



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination, 2013

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

Wednesday, 19 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 a music stand and conductor.

Fig. B-1 shows an isometric view of a model of the stand.

- (a) Draw an elevation of the stand looking in the direction of the arrow.
- (b) Draw a plan projected from the elevation.
- (c) Draw an end view of the stand.
- (d) Draw an auxiliary elevation of the *stand*, projected from the plan, which will include the true shape of surface A.

Scale 1:1

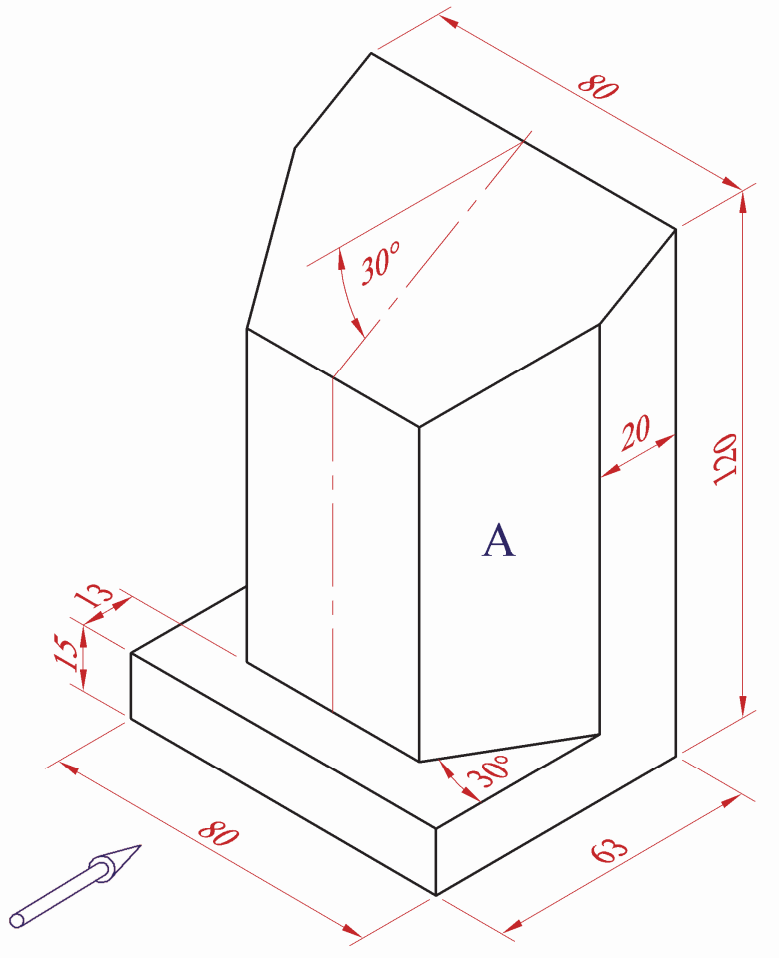


Fig. B-1

B-2. The 3D graphic on the right shows a unit for holding and charging a cordless phone.

Fig. B-2 shows an incomplete isometric projection of the unit.
The end view and plan of the unit 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 end view and plan, positioned as shown.
- (c) Draw the complete axonometric projection.

Scale 1:1

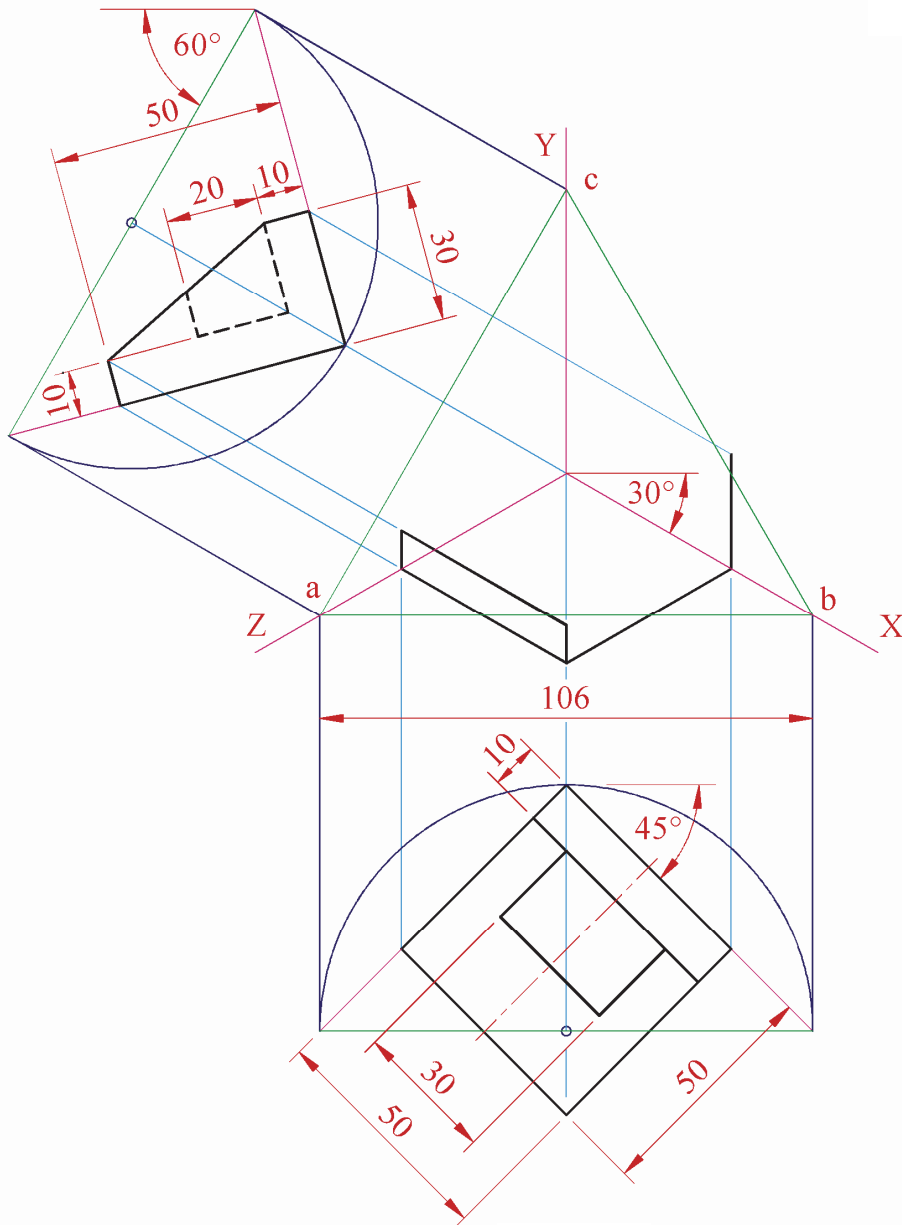
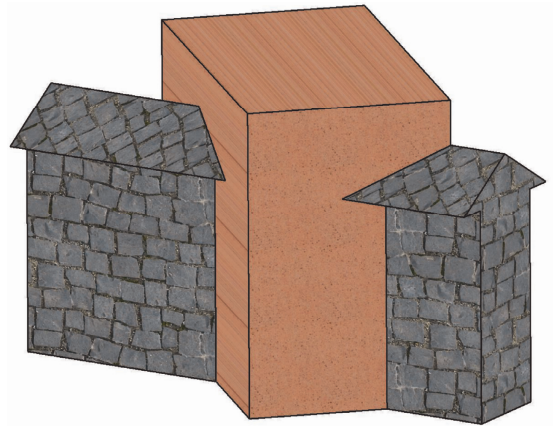


Fig. B-2

B-3. The 3D graphic on the right shows the intersection of a wall and a pillar.

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

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



Scale 1:1

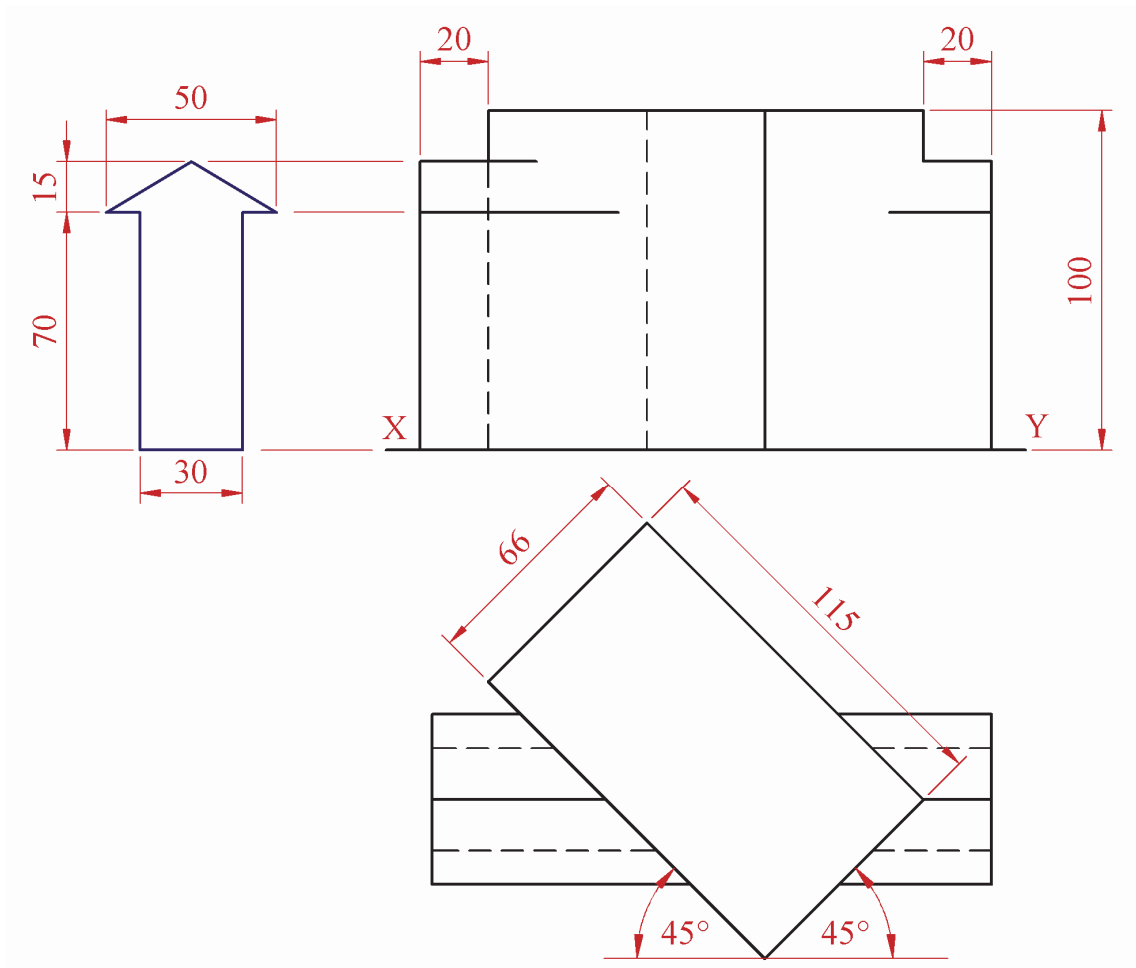


Fig. B-3

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 line **CD** is the centreline of a proposed level roadway which is at an altitude of 55m.

Using side slopes of 1 in 1 for both cuttings and 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

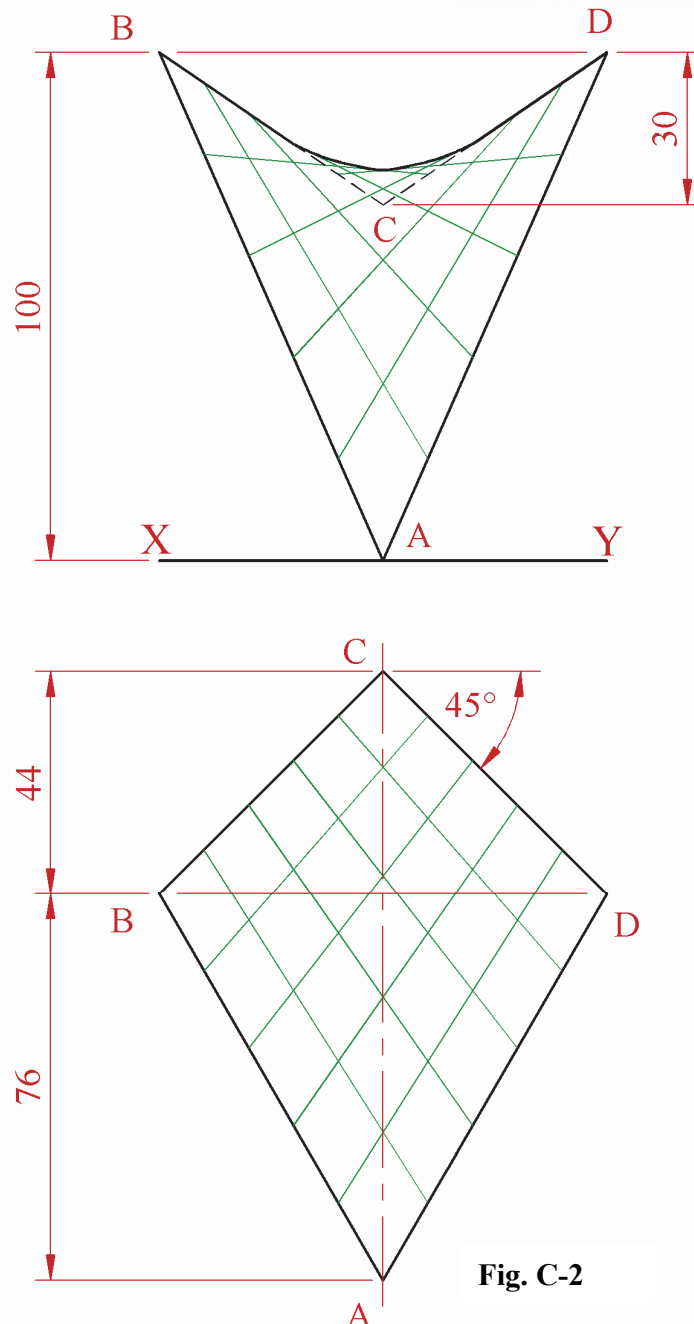
Structural Forms

C-2. The 3D graphic on the right shows a cufflink which includes a hyperbolic paraboloid surface.

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 view of the hyperbolic paraboloid surface.

Scale 1:1



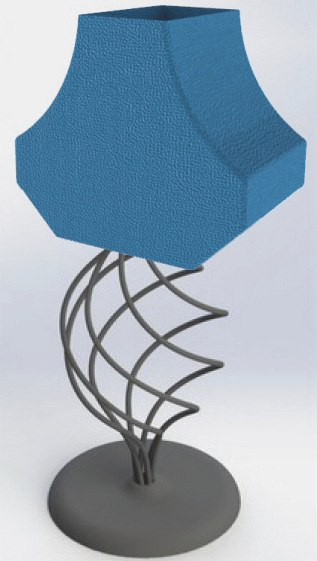
Surface Geometry

C-3. The 3D graphic on the right shows a table lamp with a modern lampshade. The lampshade is open at the top and at the bottom.

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

(a) Draw the given views of the lampshade.

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



Scale 1:1

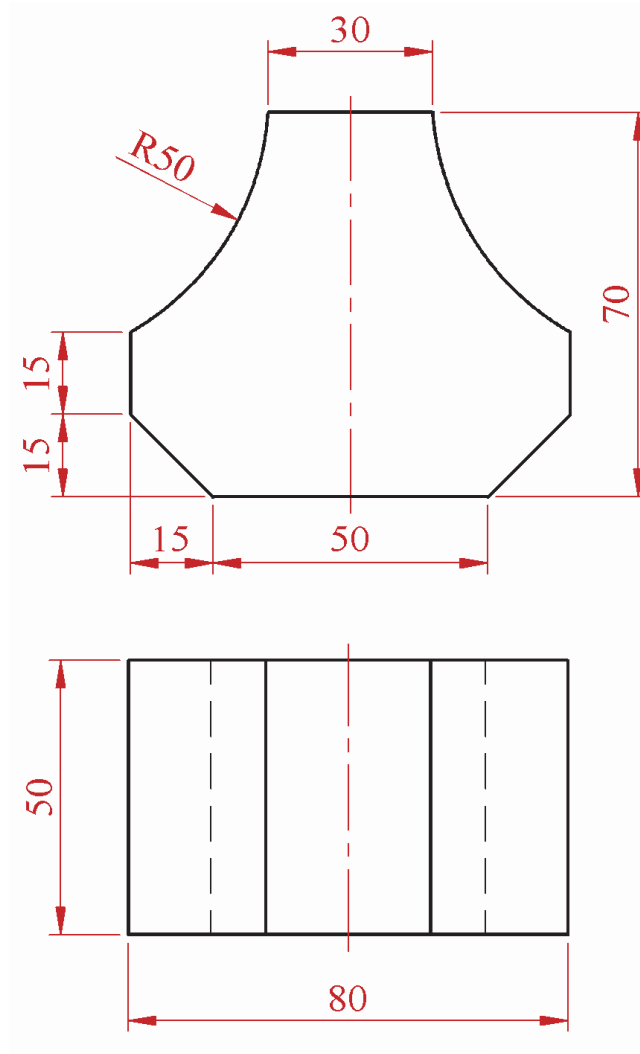


Fig. C-3

Dynamic Mechanisms

C-4. Cams are used in motorbike engines, like the one shown in the 3D graphic on the right.

Fig. C-4 below shows the outline of such a cam.

The cam imparts this motion to an inline knife edge follower:

- 0° to 90° Rise 50mm with uniform velocity
- 90° to 180° Dwell
- 180° to 360° Fall 50mm with uniform acceleration and retardation (UAR).

(a) Draw the displacement diagram for the cam.

(b) Draw the cam profile given the following:

- The cam rotates in an anti-clockwise direction
- The nearest approach of the follower to the centre of the camshaft is 30mm
- The camshaft diameter is 20mm.



Scale 1:1



Fig. C-4

Assemblies

C-5. Details of a Clamp Mechanism from the top of a bicycle stand, as shown on the right, are given in Fig. C-5 below.

A 3D graphic of the individual parts is also shown as well as a tabulated parts list.

Draw the **sectional elevation A-A** of the assembled Clamp Mechanism.

(All chamfers are 2mm×2mm. Any omitted dimensions may be estimated.)



Scale 1:1

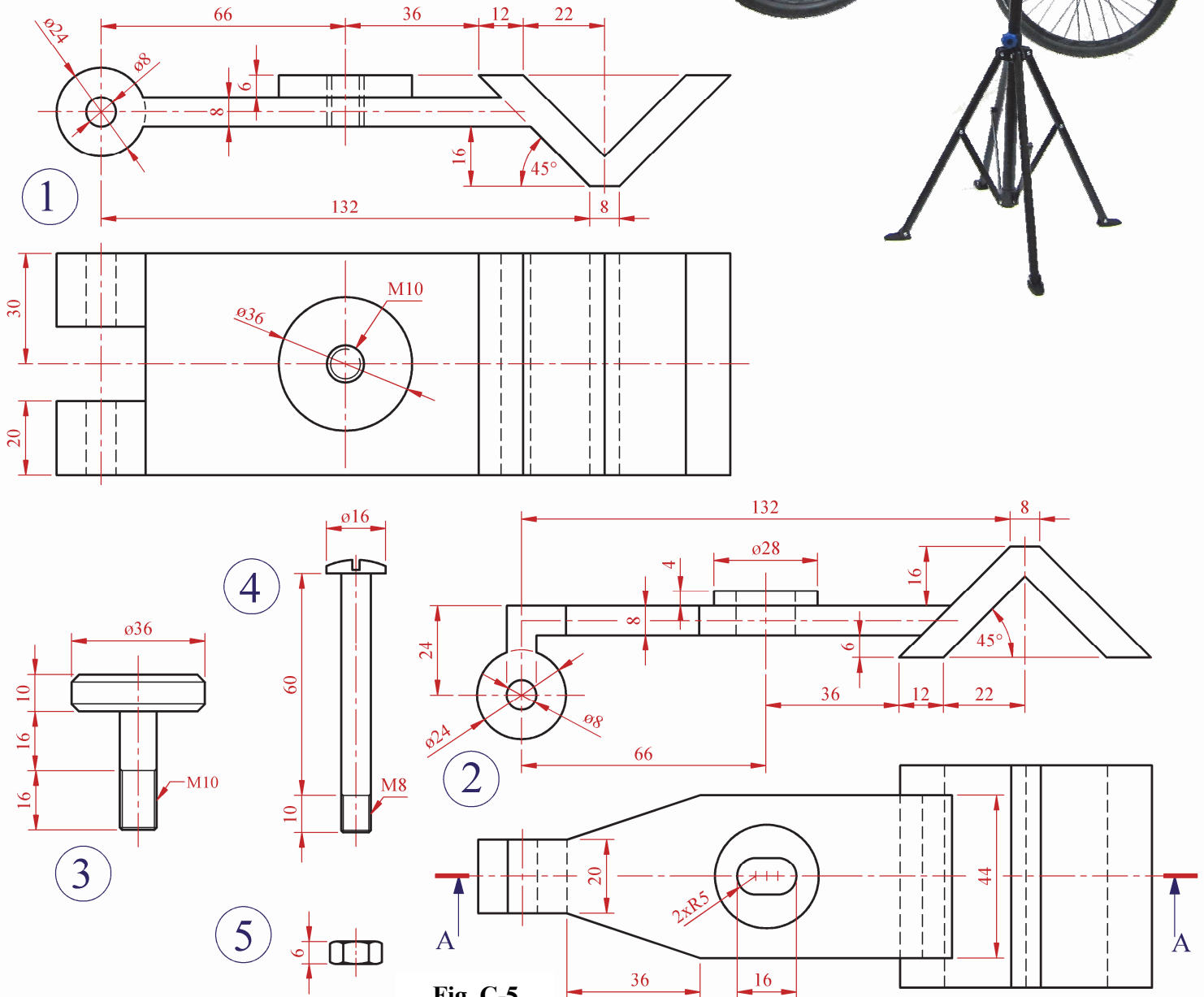
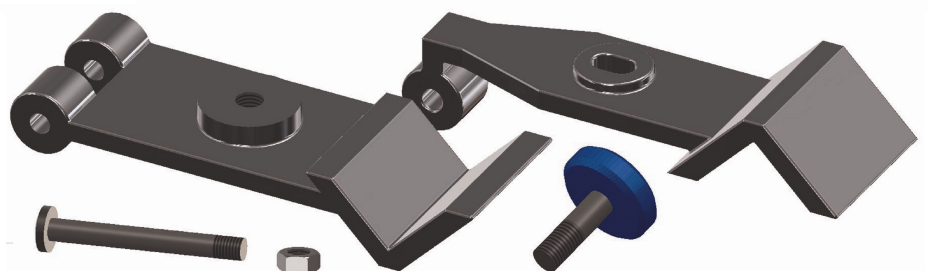


Fig. C-5

Part	Name	Qty.
1	Bottom Clamp Jaw	1
2	Top Clamp Jaw	1
3	Clamping Screw	1
4	M8 Bolt	1
5	M8 Hex Nut	1



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