



**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

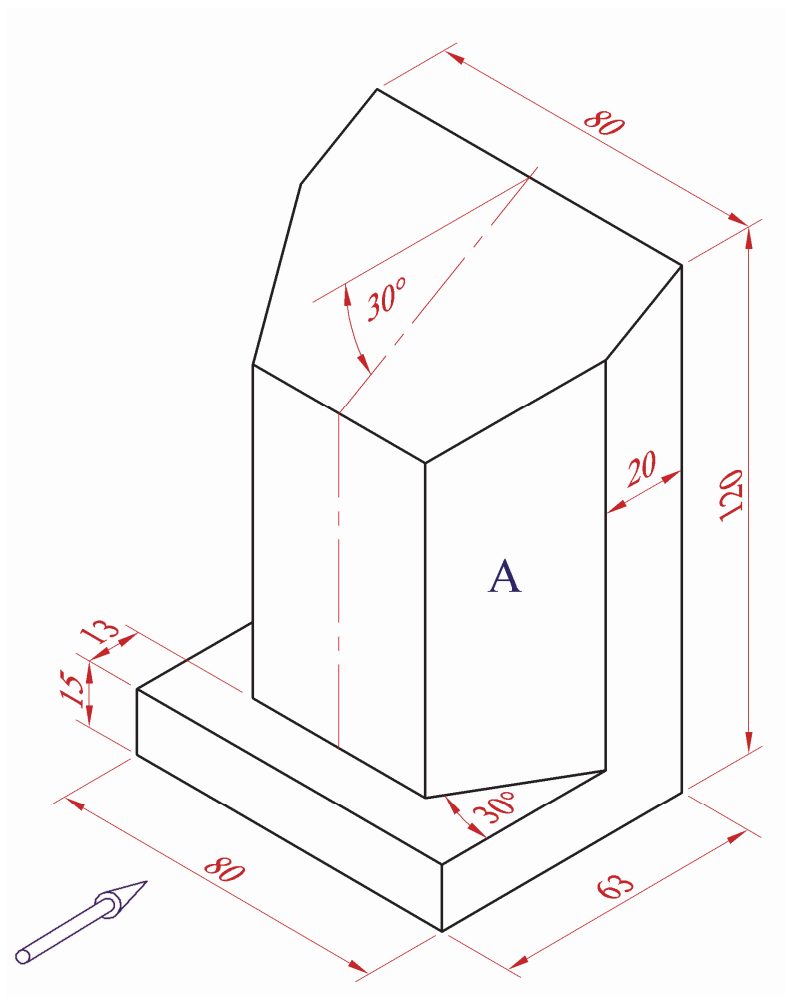


Fig. B-1

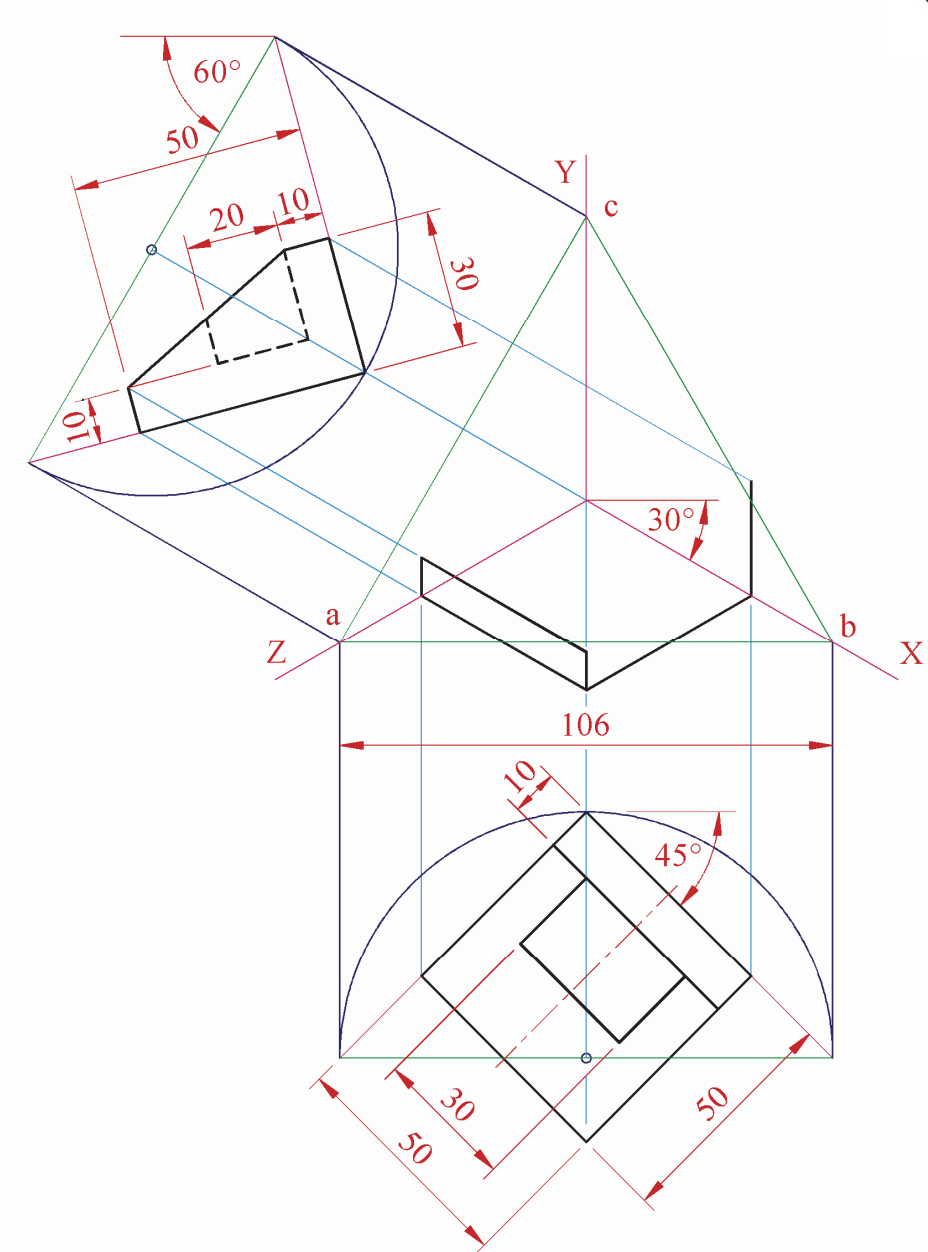
**B-2.** The 3D graphic on the right shows a unit for holding and charging a cordless phone.

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



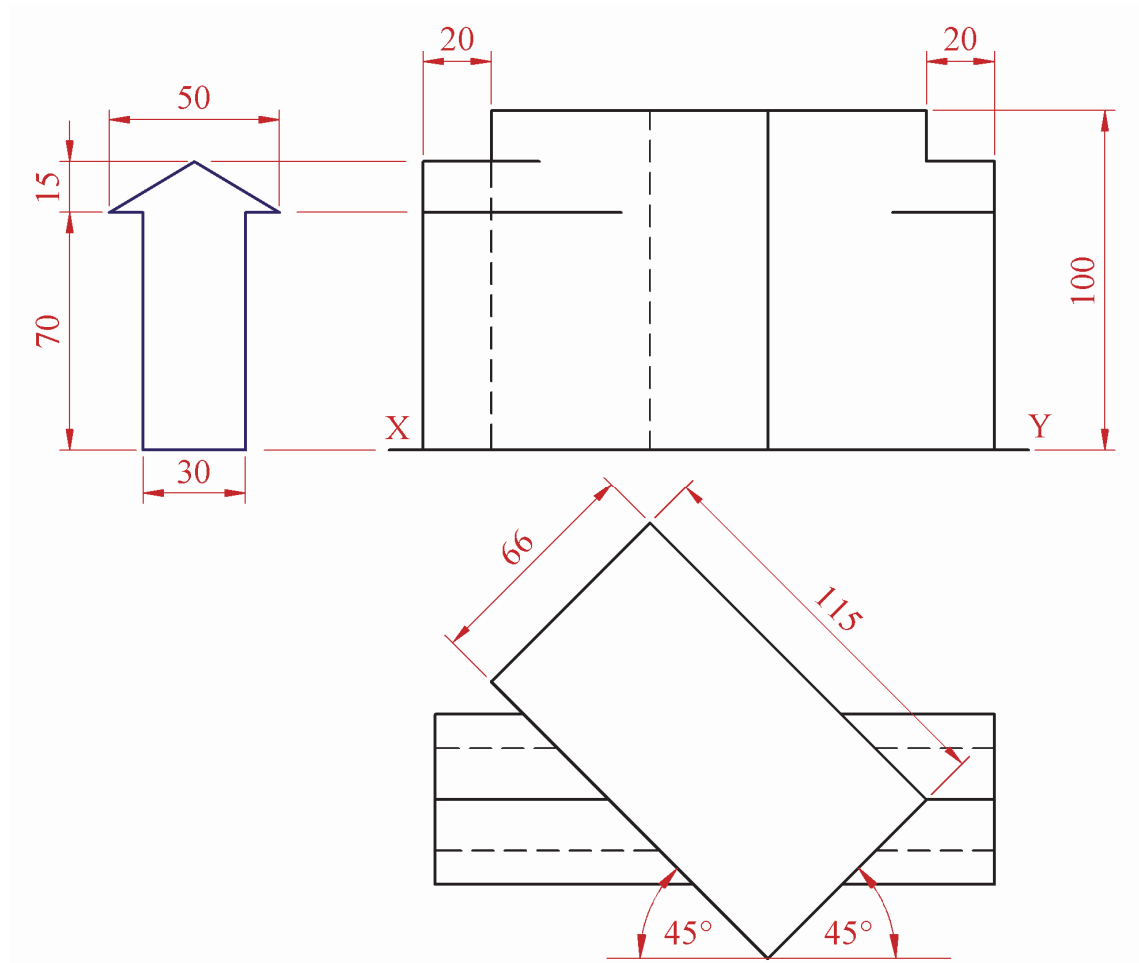
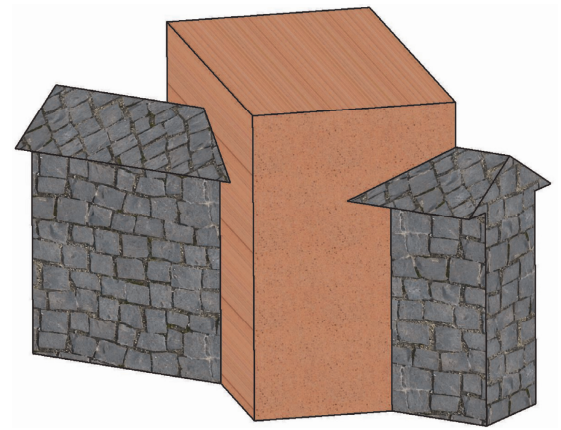
**Fig. B-2**

**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**

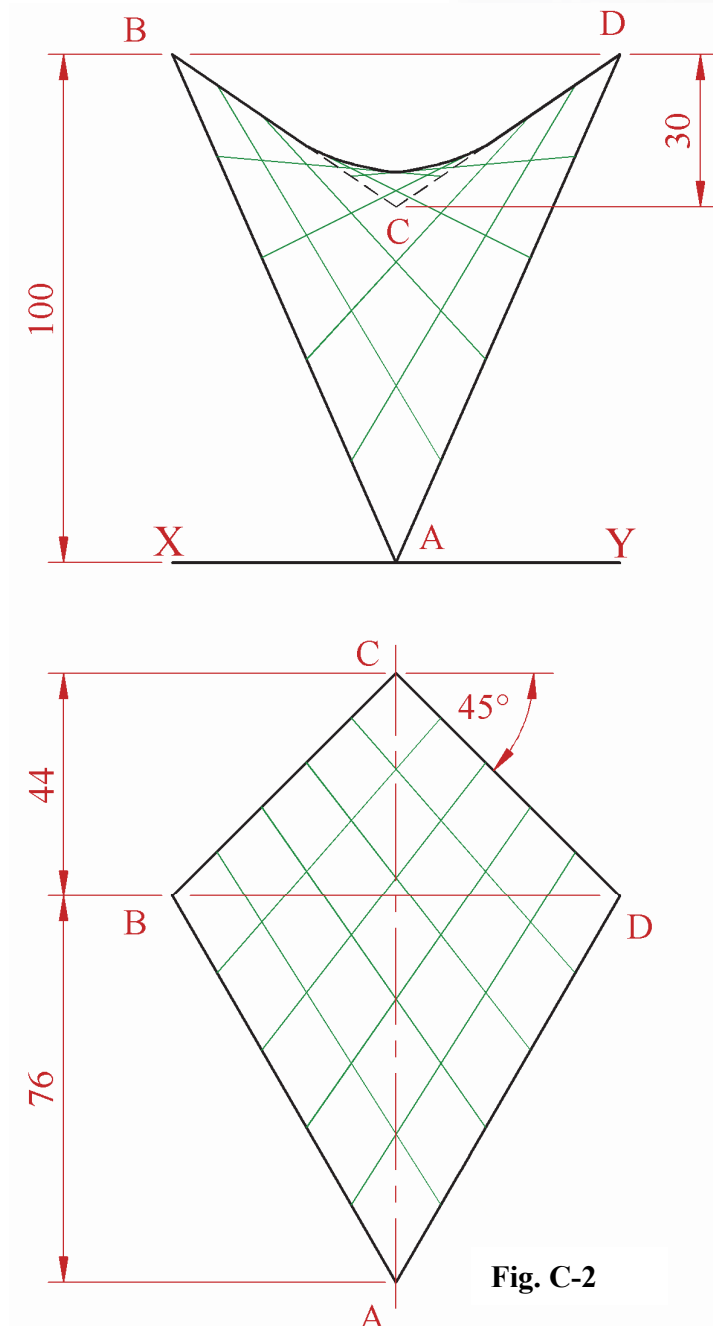
# Structural Forms

**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**



**Fig. C-2**

## Surface Geometry

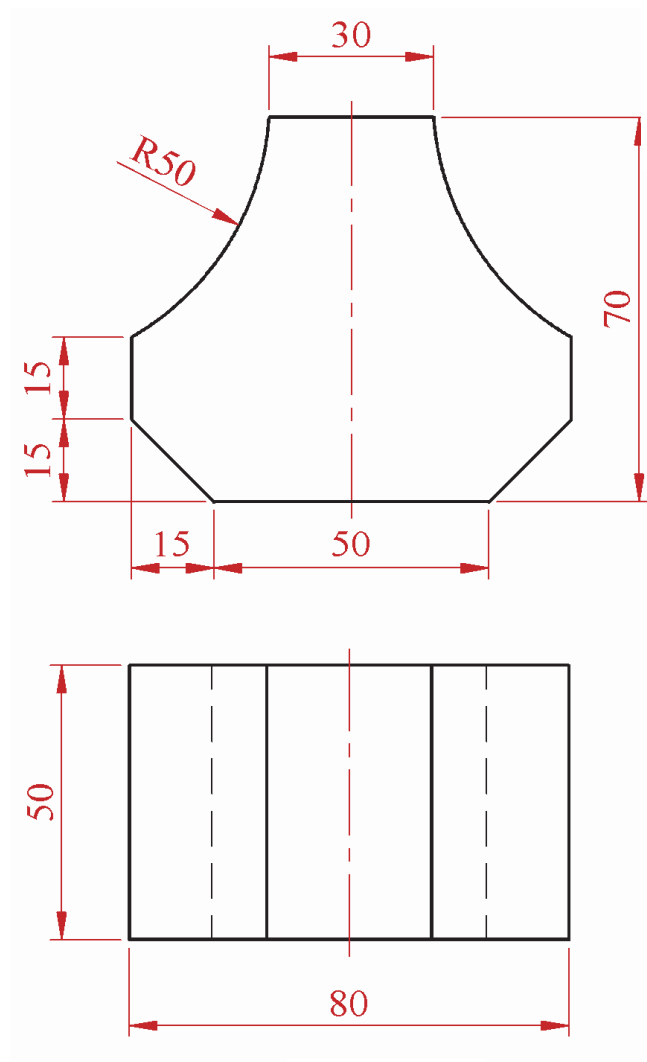
**C-3.** The 3D graphic on the right shows a table lamp with a modern lampshade. The lampshade is open at the top and at the bottom.

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

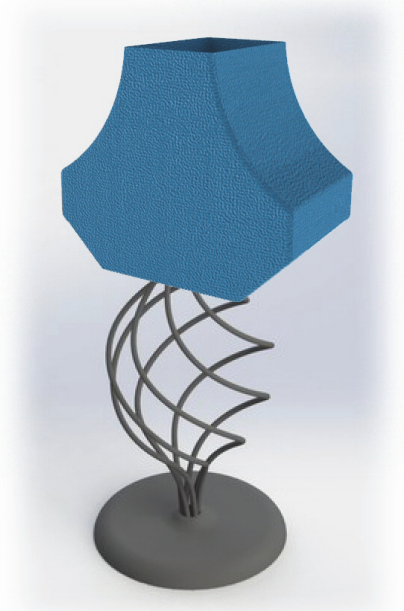
**(a)** Draw the given views of the lampshade.

**(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:

- $0^\circ$  to  $90^\circ$  Rise 50mm with uniform velocity
- $90^\circ$  to  $180^\circ$  Dwell
- $180^\circ$  to  $360^\circ$  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

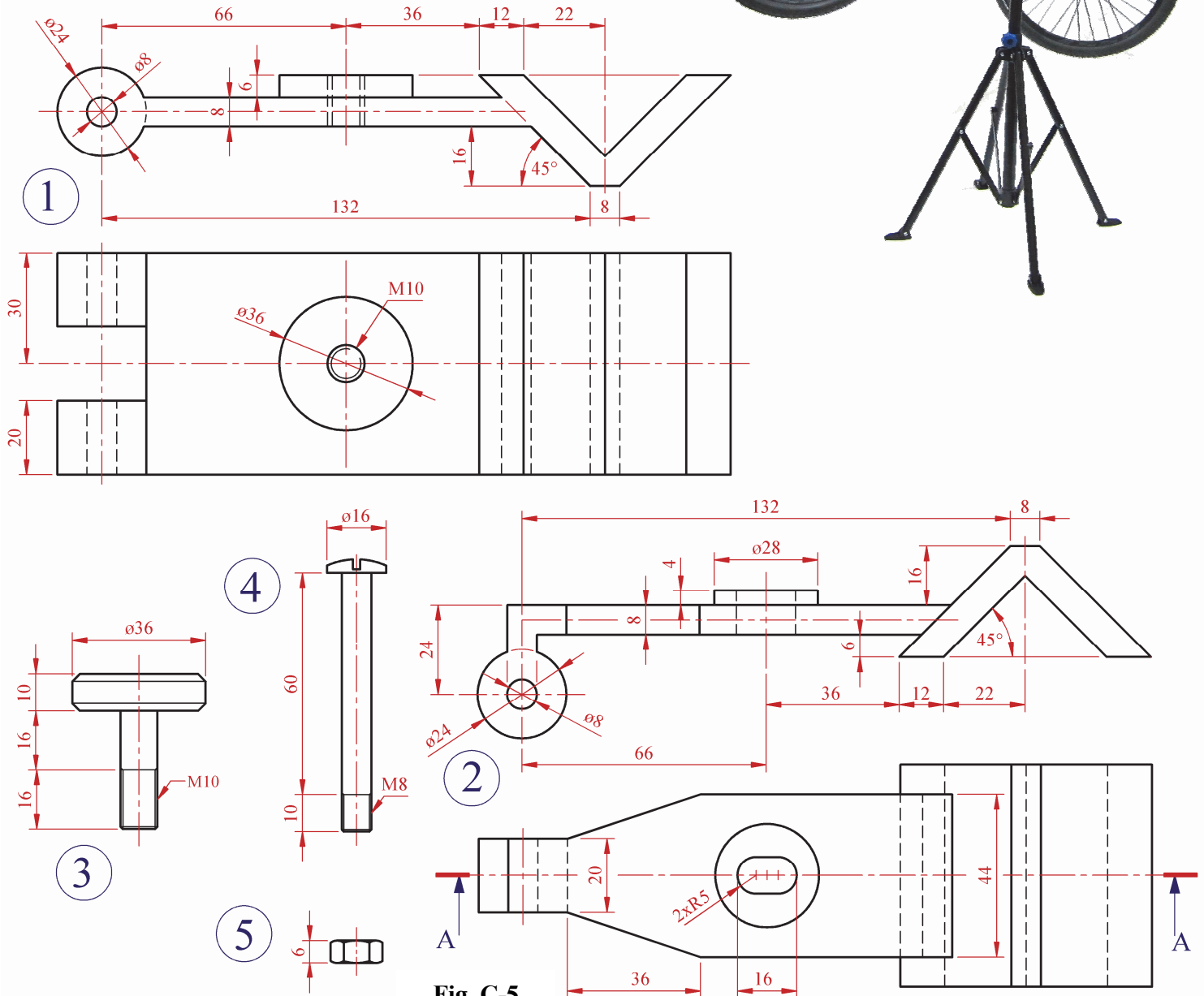
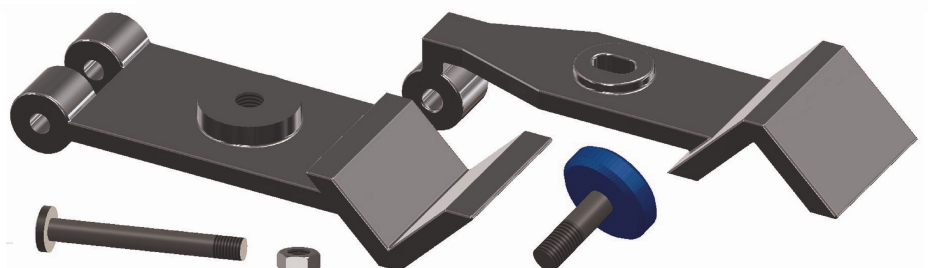


Fig. C-5

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



BLANK PAGE

BLANK PAGE

BLANK PAGE