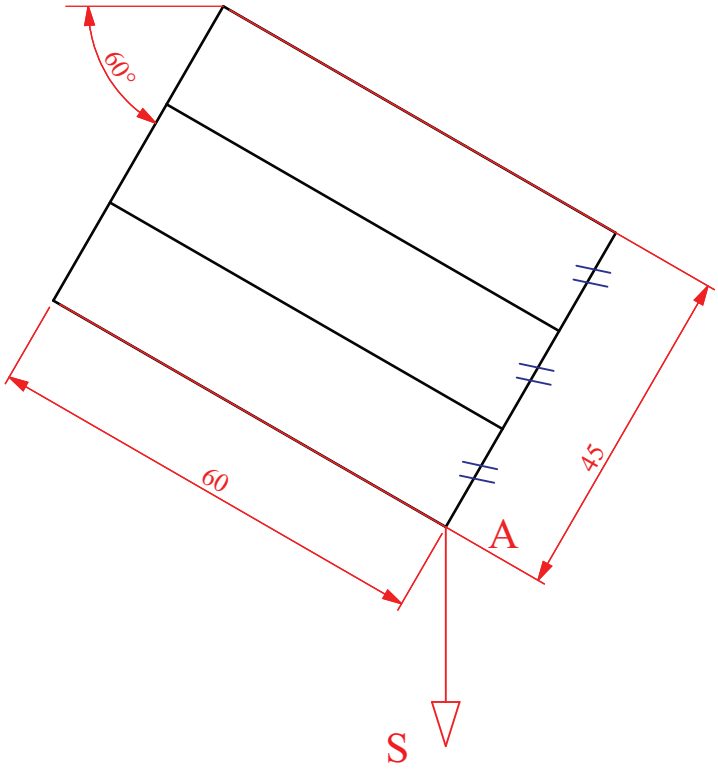


Fig. B-2

B-3. The 3D graphic on the right shows a child's toy. An equilateral triangular prism penetrates the main part of the toy.

Fig. B-3 below shows the plan and incomplete elevation of the toy.

(a) Draw the given plan and elevation of the toy showing all lines of interpenetration.

(b) Draw an end view of the toy.

Scale 1:1

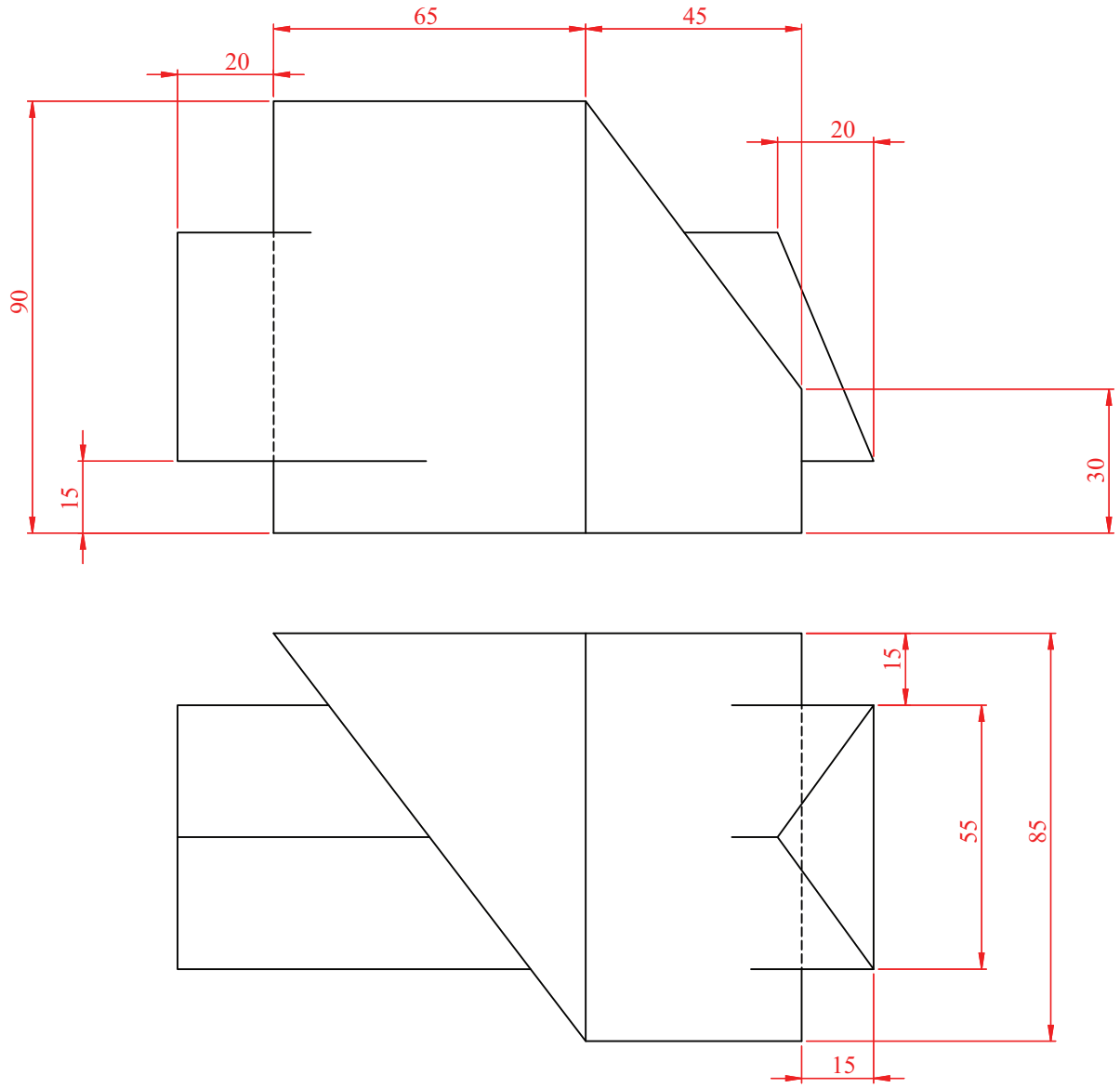


Fig. B-3

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) Determine and indicate the maximum difference in altitude recorded along the line **AB**.

(c) The line **CD** is the centreline of a proposed level roadway which is at an altitude of 60m.

Using side slopes of 1 in 1 for the cuttings, complete the earthworks on the northern side 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 graphic on the right shows a modern building. It has a roof in the form of a hyperbolic paraboloid.

Fig. C-2 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 elevation of the hyperbolic paraboloid surface.

(c) Determine the curvature along the line **BD**.

Scale 1:1

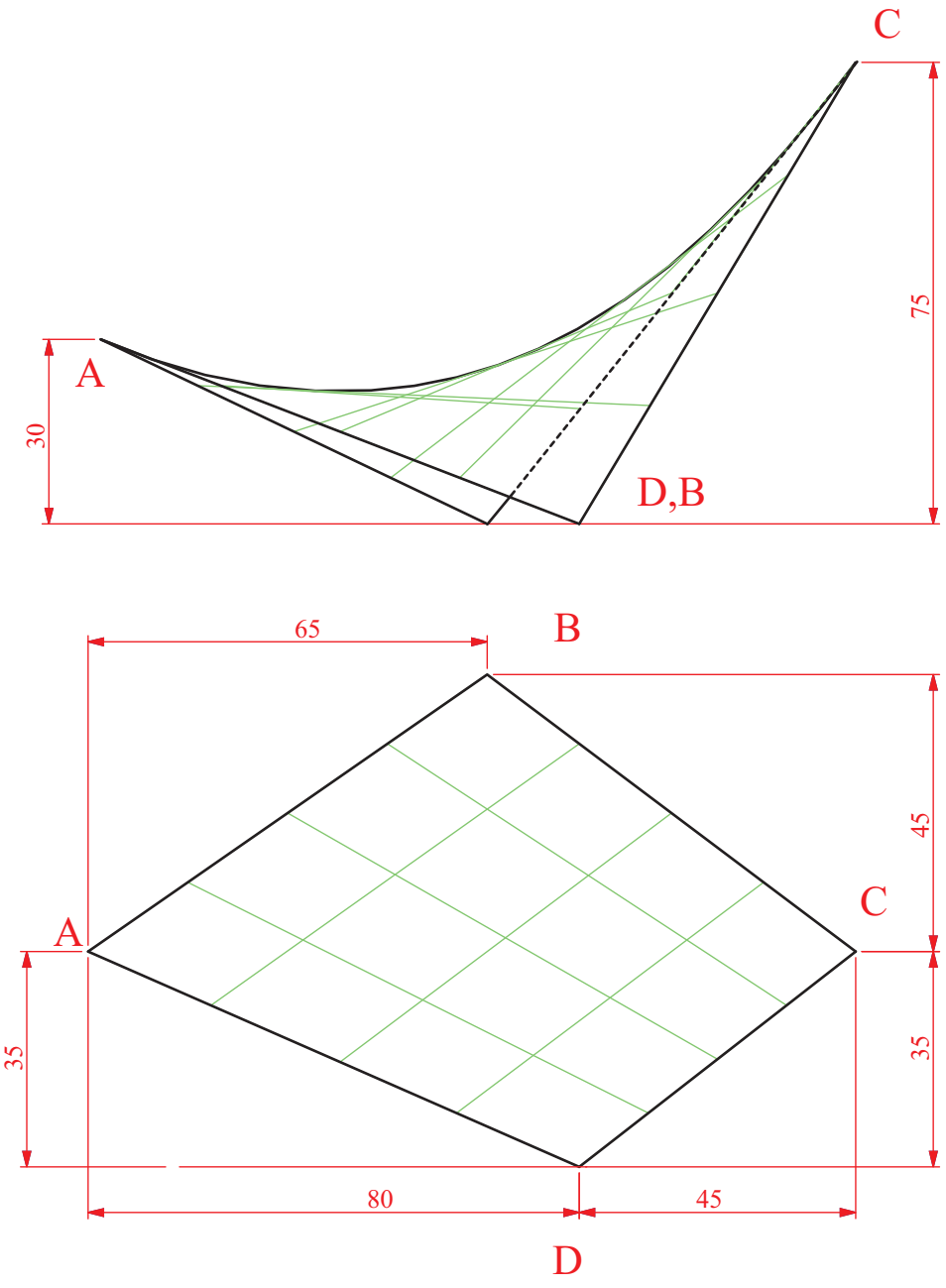


Fig. C-2

Surface Geometry

C-3. The 3D graphic on the right shows a storage box.

Fig. C-3 shows the plan and elevation of the storage box.

(a) Draw the given views.

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

Scale 1:1

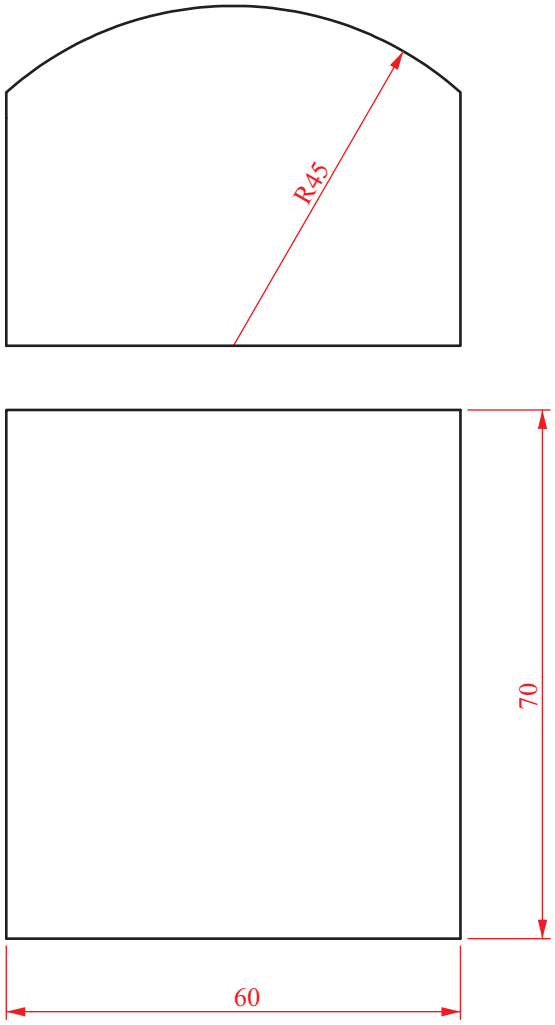


Fig. C-3

Dynamic Mechanisms

C-4. The graphic on the right shows a leaping horse toy.

A cam mechanism is used inside the toy to move the horse's body up and down as the wheel is turned.

The cam imparts the following motion to an inline knife follower:

- 0° to 120° Rise 45mm with simple harmonic motion
- 120° to 210° Dwell
- 210° to 360° Fall 45mm with uniform velocity

(a) Draw the displacement diagram for the cam.

(b) Draw the cam profile given the following information:

- The cam rotates in a clockwise direction
- The nearest approach of the follower to the centre of the camshaft is 15mm
- the camshaft diameter is 20mm.

Scale 1:1

(c) The 3D graphic on the right shows an old style bicycle, known as a *penny farthing*.

In Fig. C-4 below, the circle **C** represents a wheel of the bicycle. 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

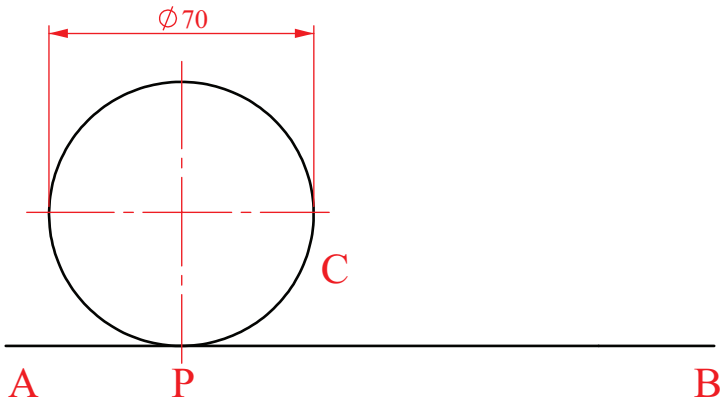


Fig. C-4

Assemblies

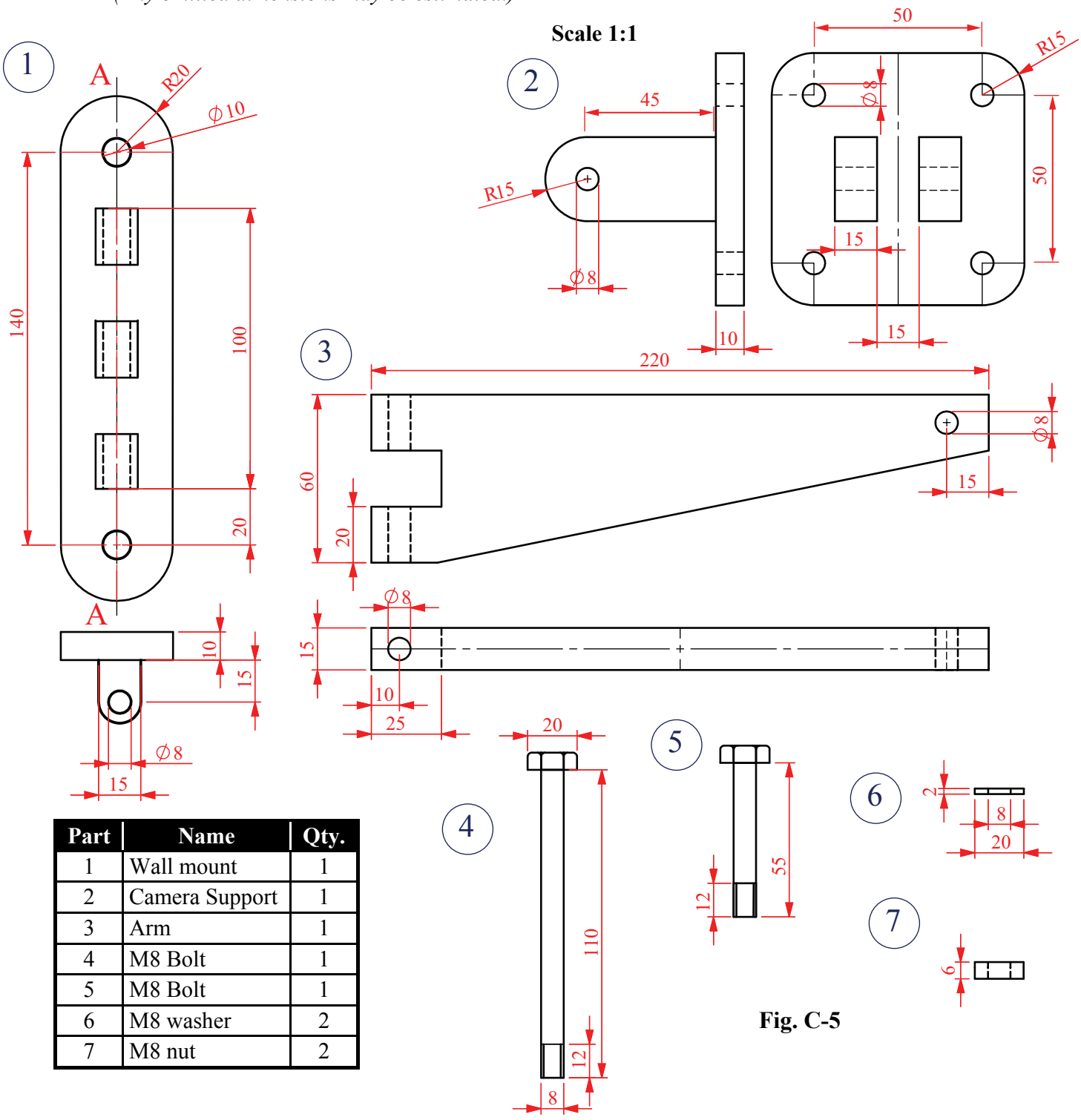
C-5. Details of a *Support Bracket* for a CCTV camera, as shown on the right, are given in Fig. C-5 below. A parts list is also given.

(a) Draw the ***sectional elevation*** **A-A$_1$** of the assembled Support Bracket, in the ***fully extended*** position when the camera's line of vision is in a horizontal position.

(b) Calculate the maximum angle of rotation that the Support Bracket can be rotated through when assembled, but without a CCTV camera mounted on it.

(Any omitted dimensions may be estimated.)

Scale 1:1



Part	Name	Qty.
1	Wall mount	1
2	Camera Support	1
3	Arm	1
4	M8 Bolt	1
5	M8 Bolt	1
6	M8 washer	2
7	M8 nut	2

Fig. C-5

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