



Pre-Leaving Certificate Examination, 2015

***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.

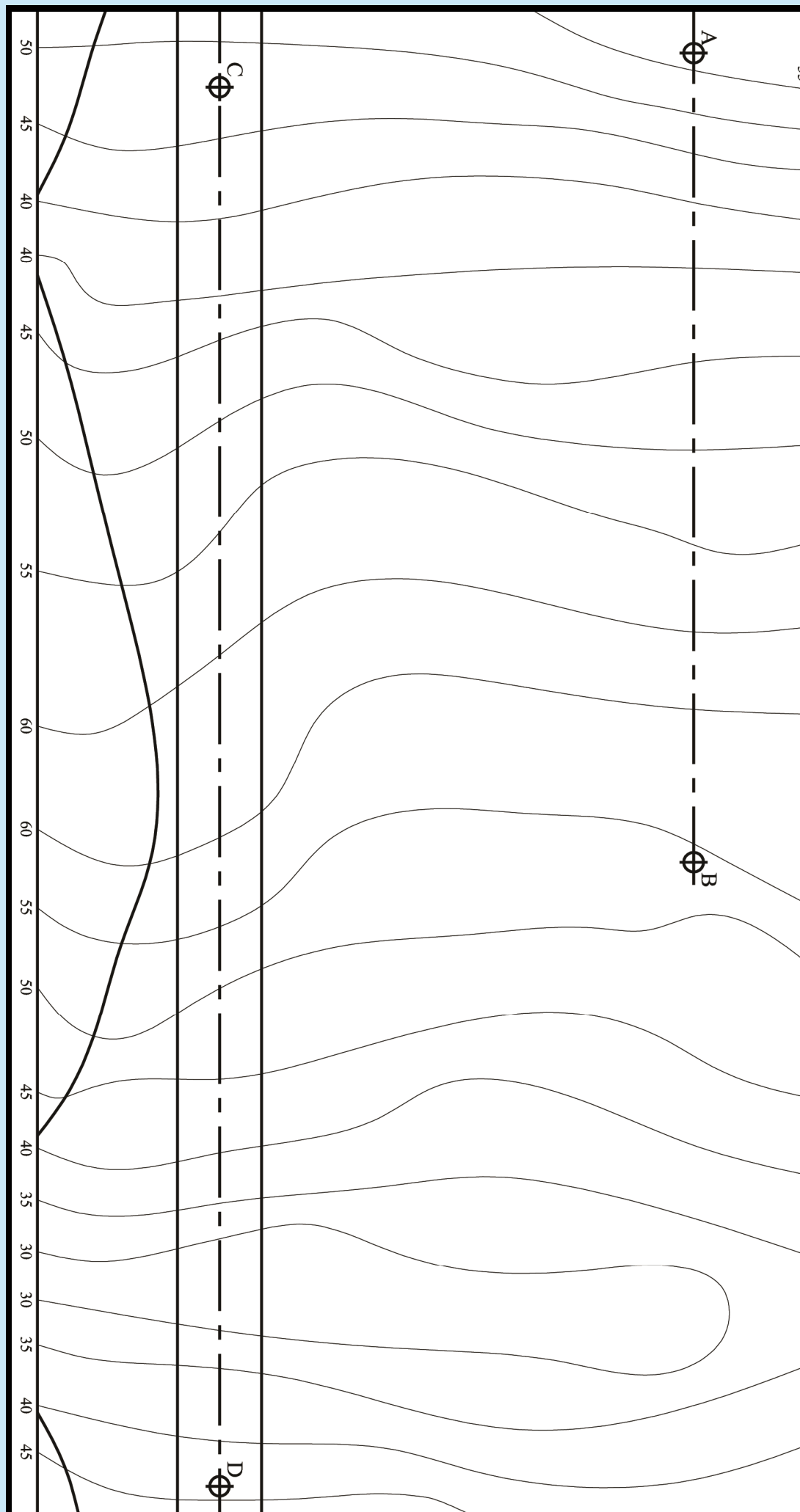
General Instructions:

- 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's Name in the box below and on all other sheets used.

Name:

School Name:

Teacher's Name:



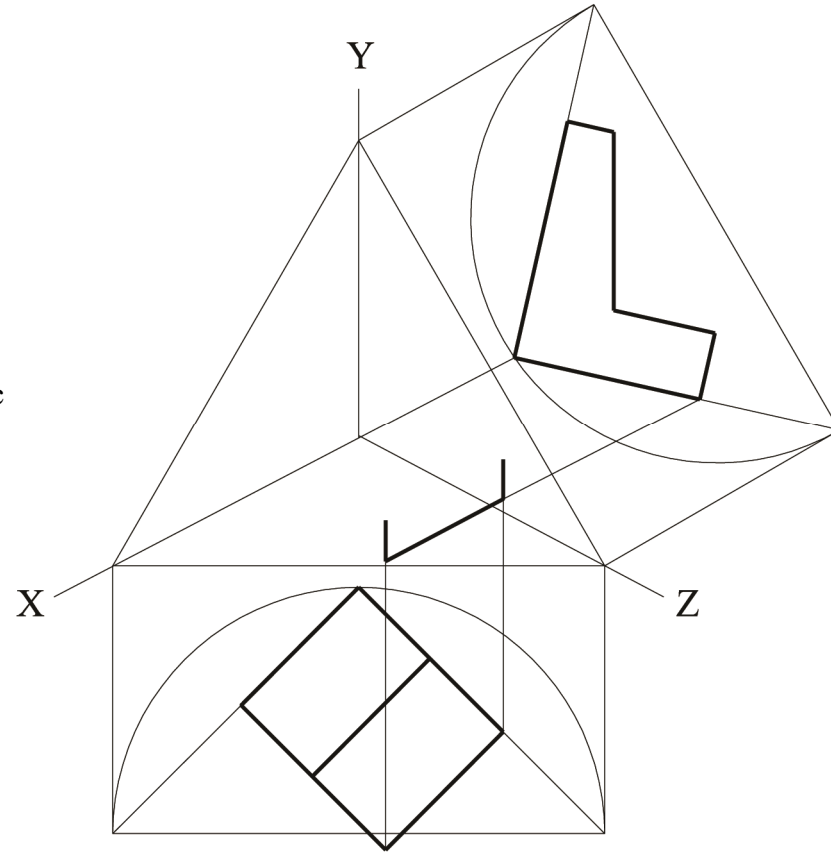
**This Contour Map is part of Section C
and should only be used for the
answering of the Geologic Geometry
Option (Question C-1).
Scale (1:1000)**

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

A-1. The 3D graphic below shows a patio area where three chairs and a table are in front of a fire source.

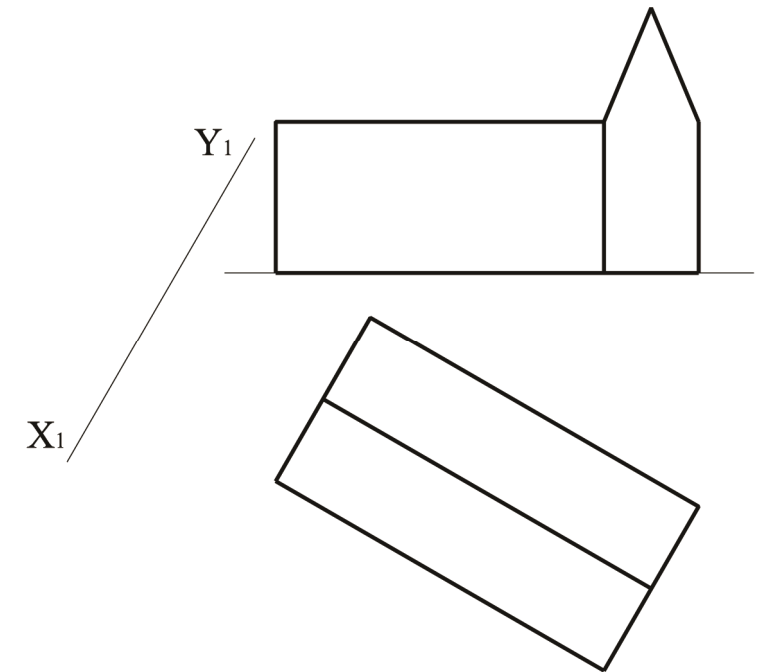
A set of isometric axes and a partially completed isometric drawing of one chair are shown on the right. The elevation and partially completed plan of this chair have been positioned relative to the axes as shown.

Complete the plan and the axonometric projection of the chair.



A-3. The 3D graphic below shows a doll's house. The plan and incomplete elevation of the doll's house are shown on the right.

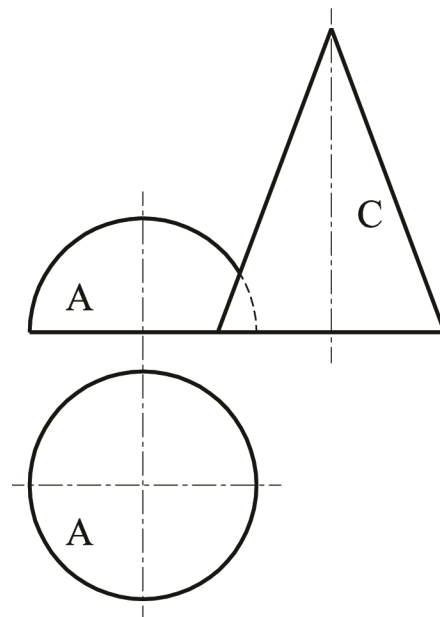
- (a) Complete the elevation of the outline of the doll's house.
- (b) Draw an auxiliary elevation of the doll's house on the given X_1Y_1 which will show the true angle between the two roof surfaces.



A-2. The 3D graphic below shows a set of hemispherical domes and a training cone for football training.

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

- (a) Draw the plan of cone C.
- (b) Draw the plan and elevation of a sphere equal in radius to hemisphere A which is in contact with the given solids A and C and rests on the horizontal plane.



A-4. The 3D graphic below shows an entrance to a building. The top of the entrance is in the shape of the semi-ellipse.

In the drawing on the right, **AB** is the major axis of the ellipse. The focal points are also shown.

- (a) Locate the minor axis of the ellipse.
- (b) Draw the semi-ellipse.



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, 2015

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 collection of commemorative plaques mounted on pillars.

Fig. B-1 below shows the model plan and elevation of a similar set of three pillars and a curved wall.



(a) Draw the given plan and elevation.

(b) Draw the auxiliary elevation of the wall and pillars, projected from the plan in the direction of the arrow.

Scale 1:1

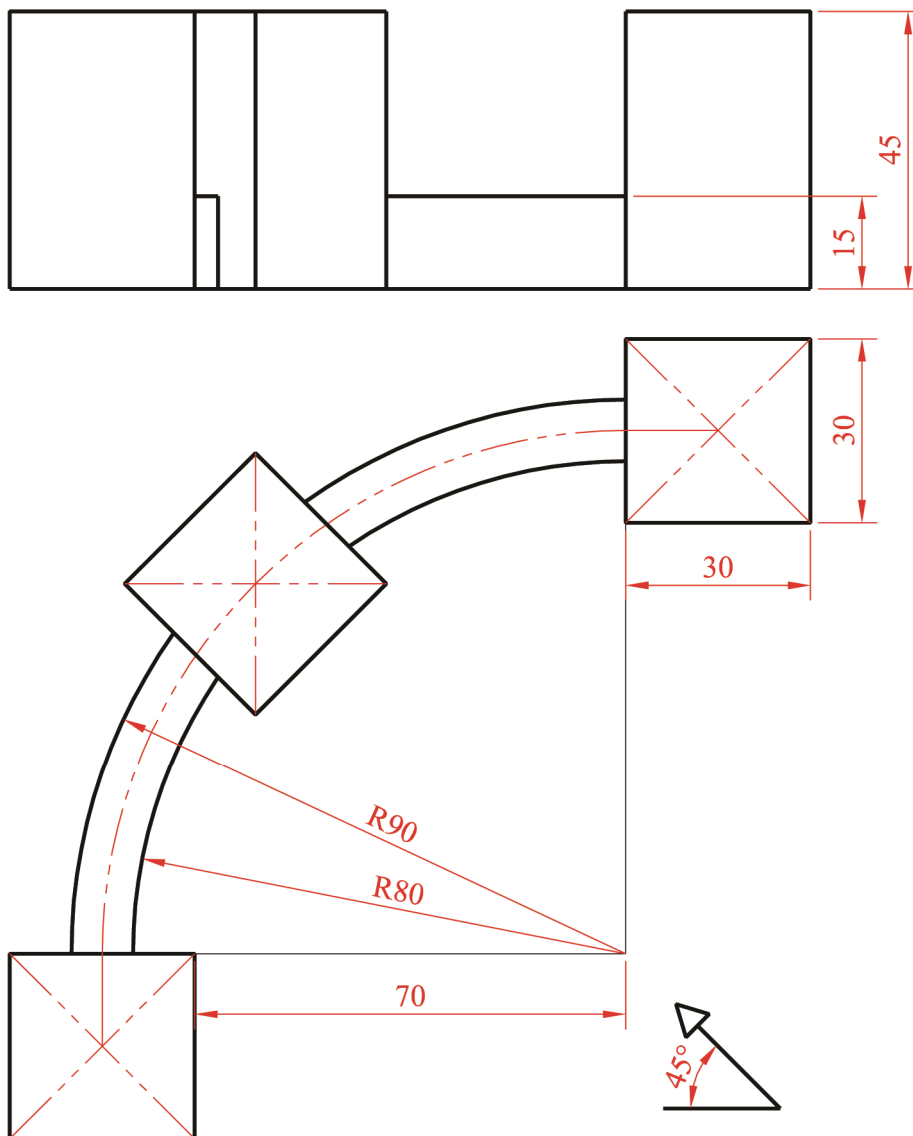


Fig. B-1

B-2. The 3D graphic on the right shows a storage box with a sloping lid.

Fig. B-2 below shows the plan and elevation of a model of the box.



Make a perspective drawing of the model given the following:

- The picture plane passes through corner **A**
- The spectator **S** is 90mm from corner **A**
- The horizon line is 45mm above the ground line.

Scale 1:1

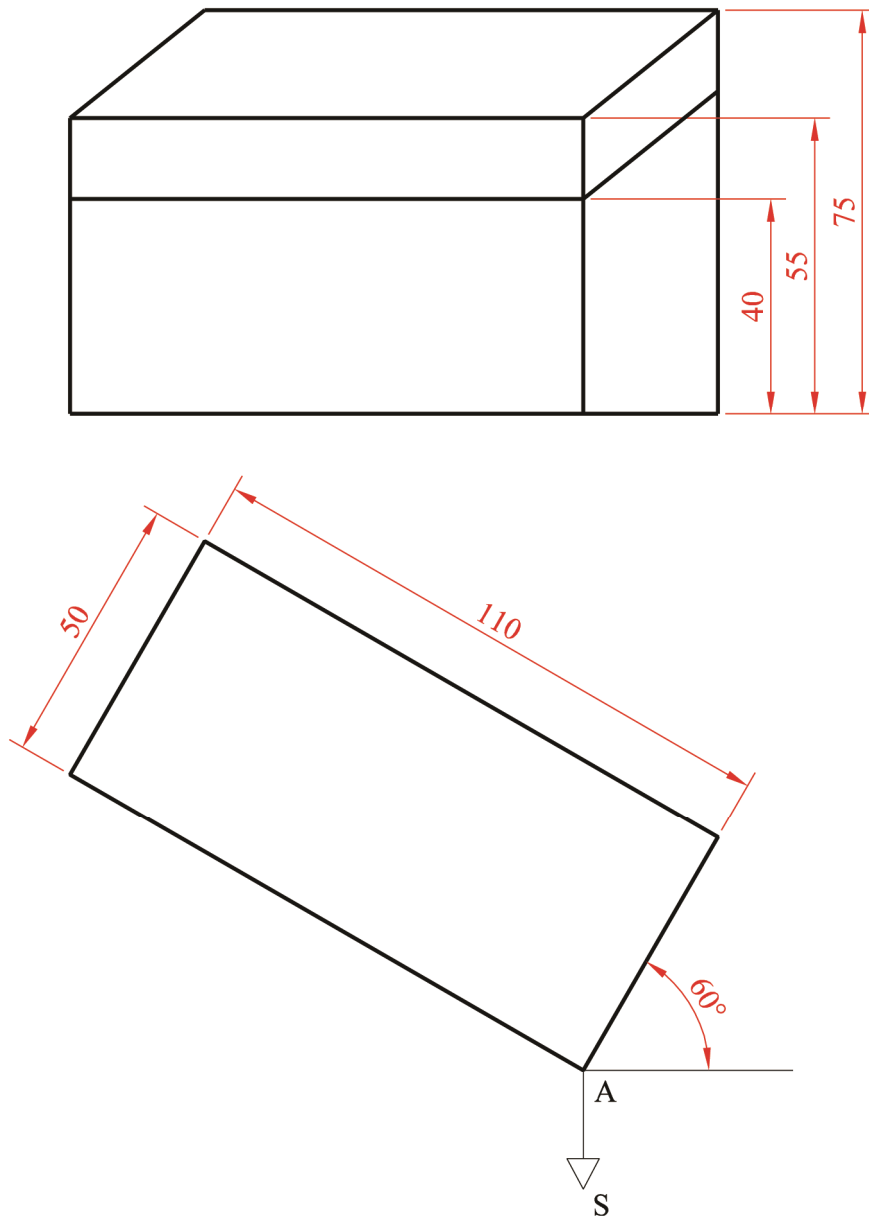
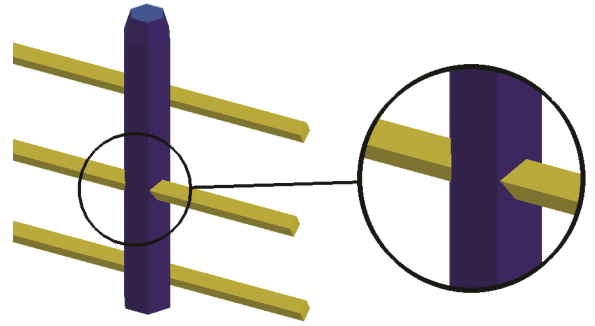


Fig. B-2

B-3. The 3D graphic on the right shows a post and rail type fence, which has been manufactured from recycled plastic.

Fig. B-3 below shows a portion of the hexagonal post and one of the square rails from the fence.

Draw the given plan and elevation of the post and rail fence and project an end view, showing all lines of interpenetration.



Scale 1:1

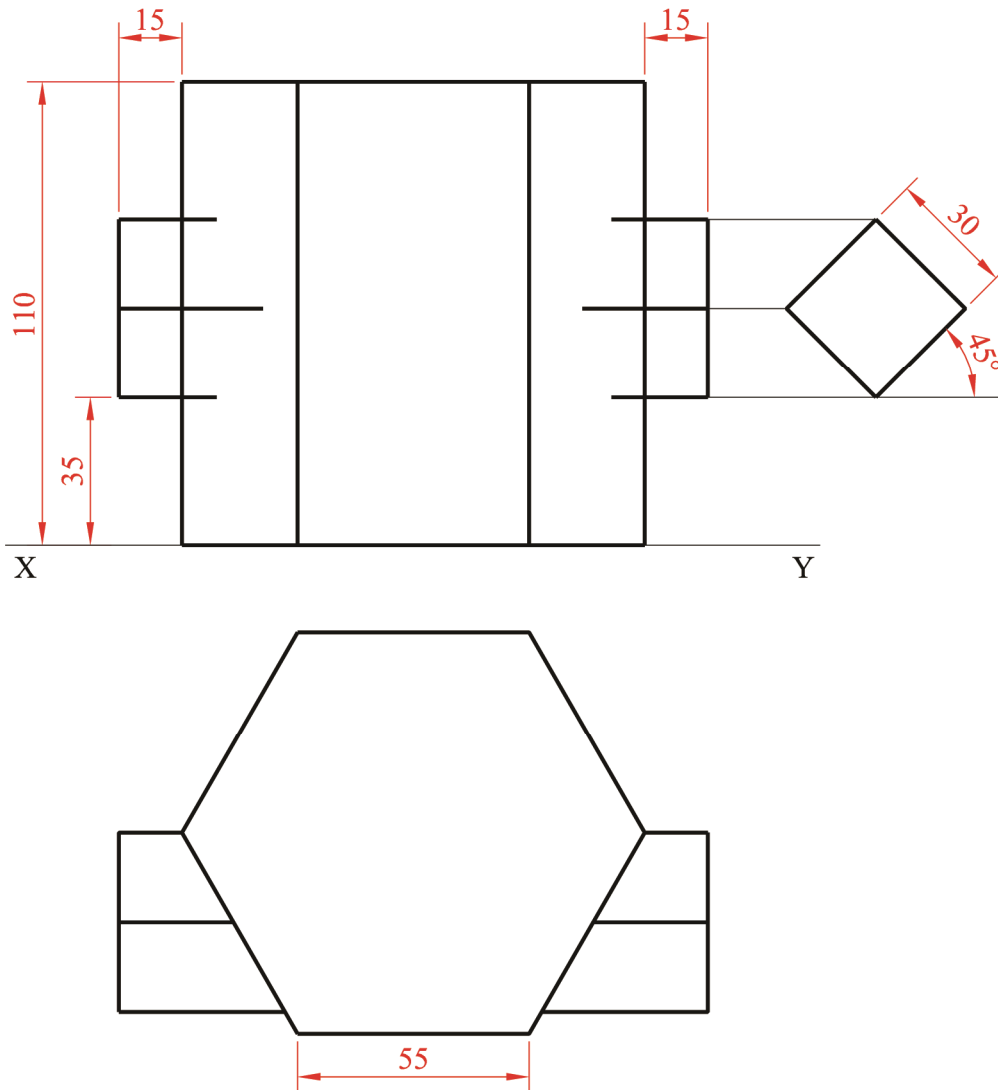


Fig. B-3

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) The valley to the right of **A** floods during heavy rain.

Draw a line on the profile to indicate the surface of the water when it is 15m in depth.

(c) The line **CD** is the centreline of a proposed roadway which is level at an altitude of 65m.

Using side slopes of 1 in 1 for the embankments, 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 an Irish church. Its roof is in the form of a hyperbolic paraboloid.

Fig. C-2 below shows the plan and elevation of a model of the roof.

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



Scale 1:1

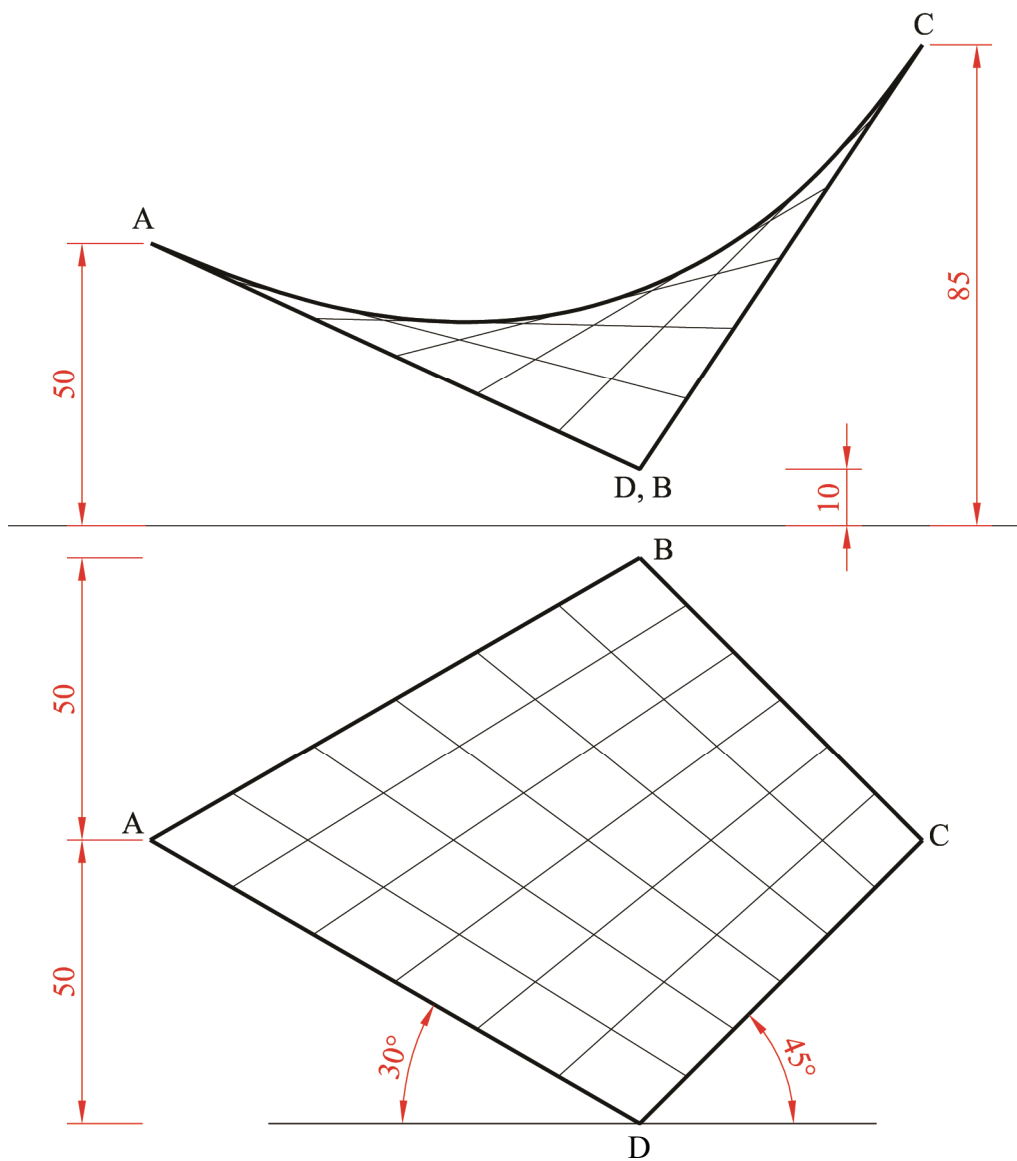
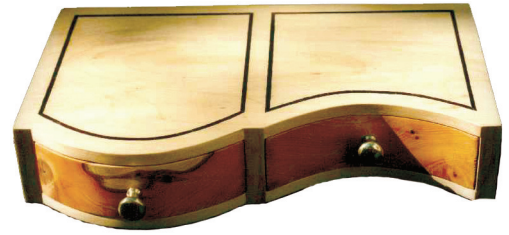


Fig. C-2

Surface Geometry

C-3. The 3D graphic on the right shows a set of curved drawers.

Fig. C-3 below shows the plan and elevation of a shaped solid on which the design of the set of drawers is based.



- (a) Draw the given views.
- (b) Draw a one-piece surface development of the shaped solid.

Scale 1:1

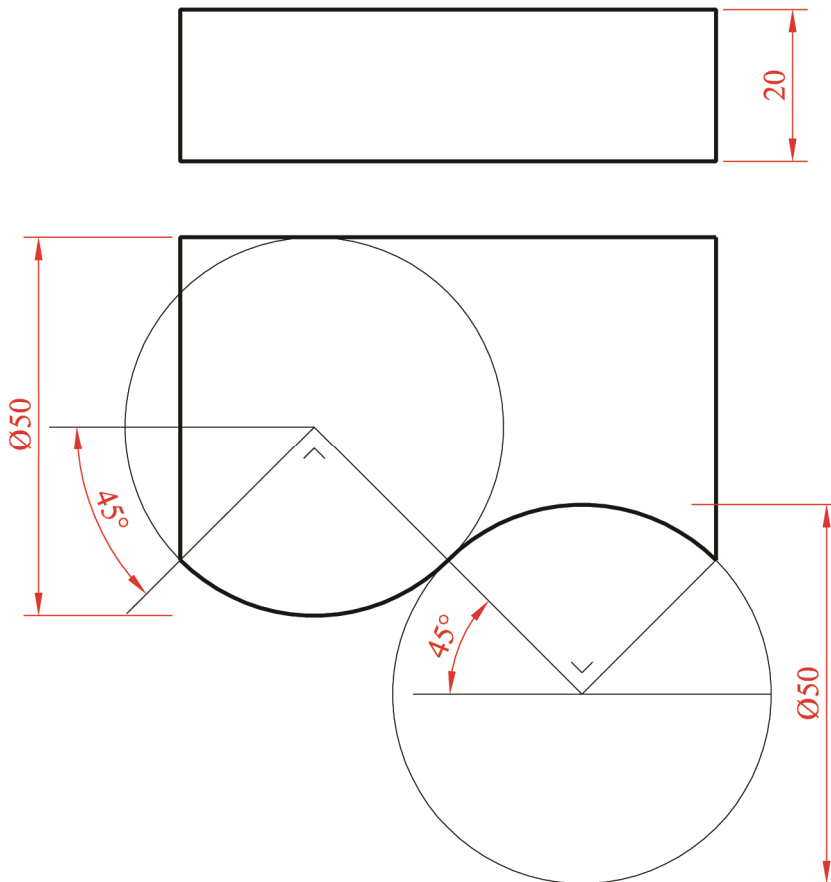


Fig. C-3

Dynamic Mechanisms

C-4. (a) The 3D graphic on the right shows an enlarged view of the piston and crank mechanism from the engine of a remote control truck.

Fig. C-4 below is a line-diagram representation of a crank mechanism.

Crank **OA** and the arm **AC** are pin jointed at **A**. Point **B** is locked on the arm **AC** as shown. As the crank **OA** rotates in a clockwise direction, for one revolution, **C** moves along the vertical axis.

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

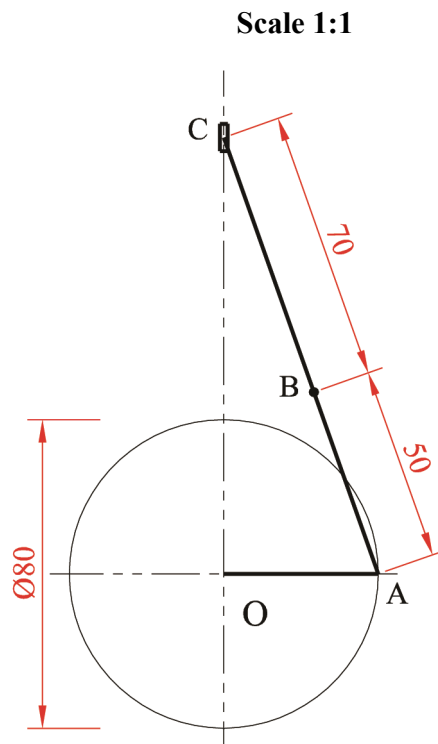


Fig. C-4

(b) The 3D graphic on the right shows an enlarged view of the camshaft from such an engine.

The cam imparts the following motion to the piston:

- 0° to 150° Rise 45mm with uniform velocity
- 150° to 240° Dwell
- 240° to 360° Fall 45mm with simple harmonic motion.

Draw the displacement diagram.

Note: It is not necessary to draw the profile of the cam.

Scale 1:1



Assemblies

C-5. Details of a Rolling Pin, as shown on the right, are given in Fig. C-5 below.

A parts list is also given.

Draw the plan and project a *sectional elevation* A-A of the assembled Rolling Pin.

(Any omitted dimensions may be estimated.)



Scale 1:1

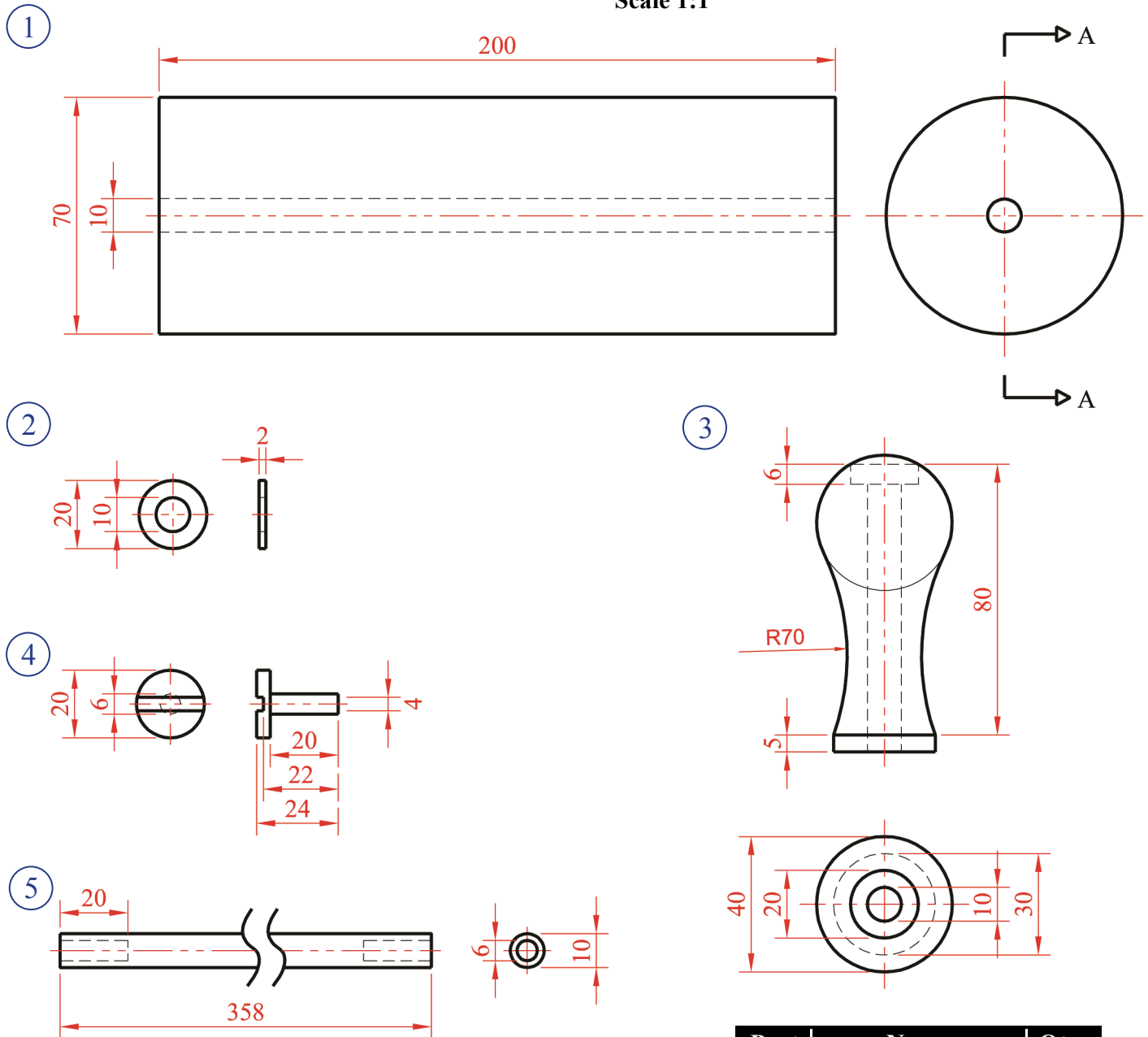


Fig. C-5

Part	Name	Qty.
1	Pin	1
2	Washer	2
3	Handle	2
4	Screw set	2
5	Screw set receiver	1

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