



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination, 2018

Design & Communication Graphics

Ordinary Level

Sections B and C (180 marks)

Wednesday, 20 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 graphic on the right shows a portion of a house and a bay window.

Fig. B-1 below shows an isometric view of a similar structure.

- (a) Draw the elevation of the complete structure looking in the direction of the arrow.
- (b) Project a plan from the elevation.
- (c) Draw the auxiliary elevation of the **structure**, projected from the plan, which will include the true shape of surface **A**.



Scale 1:1

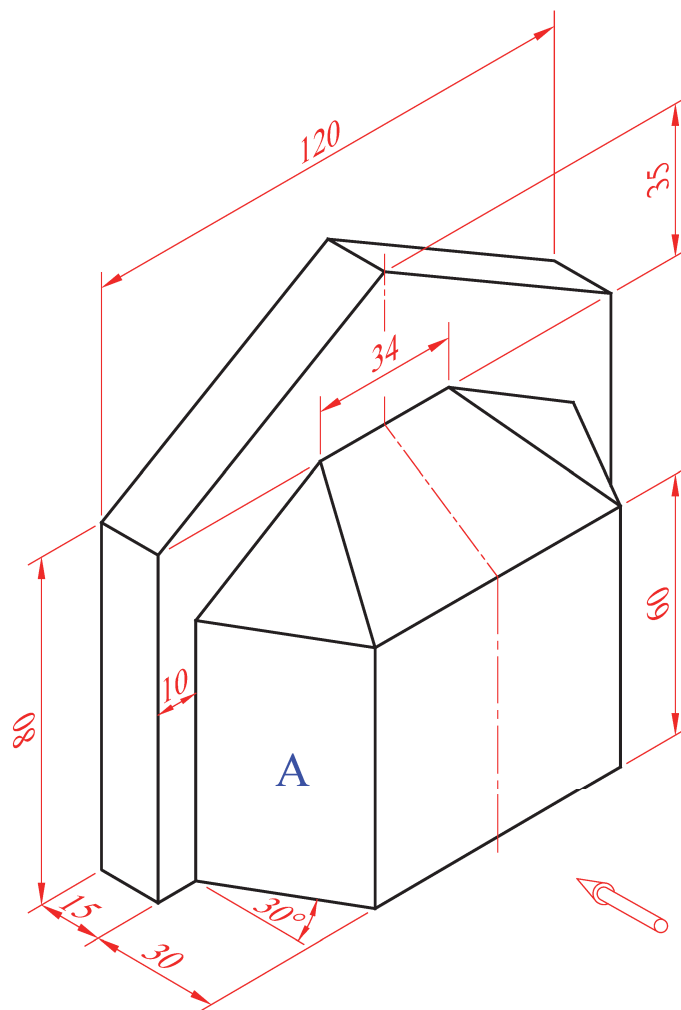


Fig. B-1

B-2. The 3D graphic on the right shows a climbing pole from a children's playground. It consists of a central rectangular pillar with horizontal steps attached.

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

A section through the horizontal step is also shown.

- (a) Draw the given plan and the completed elevation, showing all lines of interpenetration.
- (b) Draw an end view of the structure.

Scale 1:1

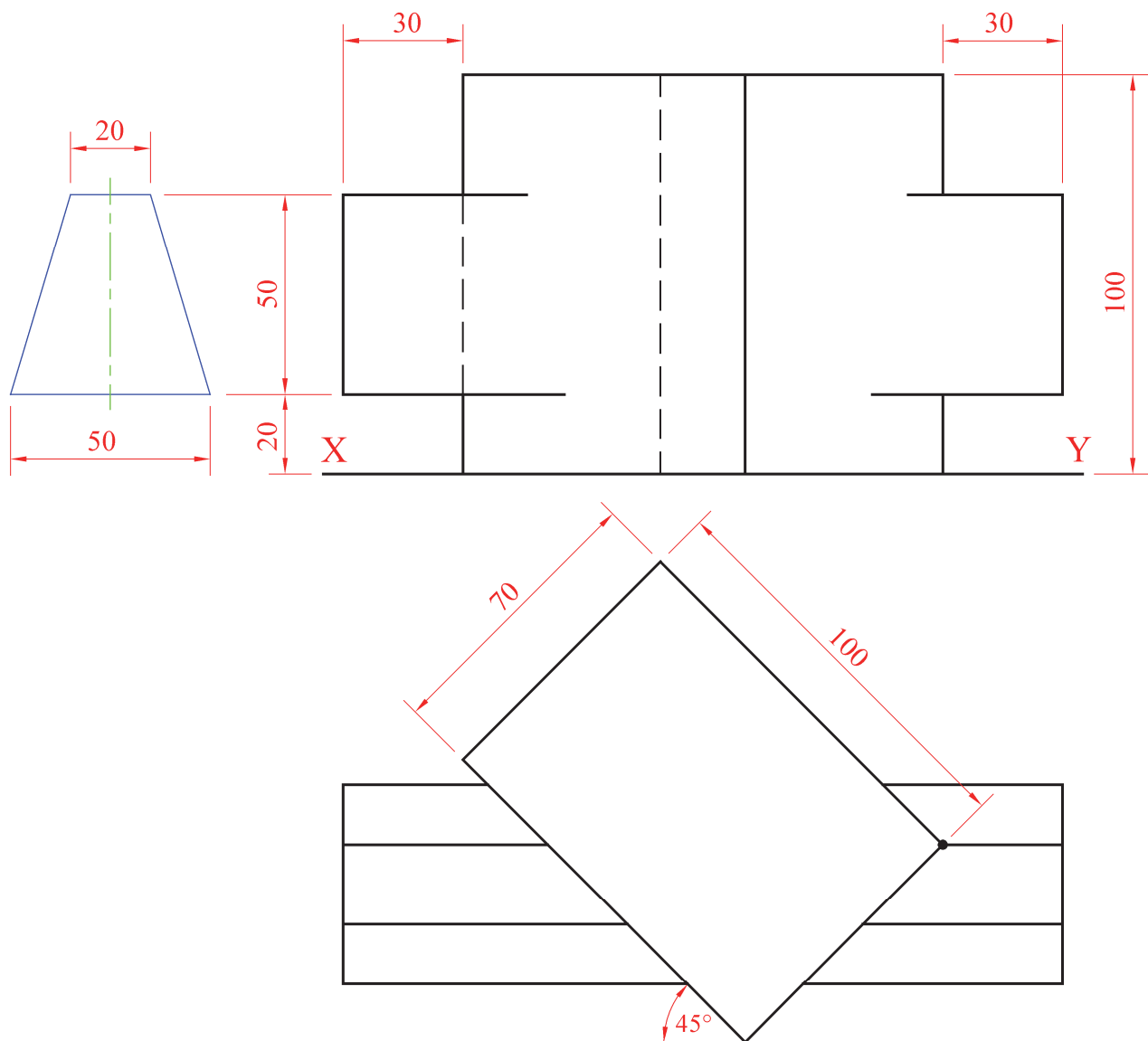
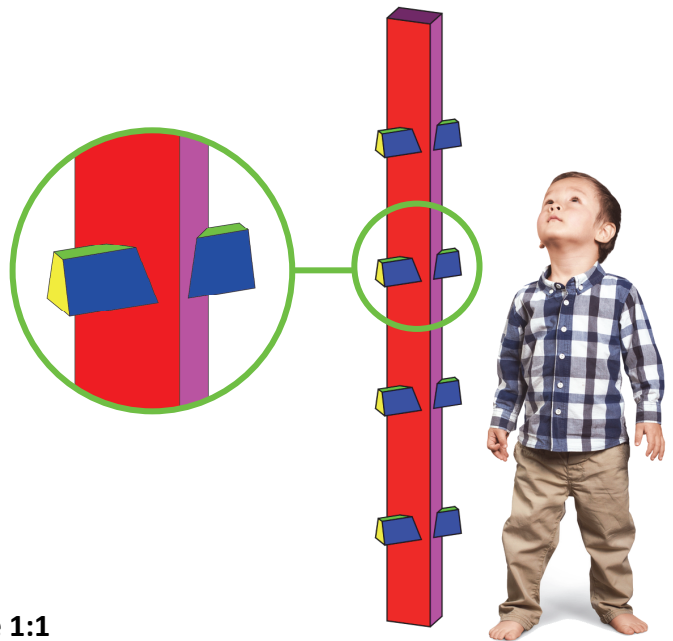


Fig. B-2

B-3. The graphic on the right shows a clock.

Fig. B-3 below shows an incomplete isometric projection of a similar clock.

The elevation and plan of the clock are also shown in their required positions.

- (a) Draw the given equilateral triangle **abc** and the axonometric axes **X**, **Y**, and **Z**.
- (b) Draw the elevation and plan positioned as shown.
- (c) Draw the axonometric projection of the main body of the clock.
- (d) Draw the axonometric projection of the circular face of the clock.



Scale 1:1

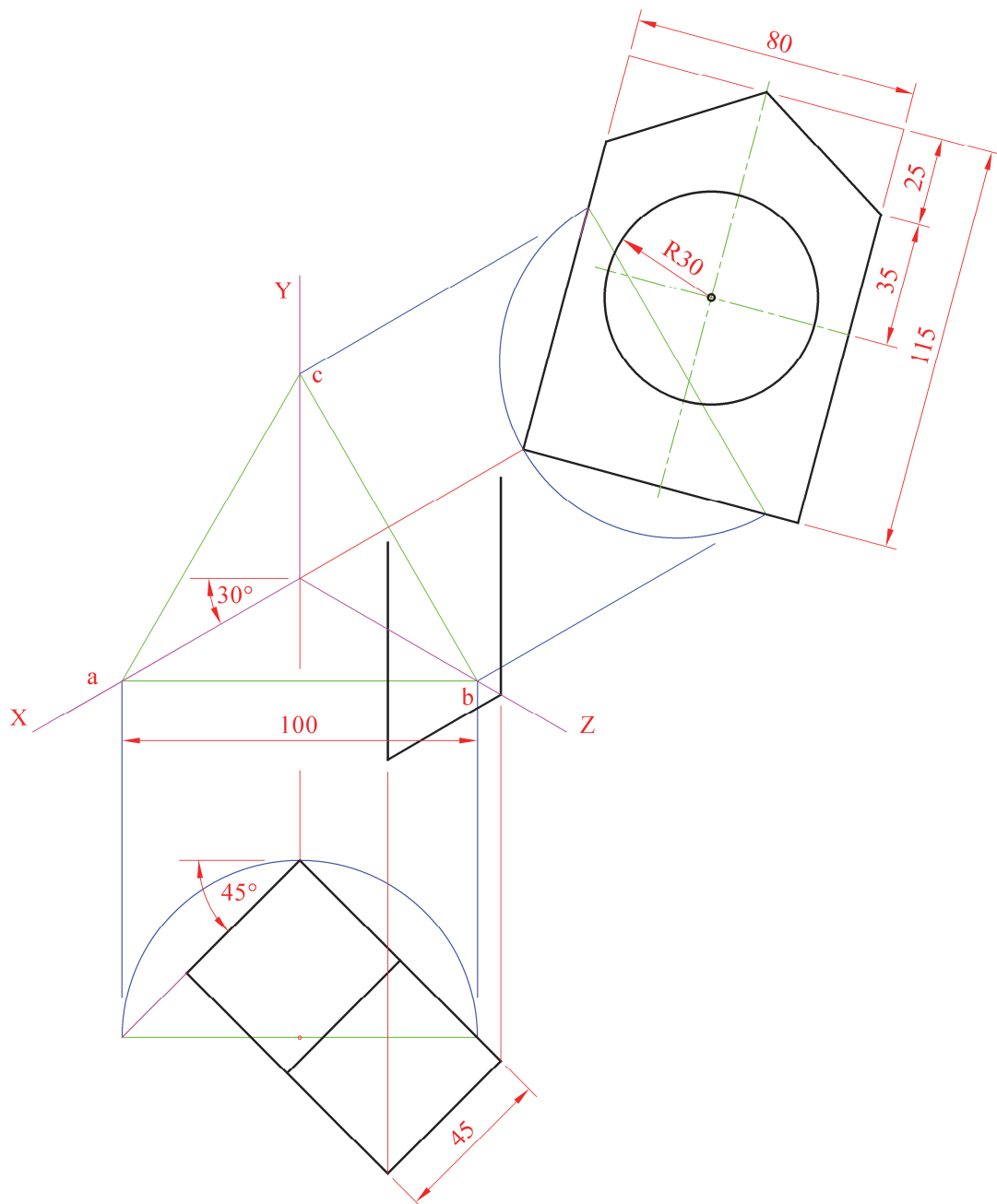


Fig. B-3

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) A vertical pylon is to be built at point **A**. On the profile, determine the minimum height of the pylon, if its top is to be visible from the ground at point **B**.
- (c) The image on the right shows a section of the new M17 motorway linking Galway and Clare. Earthworks were necessary to accommodate the roadway as shown.

CD is the centreline of a roadway which is level at an altitude of 25m.

Using side slopes of 1:1 for the cuttings and 1:2 for the embankments, complete the earthworks on the northern side, which are 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 image on the right shows the newly opened *Crossrail* train station in London's docklands area. The structure is based on a parabola and has been shaped as shown.

Fig. C-2 below shows the plan, elevation and end view of a model of the front part of the station. A 3D view of the model is also given.



- Draw the given elevation. The vertex of the parabolic curve **ABC** is located at **B**.
- Draw the given end view.
- Project the given plan, clearly showing how the points on the curve are located.
(**Note:** Hidden detail is not required.)

Scale 1:1

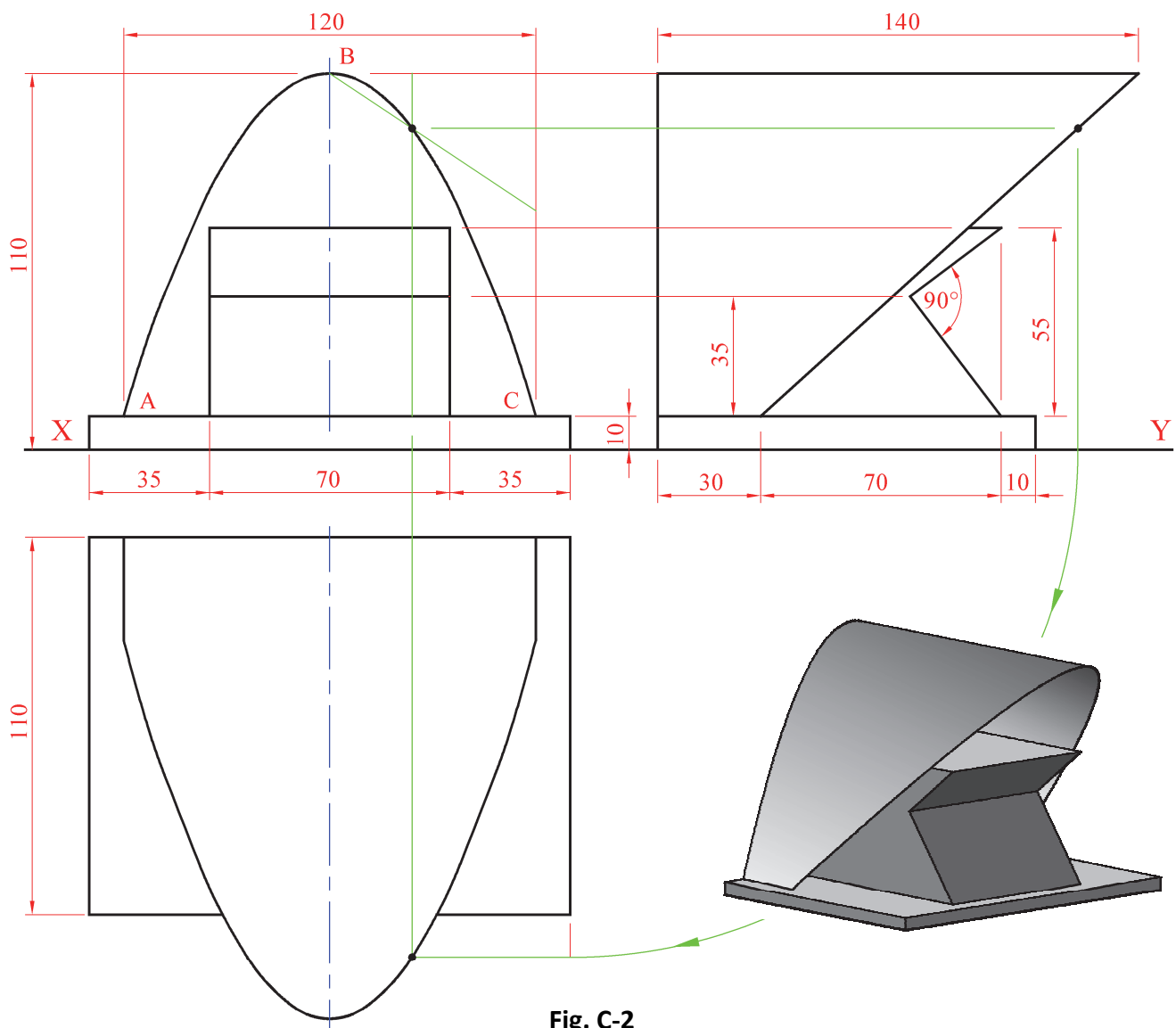


Fig. C-2

Surface Geometry

C-3. The graphic on the right shows a lady carrying a handbag.

The projections of the bag are shown in Fig. C-3 below.

- (a) Draw the given views of the bag, showing clearly how the centre of the arc is located.
- (b) Project an end view of the bag.
- (c) Draw a one-piece surface development of the bag (including the curved top surface).

Ignore the handle for the purpose of your drawing.

Scale 1:1

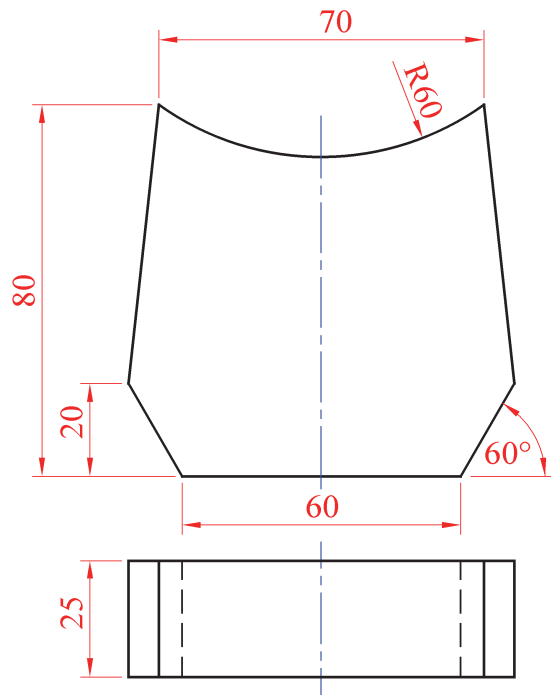


Fig. C-3

Dynamic Mechanisms

C-4. The graphic below shows various images of the *Orbit Tower* which is located in London's Olympic Village. At over 100m in height, it is the UK's tallest sculpture and also incorporates the world's longest, fastest and tallest tunnel slide. Part of the slide is in the form of a cylindrical helix as shown.

(a) Fig. C-4(a) on the right shows the projections of a cylinder and a portion of such a helix.

- Draw the given plan and elevation of the cylinder.
- Complete the projections of a regular helix which moves in a clockwise direction about the cylinder, from point **A** at the base, to point **B** at the top, in one revolution.

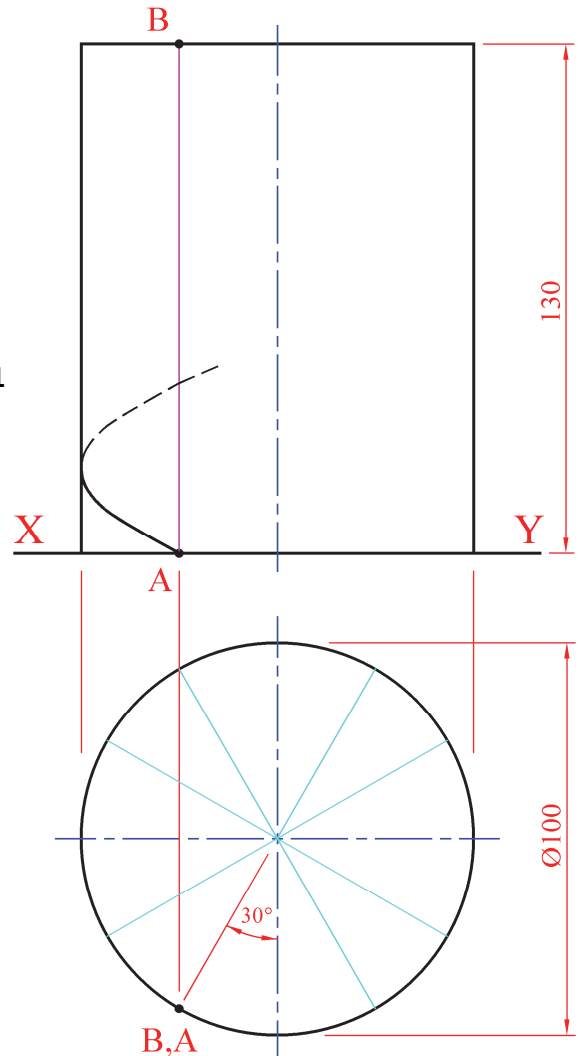
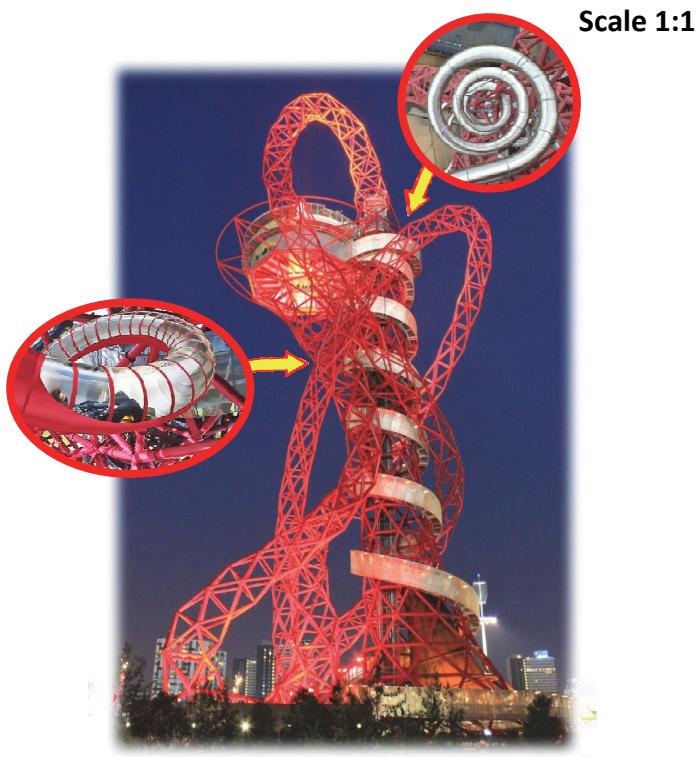


Fig. C-4(a)

(b) A cam is used as part of the braking system for an elevator, which is located in the central tower of the sculpture.

Draw the displacement diagram for a cam which imparts the following motion to an inline knife edge follower:

- 0° to 120° Rise 70mm with uniform velocity
- 120° to 180° Dwell
- 180° Vertical fall of 22mm
- 180° to 360° Fall 48mm with uniform acceleration and retardation.

(In the displacement diagram, use a distance of 15mm to represent each 30° interval.)

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

Scale 1:1

Assemblies

C-5. Children enjoy playing with toys relating to space exploration. Details of a toy spaceship are given in Fig. C-5 below.

A parts list and a 3D graphic of the parts are also shown.

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

Scale 1:1

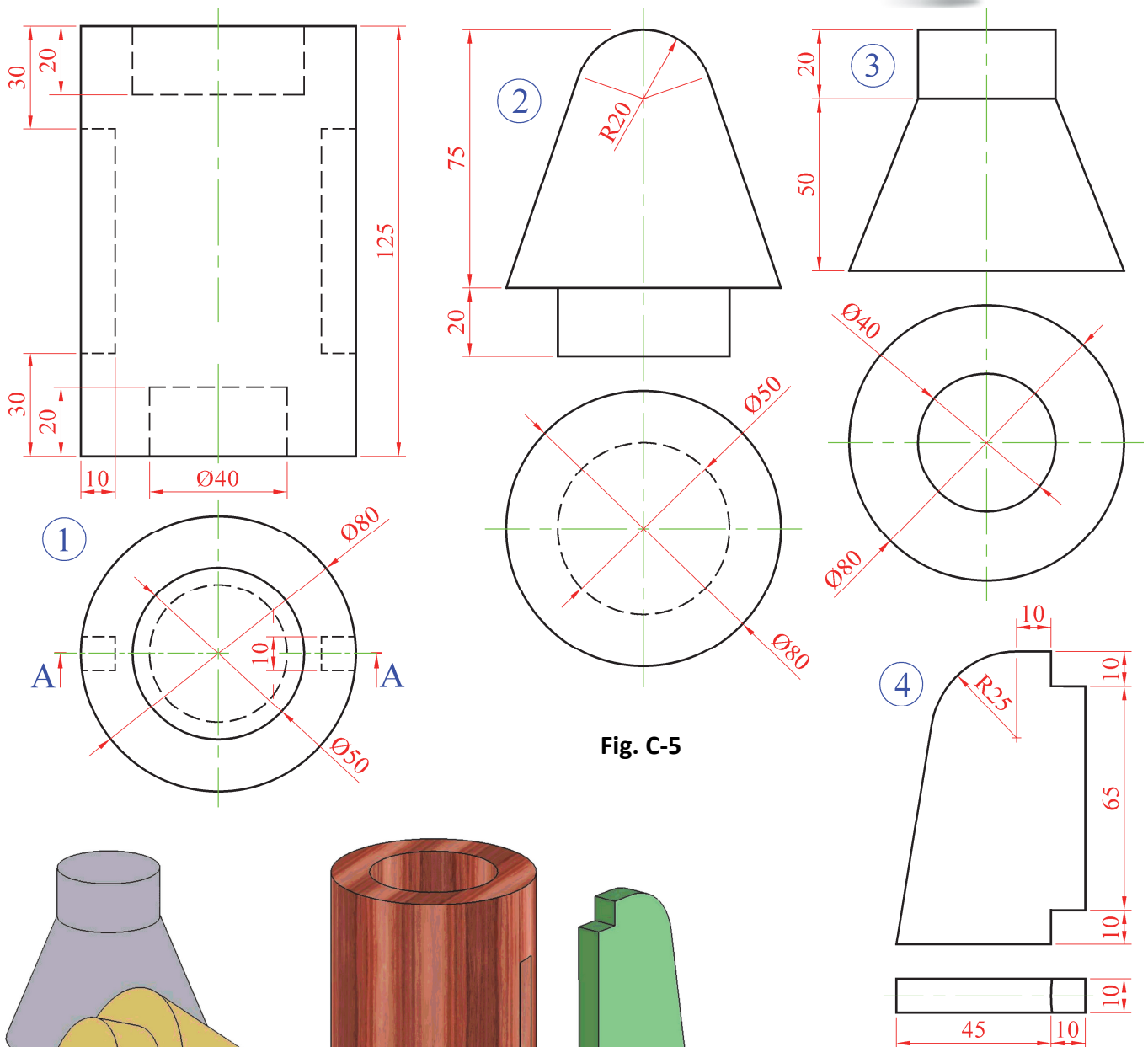


Fig. C-5

Part	Name	Qty.
1	Main body	1
2	Nose cone	1
3	Thruster	1
4	Wing	2

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