Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination, 2015

Design & Communication Graphics
Ordinary Level
Sections B and C (180 marks)

Wednesday, 17 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 3D graphic on the right shows an outline design for a modern school building. The main brick building intersects a central concrete tower as shown.

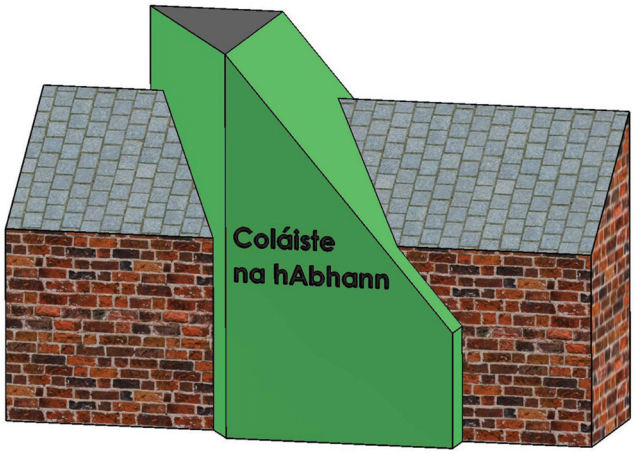


Fig. B-1 shows the incomplete projections of the school building.

(a) Draw the given views and show all lines of interpenetration.

(b) Draw an end view of the school building.

Scale 1:1

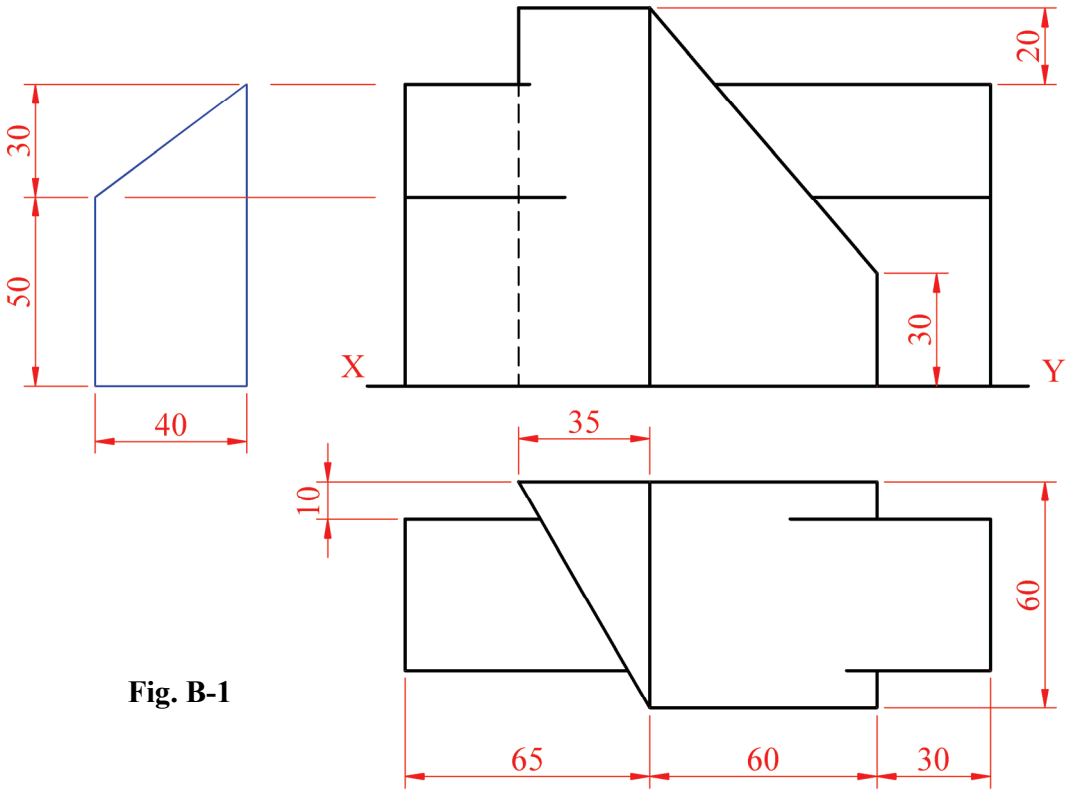


Fig. B-1

B-2. The 3D graphic on the right shows a dog kennel.

Fig. B-2 below shows an incomplete isometric projection of the kennel. The elevation and plan of the kennel 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 sides and roof of the kennel.

(d) Draw the axonometric projection of the front of the kennel to include the semi-circular opening.

Scale 1:1

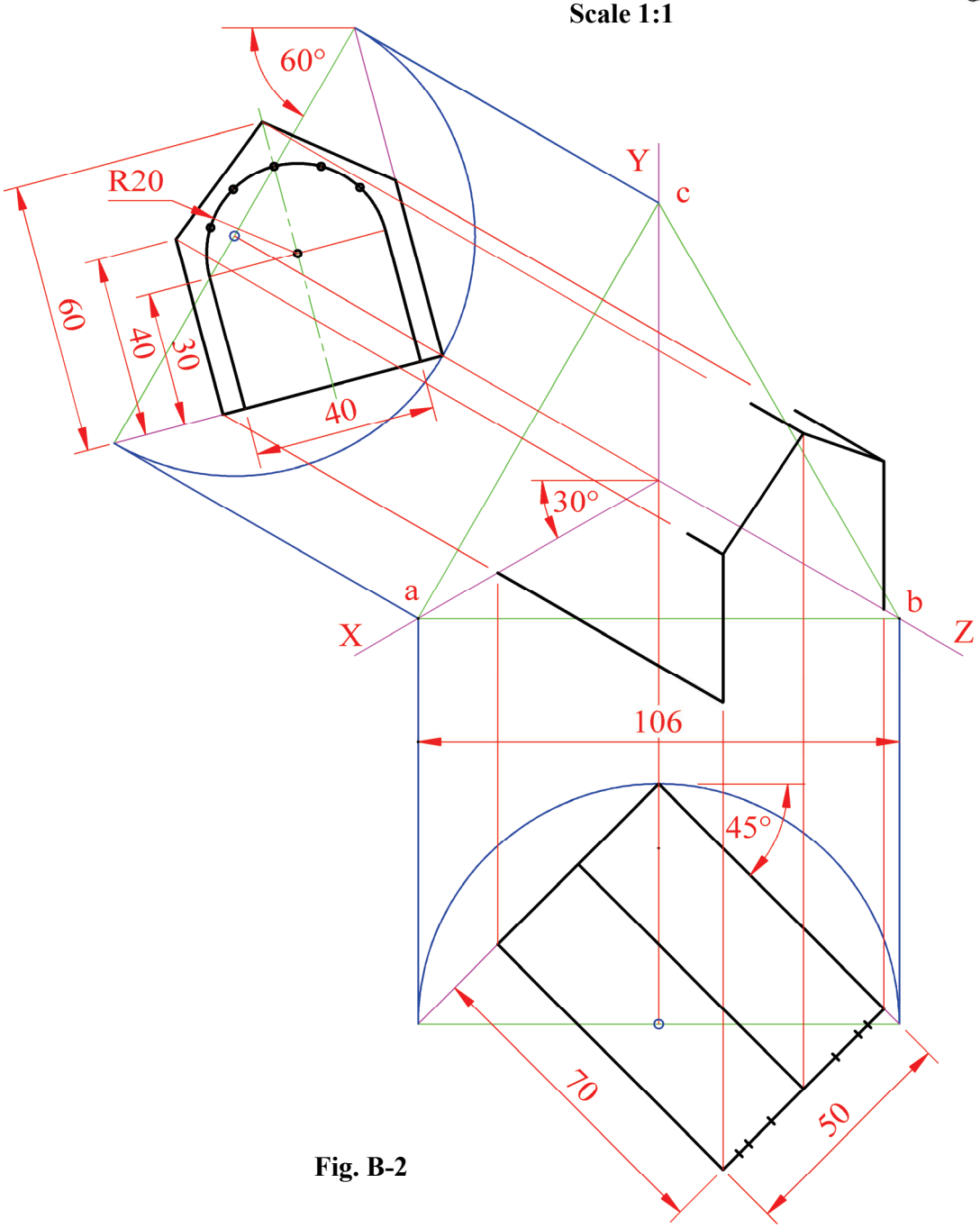


Fig. B-2

B-3. The 3D graphic on the right shows a delicatessen counter with a sandwich display unit on top.

Fig. B-3 below shows an isometric view of the structure.

(a) Draw an elevation of the structure in the direction of the arrow.

(b) Project a plan from the elevation.

(c) Draw an auxiliary elevation of the ***structure***, projected from the plan, which will include the true shape of surface **A**.

Scale 1:1

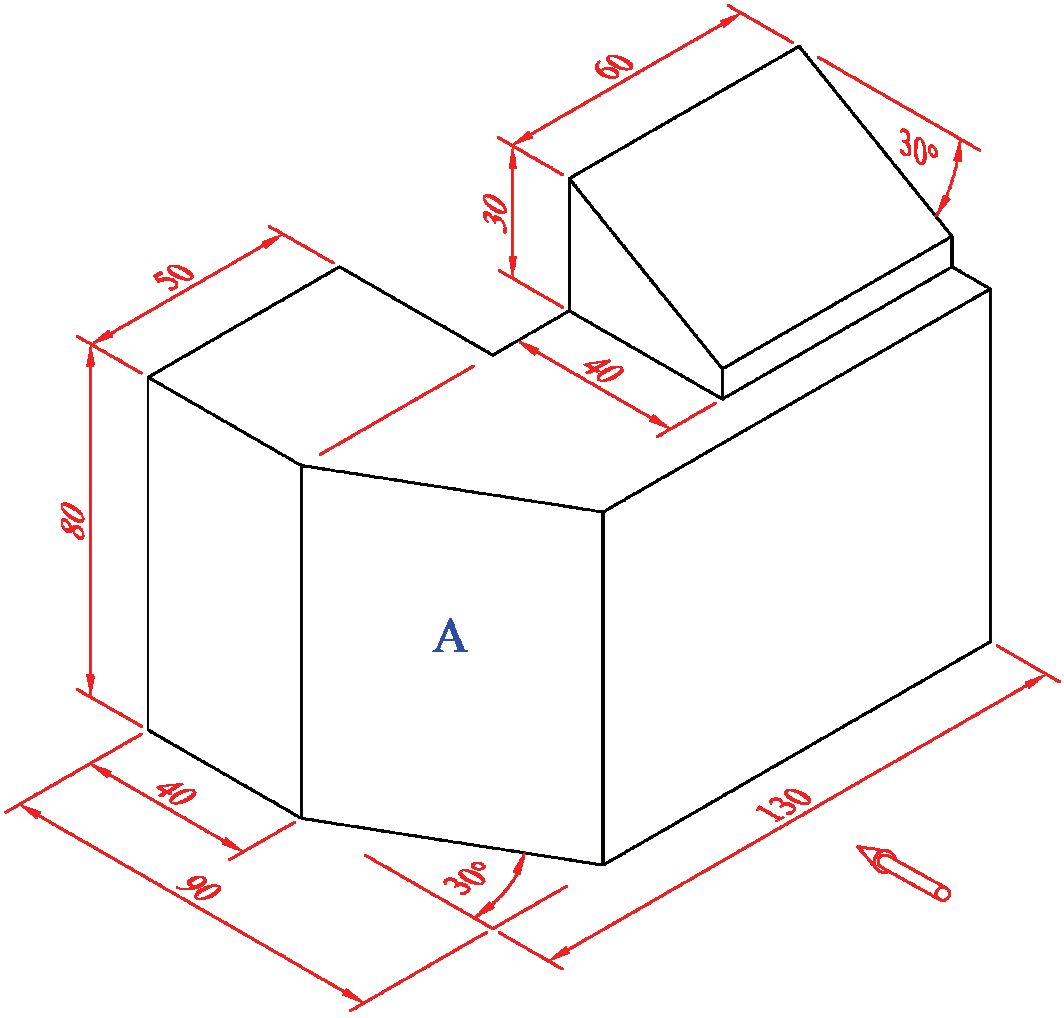


Fig. B-3

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) **C**, **D** and **E** are outcrop points on the top surface of a stratum of ore.
Determine the strike and dip of the stratum.

(c) The stratum has a thickness of 10 metres. In your auxiliary view, which shows the dip, draw the bottom surface of the stratum.

Scale 1:1000

C-2. The graphic on the right shows the Glasnevin Museum in Dublin, which has a modern roof structure. Hyperbolic paraboloid surfaces are often used in structures such as this.

Fig. C-2 shows the projections of a hyperbolic paraboloid surface **ABCD**, the outline of which is a parallelogram in elevation as shown.

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

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

Scale 1:1

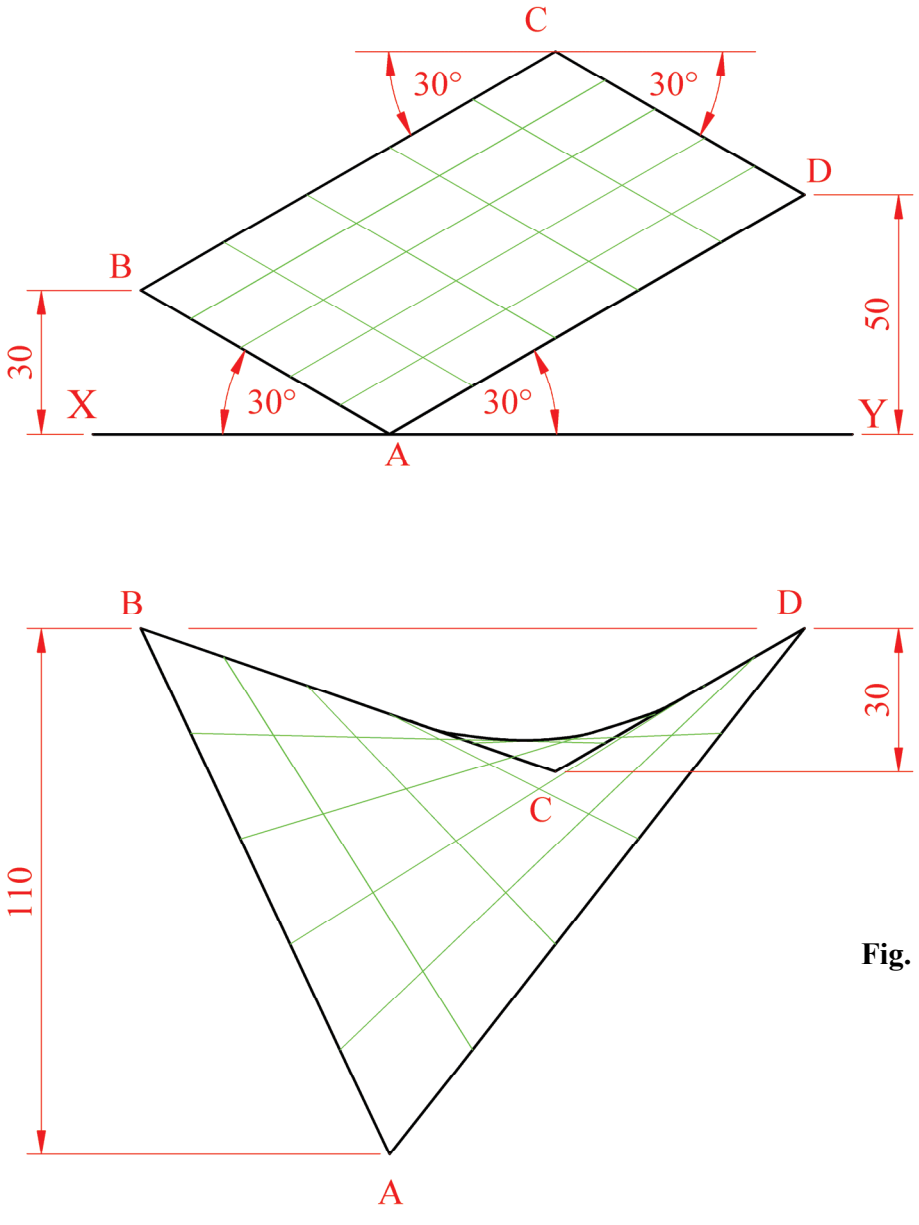


Fig. C-2

Surface Geometry

C-3. The 3D graphic on the right shows a kit bag with a sports logo.

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

(a) Draw the given views.

(b) Project an end view of the bag.

(c) Draw a one-piece surface development of the bag.

Ignore the logo and the handle for the purpose of your drawing.

Scale 1:1

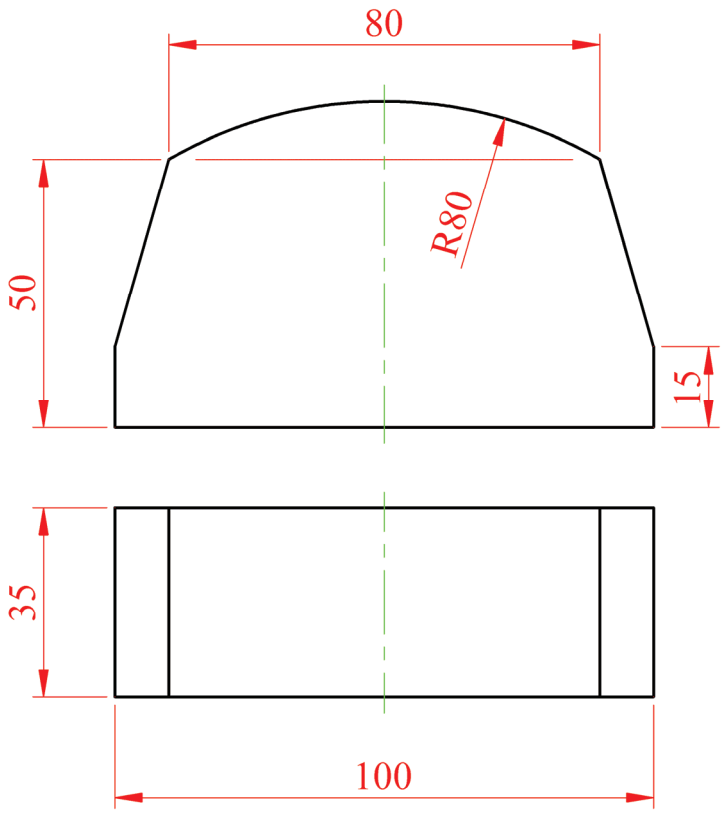


Fig. C-3

C-4. The image on the right shows a clamping device used in rock climbing.

A cam mechanism is used in the device in order to grip into cracks in the rock face.

The 3D graphic below shows a similar cam which imparts the following motion to an inline knife edge follower:

- 0° to 120° Rise 60mm with uniform velocity
- 120° to 180° Dwell
- 180° to 360° Fall 60mm with simple harmonic motion

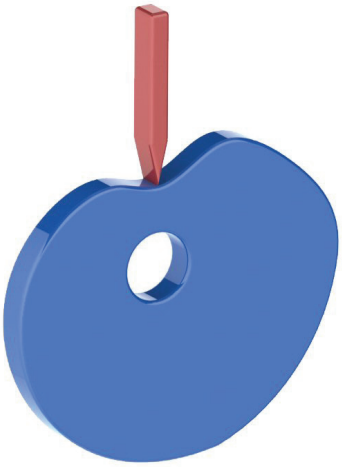
(a) Draw the displacement diagram for the cam.

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

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

- The cam rotates in an anti-clockwise direction
- The nearest approach of the follower to the centre of the camshaft is 40mm
- The camshaft diameter is 18mm.

Scale 1:1



Assemblies

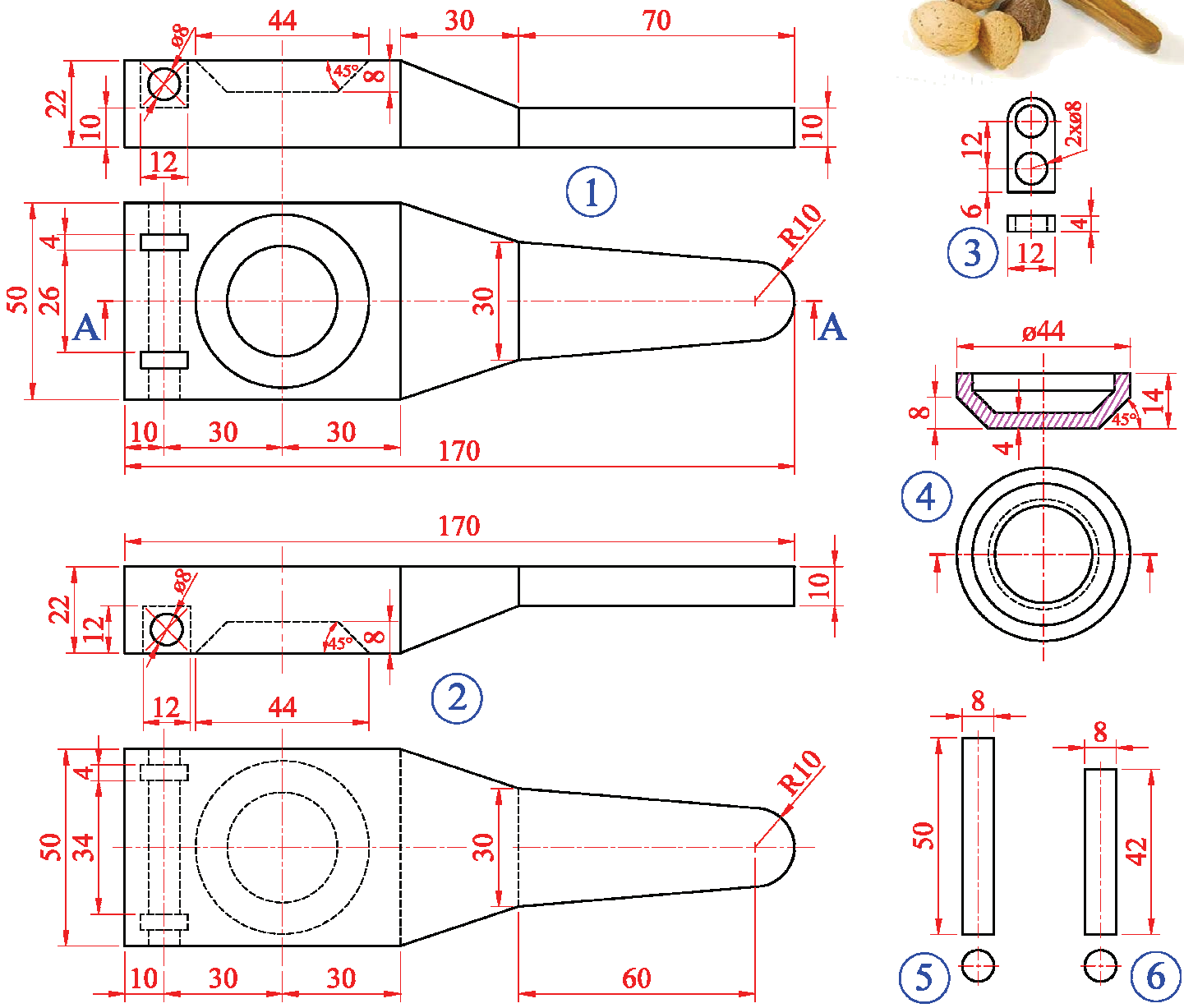
C-5. Details of a *Handheld Nut Cracker*, as shown on the right, are given in Fig. C-5 below.

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

Draw the ***sectional elevation*** A-A of the assembled Nut Cracker, in the ***fully closed*** position.

(Any omitted dimensions may be estimated.)

Scale 1:1



Part	Name	Qty.
1	Bottom Handle	1
2	Top Handle	1
3	Brass Pin Holder	4
4	Metal Jaw	2
5	50mm Pin	2
6	42mm Pin	1

Fig. C-5

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