



Pre-Leaving Certificate Examination, 2013

***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** each.

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

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

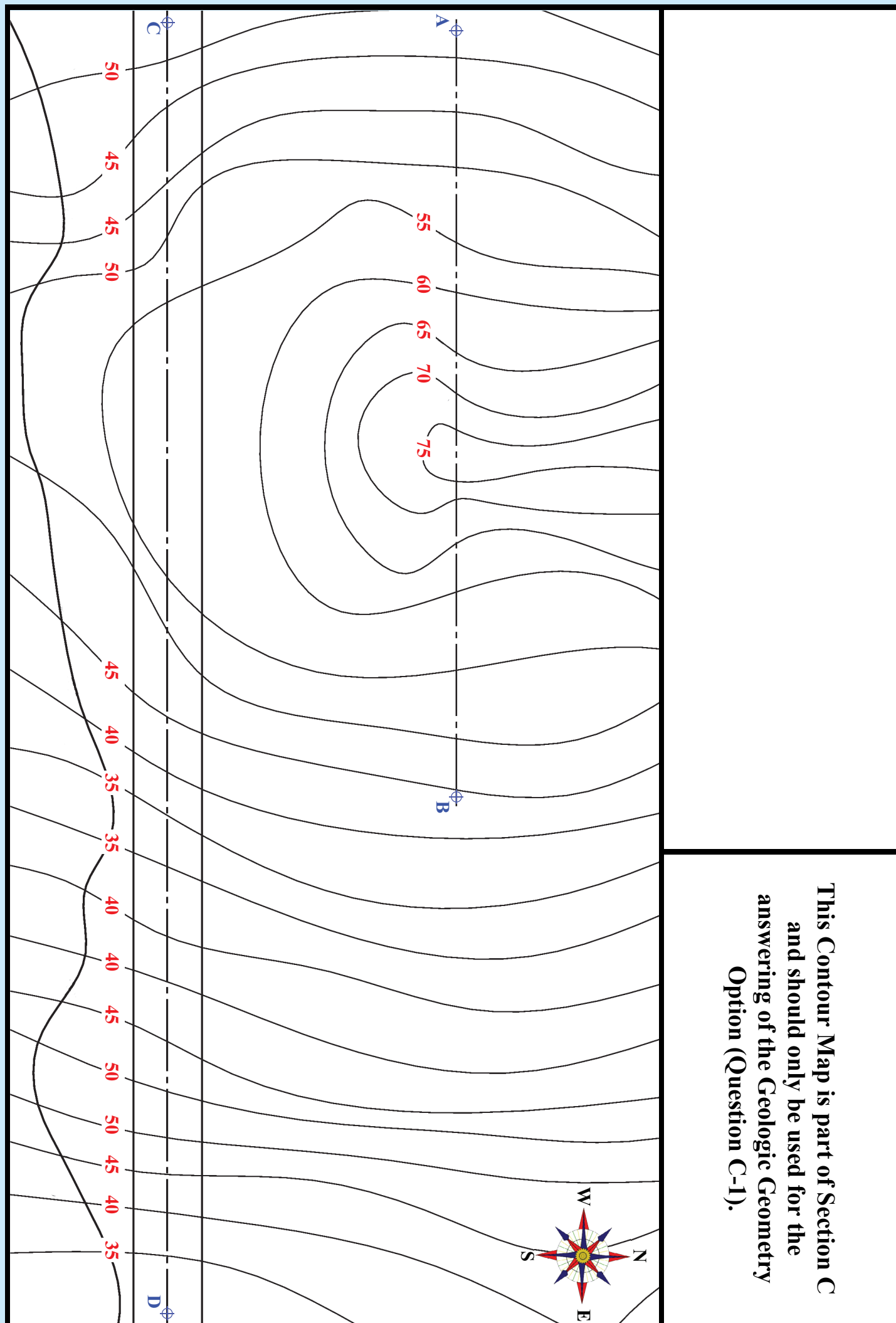
General Instructions:

- 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 name in the box below and on all other sheets used.

Name:

School Name:

Teacher Name:



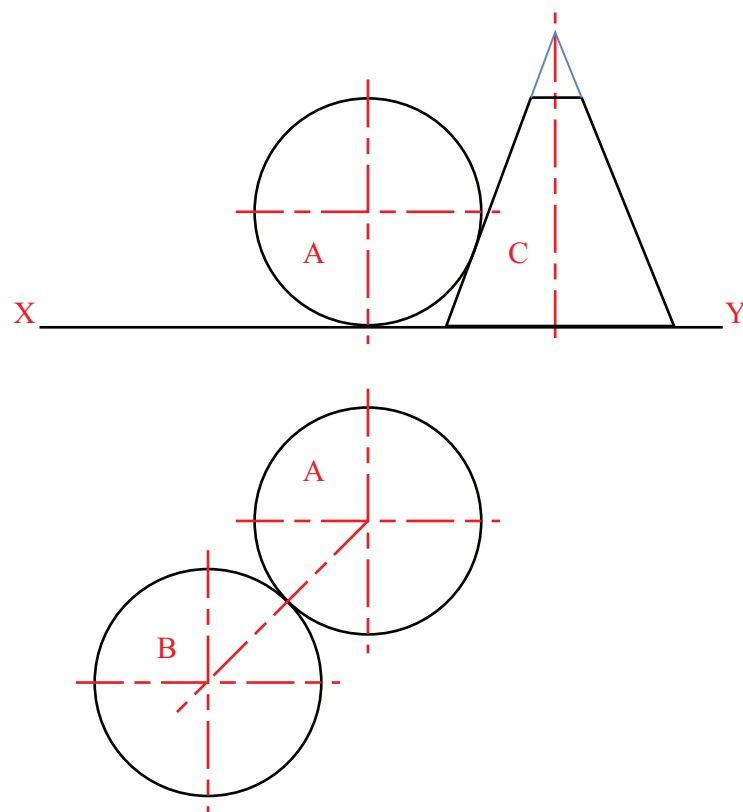
**This Contour Map is part of Section C
and should only be used for the
answering of the Geologic Geometry
Option (Question C-1).**

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

A-1. The 3D graphic below shows three candles.

The drawing on the right shows the plan and elevation of the sphere **A**. The plan of sphere **B** and the elevation of cone **C** which are in contact with sphere **A** are also shown. All solids rest on the horizontal plane.

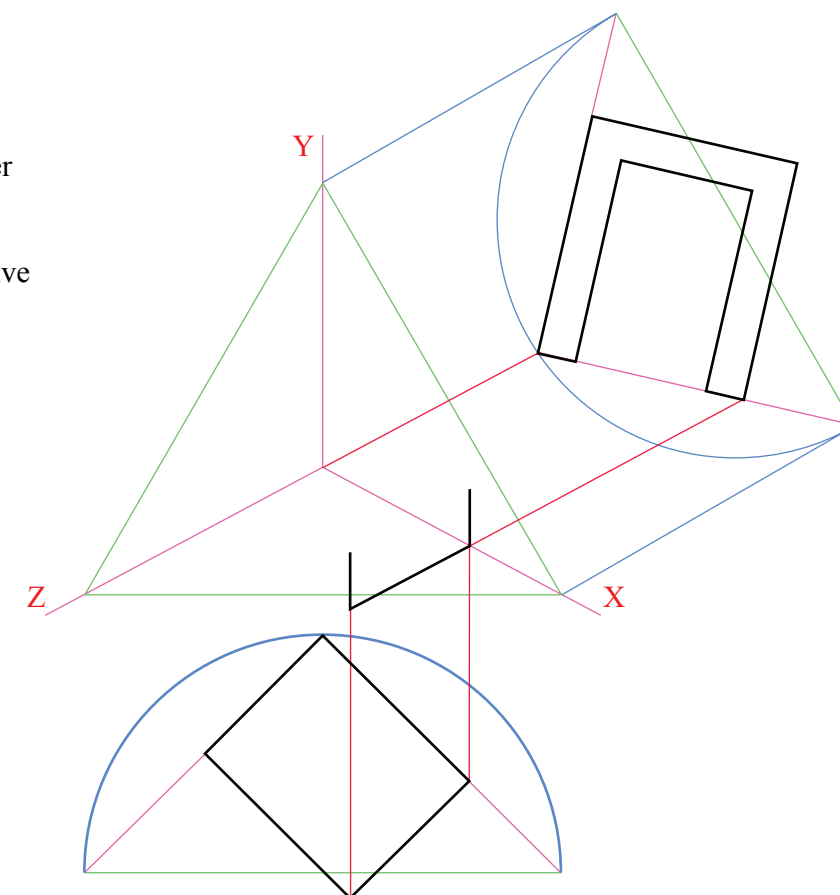
- (a) Draw the elevation of sphere **B**.
- (b) Draw the plan of cone **C**.



A-3. The 3D graphic below shows a nest of tables.

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

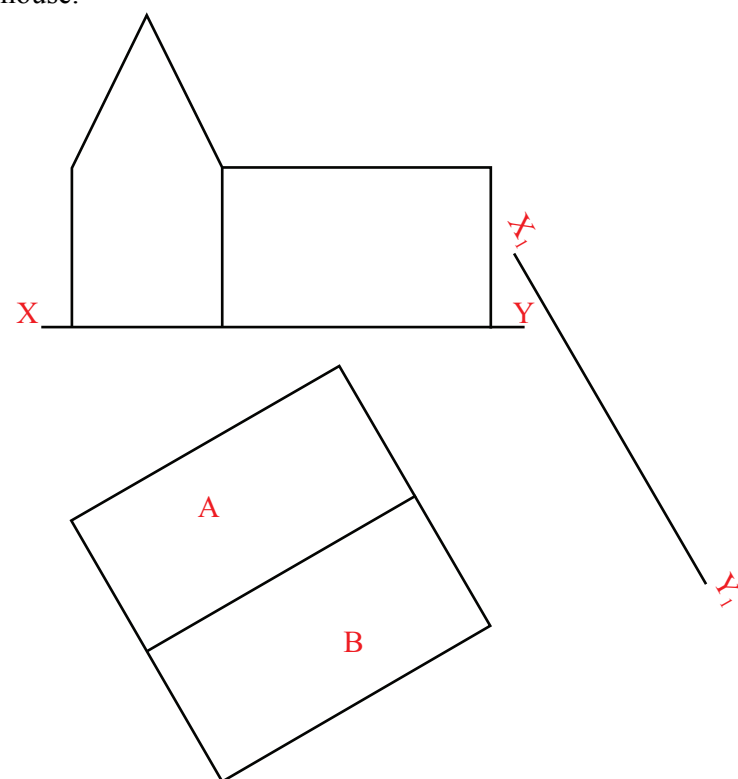
- (a) Complete the plan of the table.
- (b) Complete the axonometric projection.



A-2. The photograph below shows a bird house.

The plan and incomplete elevation of the bird house are shown on the right.

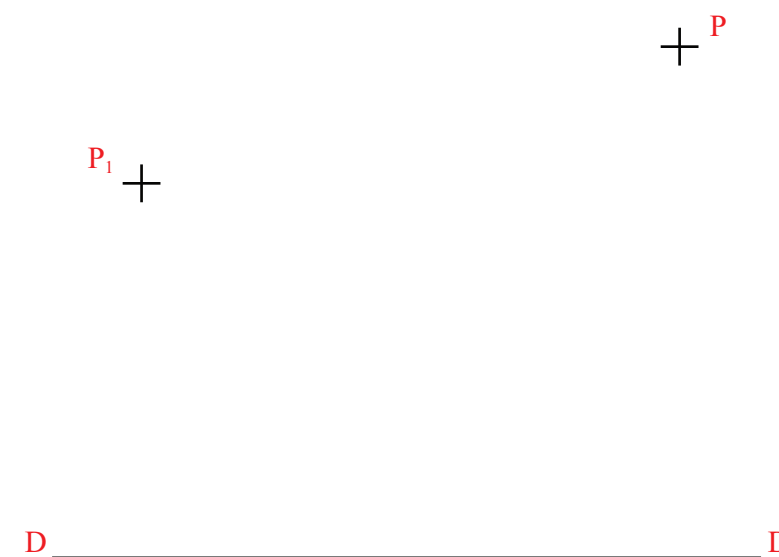
- (a) Complete the elevation of the outline of the bird house.
- (b) Draw an auxiliary elevation of the birdhouse, on the given X_1Y_1 , which will show the true angle between the two roof surfaces **A** and **B**.



A-4. A photograph of a bridge with a parabolic support is shown.

The drawing on the right shows the directrix of the parabola and two points on the curve **P** and **P₁**.

- (a) Locate the focus, axis and vertex of the parabola.
- (b) Locate at least four extra points and draw a portion of the curve.



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

Pre-Leaving Certificate Examination, 2013

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

Sections B and C (180 marks)

Time: 3 Hours

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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 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 the entrance to a dwelling house.

Fig. B-1 below shows the plan and elevation of one half of a similar entrance. It consists of two piers and a curved wall as shown.



(a) Draw the given plan and elevation.

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

Scale 1:1

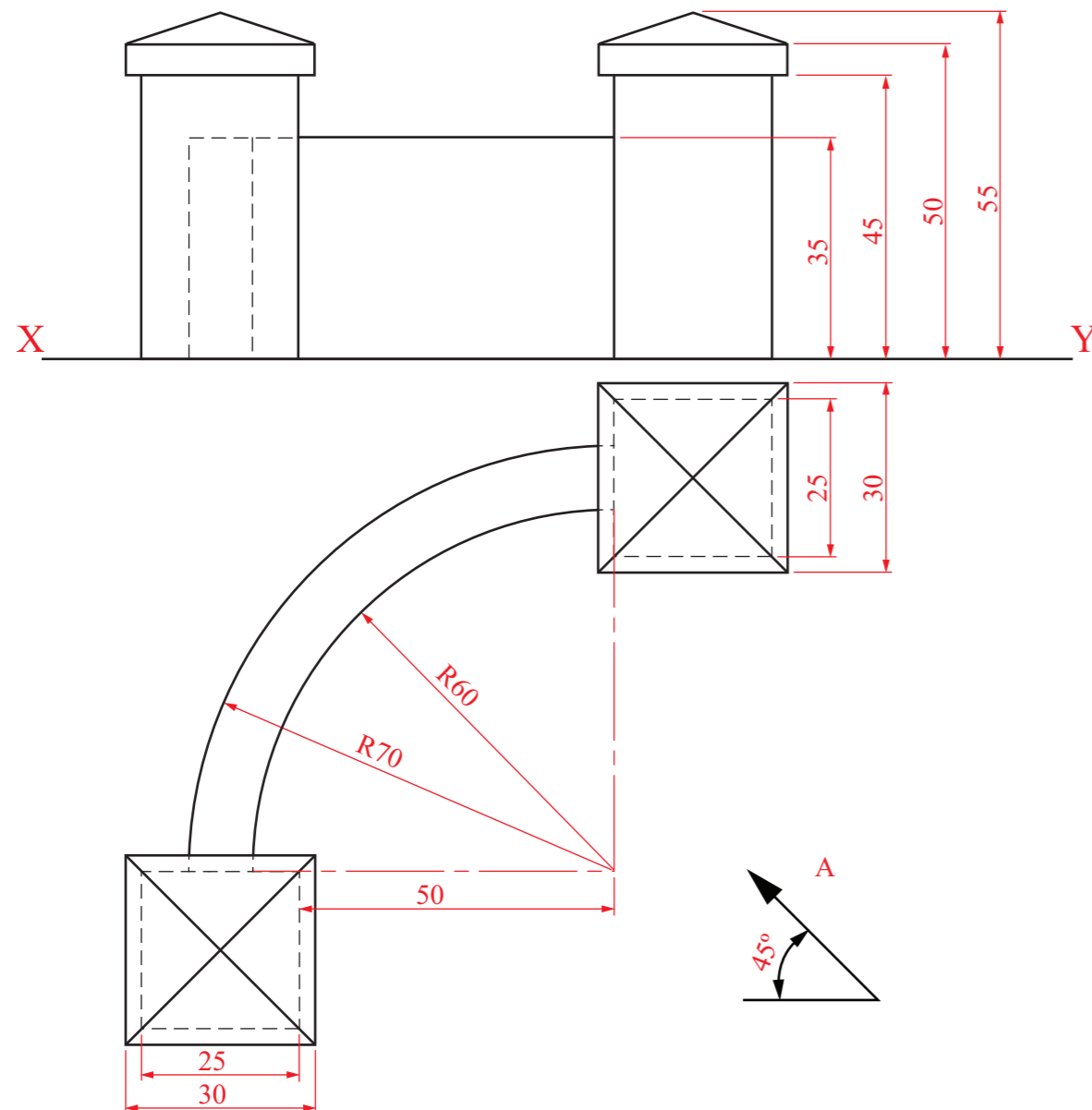


Fig. B-1

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B-2. The graphic on the right shows a ski chalet.

Fig. B-2 below shows the plan and elevation of a portion of the chalet.

Make a perspective drawing of the house given the following:

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



Scale 1:1

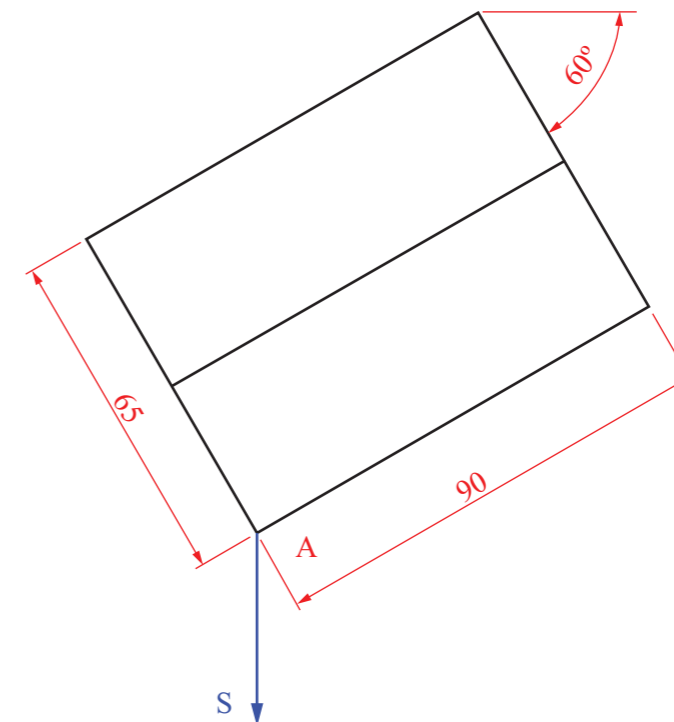
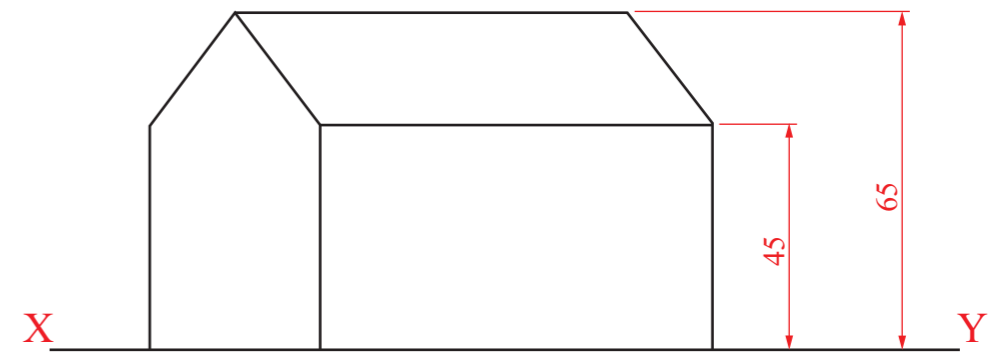


Fig. B-2

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B-3. The graphic on the right shows a portion of a climbing frame in a children's playground.

Fig. B-3 shows the elevation and end elevation of a solid with an octagonal hole which is based on the shape of the climbing frame.



- (a) Draw the octagon and complete the end view.
- (b) Draw the given elevation.
- (c) Project a plan from the elevation.

Scale 1:1

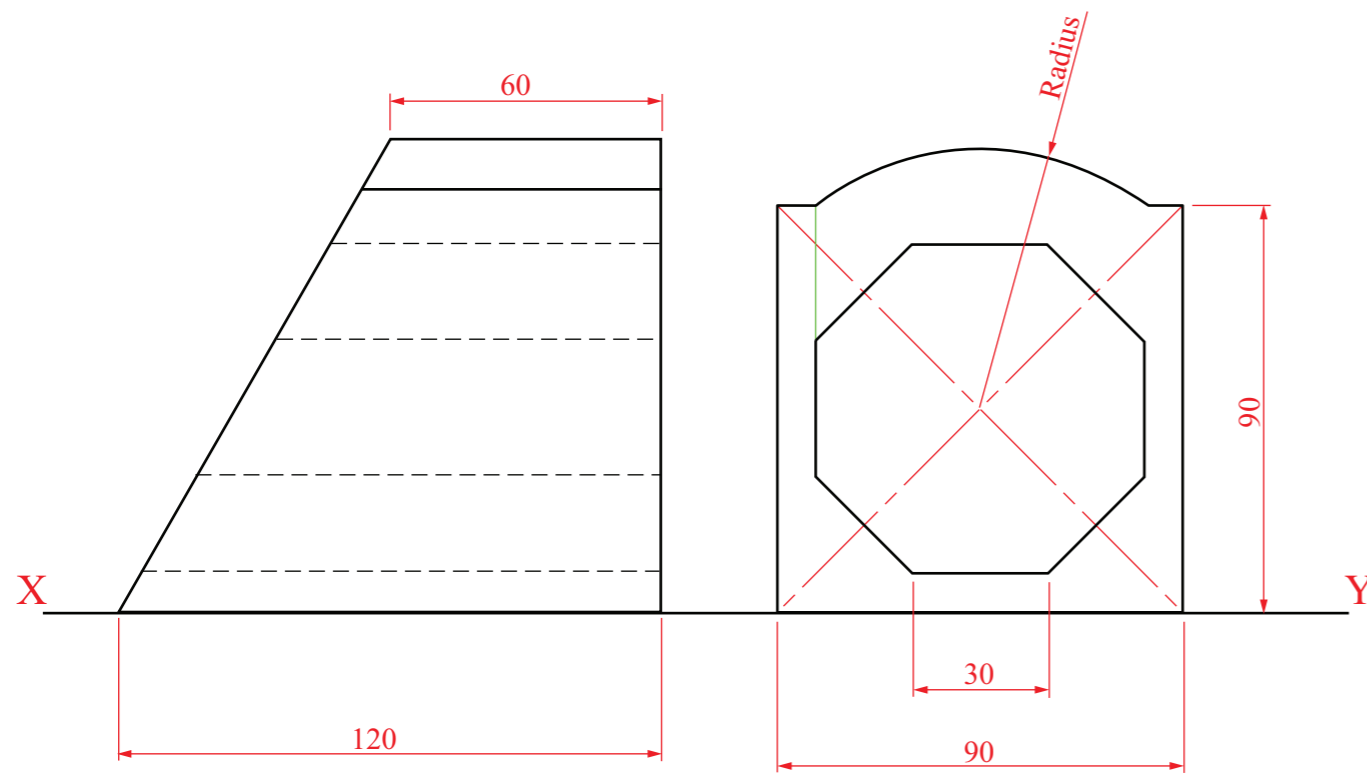


Fig. B-3

Assemblies

C-5. The 3D graphic on the right shows a sweet scoop.

Details of a similar sweet scoop are given in Fig. C-5 with the parts list tabulated below.

Note: For clarity, some centrelines have been omitted.

Draw the **sectional elevation** A-A of the assembled sweet scoop.

(Any omitted dimensions may be estimated.)

Scale 1:1

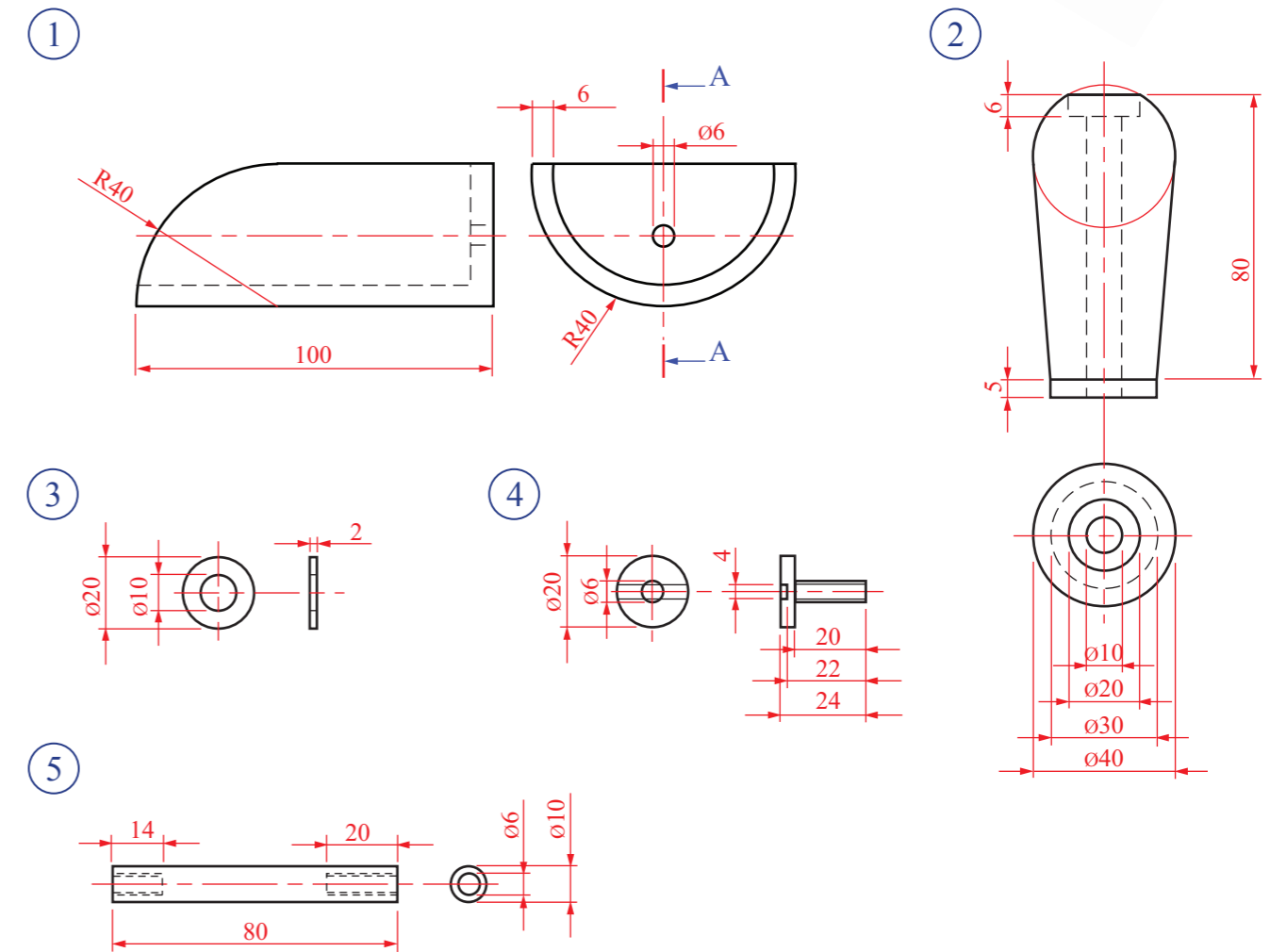


Fig. C-5

Part	Name	Qty.
1	Scoop	1
2	Handle	1
3	Washer	1
4	Screw Set	2
5	Screw Set Receiver	1

Dynamic Mechanisms

C-4. (a) The graphic on the right shows a toy train. A cam and in-line follower are used inside the train to move the chimney stack up and down as the train rolls along the track.



Draw the profile of a clockwise cam which provides the following displacement to an in-line knife-edge follower:

- 0° to 120° SHM rise of 45mm
- 120° to 210° Dwell
- 210° to 360° UV fall of 45mm

Draw the displacement diagram.

Note: The displacement diagram and the profile of the cam are required.

Scale 1:1

(b) The graphic on the right shows a crank and sliding link mechanism. A line diagram of the mechanism is shown in Fig. C-4.



The rod **OA** rotates about point **O** causing the link **C** to move in a horizontal direction along the line as shown.

Find the maximum and minimum distances that can exist between points **O** and **C** in any one revolution.

Scale 1:1

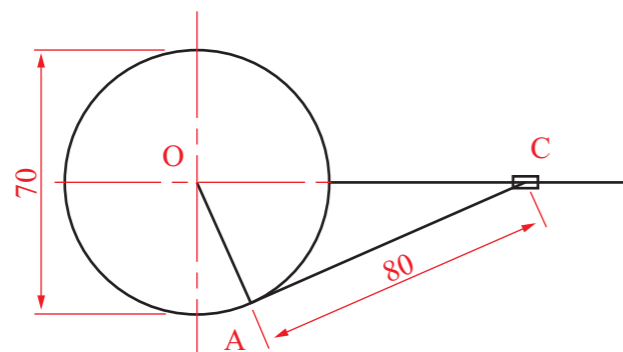


Fig. C-4

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) **CD** is the centreline of a proposed roadway which is level at an altitude of 30m.

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

Structural Forms

C-2. The graphic on the right shows a carport.
Its roof is in the form of a hyperbolic paraboloid.

Fig. C-2 below shows the plan and elevation of the roof. Points **A** and **C** have an altitude of 80mm while points **B** and **D** both have an altitude of 20mm.

(a) Draw the given plan and elevation of the hyperbolic paraboloid surface.

(b) Project an end view of the hyperbolic paraboloid surface.

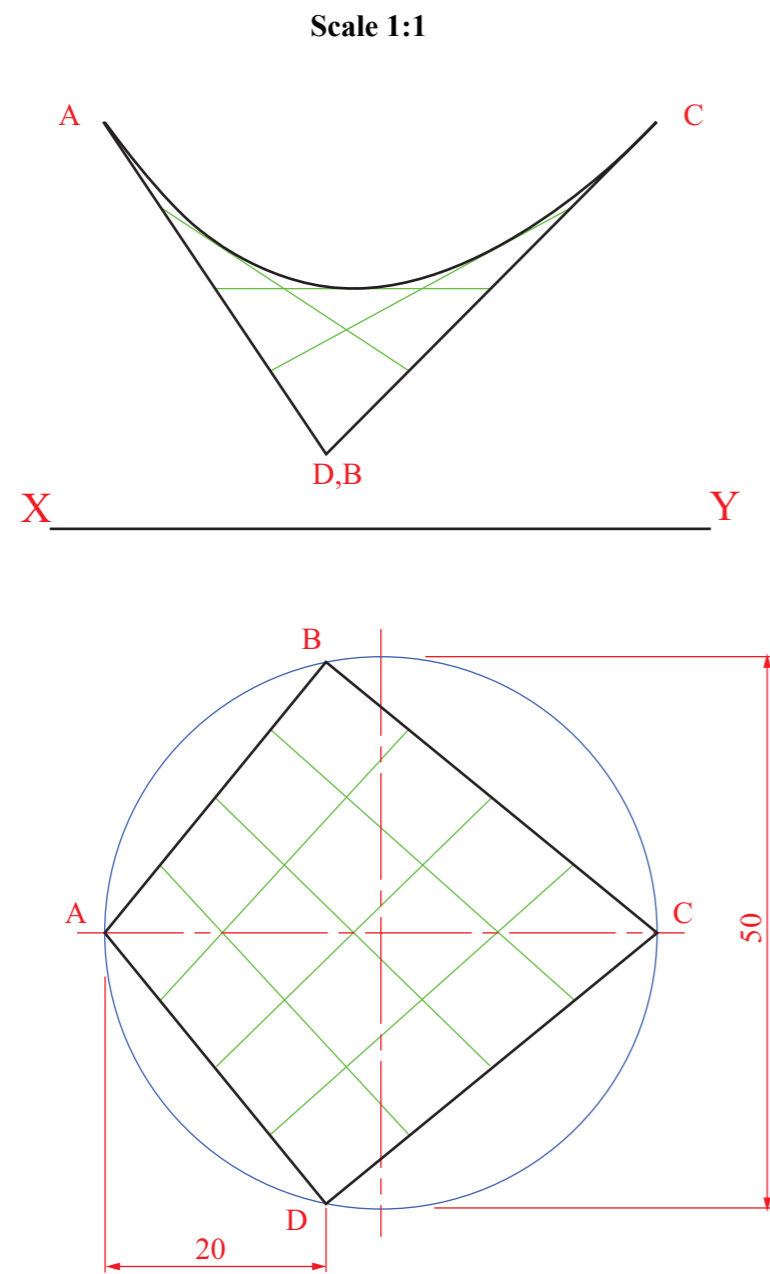


Fig. C-2

Surface Geometry

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

The plan and elevation of the box are shown in Fig. C-3 below.

(a) Draw the given views.

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



Scale 1:1

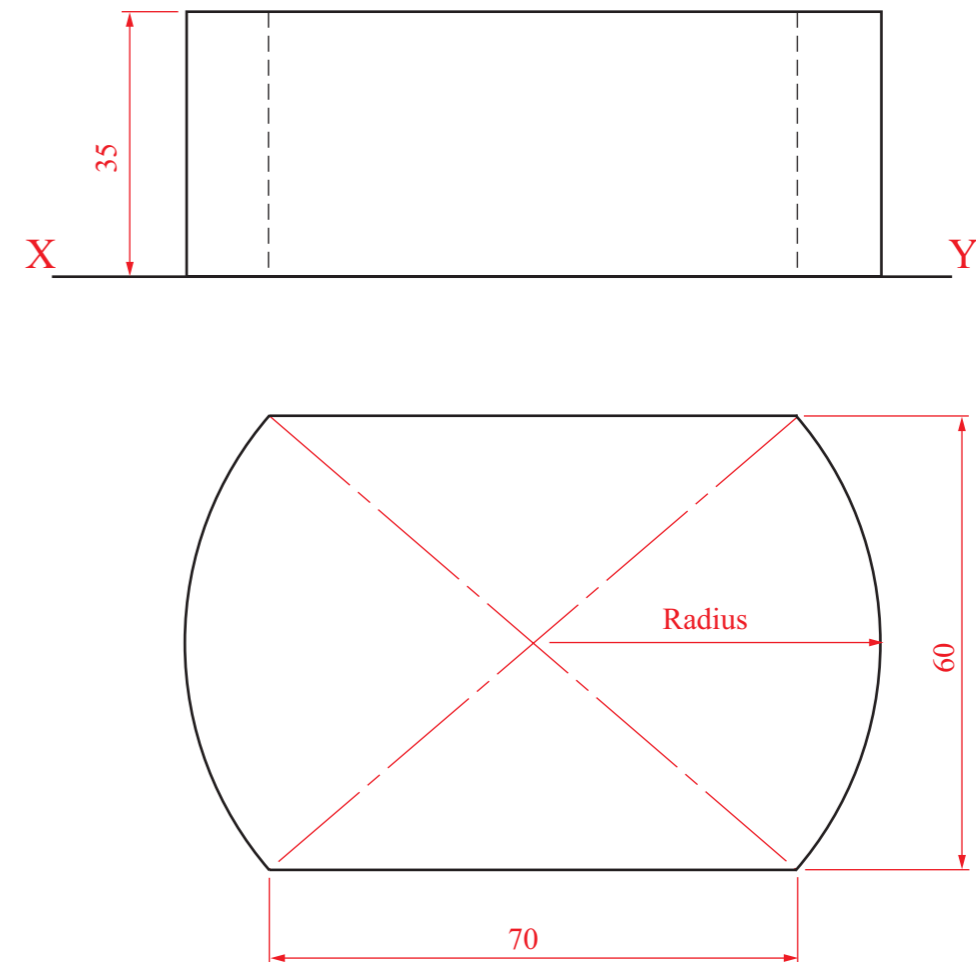


Fig. C-3