



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination, 2011

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

Friday, 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 a bus shelter.

Fig. B-1 shows the plan and elevation of a model of the bus shelter.

- (a) Draw the given plan.
- (b) Make a perspective drawing of the structure given the following:
- The spectator point is 70mm from corner **A**
 - The picture plane is touching corner **A**
 - The horizon line is 40mm above the ground line.



Scale 1:1

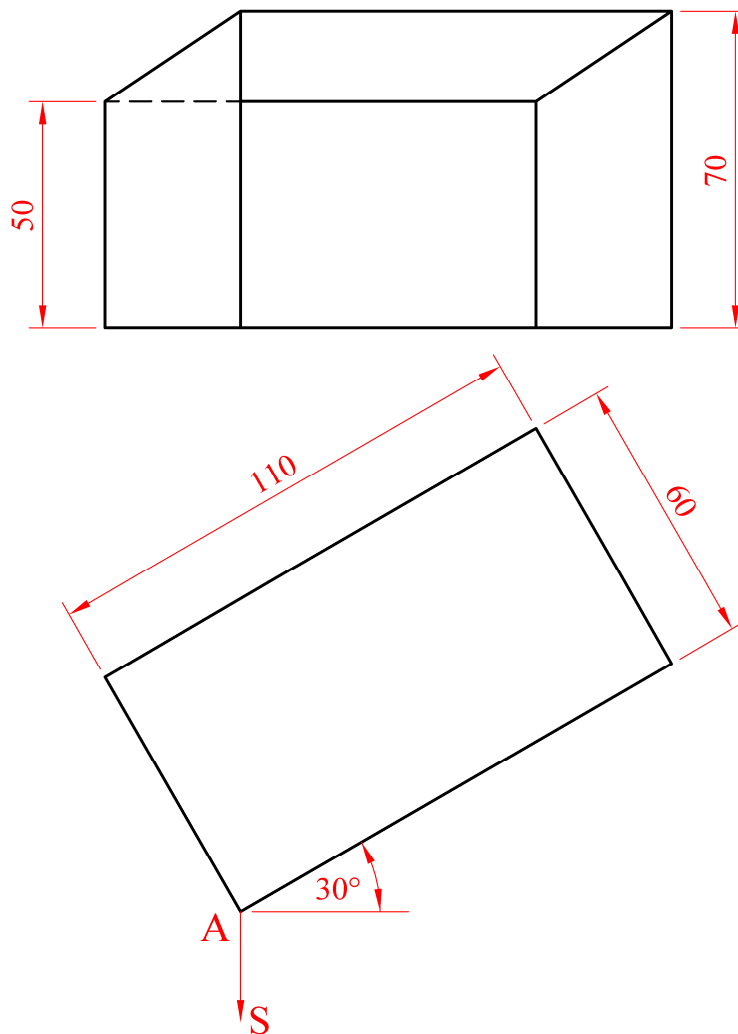


Fig. B-1

B-2. The 3D graphic on the right shows an arrangement of playground equipment consisting of an entrance tunnel leading to a play area, which is square in plan.

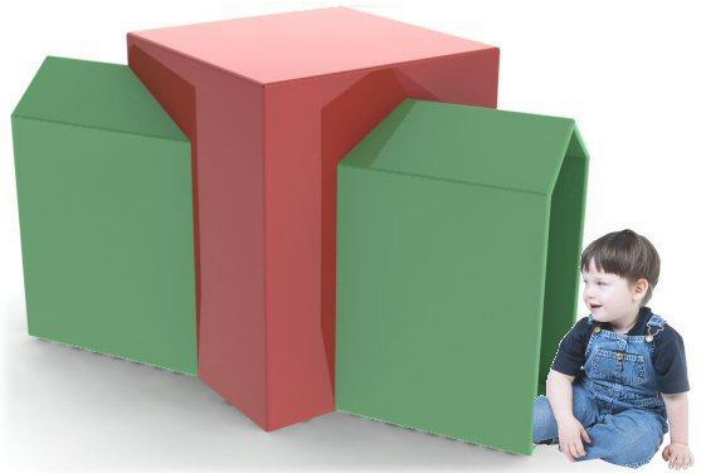


Fig. B-2 below shows the plan and elevation of the arrangement.

- (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

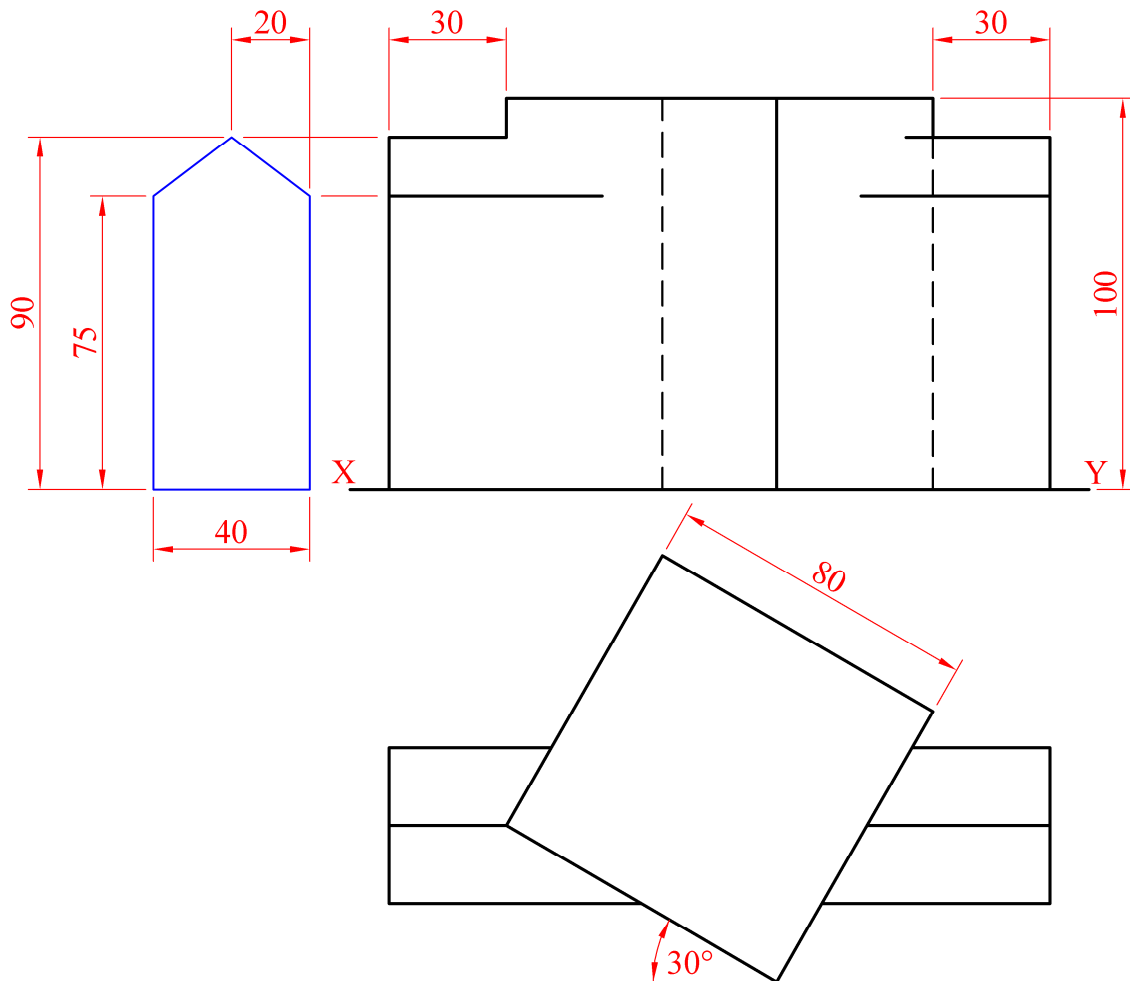


Fig. B-2

B-3. The 3D graphic on the right shows a model of a fireplace.

Fig. B-3 shows the plan and elevation of the fireplace.

- (a) Draw the given plan and elevation.
- (b) Draw an auxiliary elevation of the *fireplace*, projected from the plan, which will include the true shape of surface A.



Scale 1:1

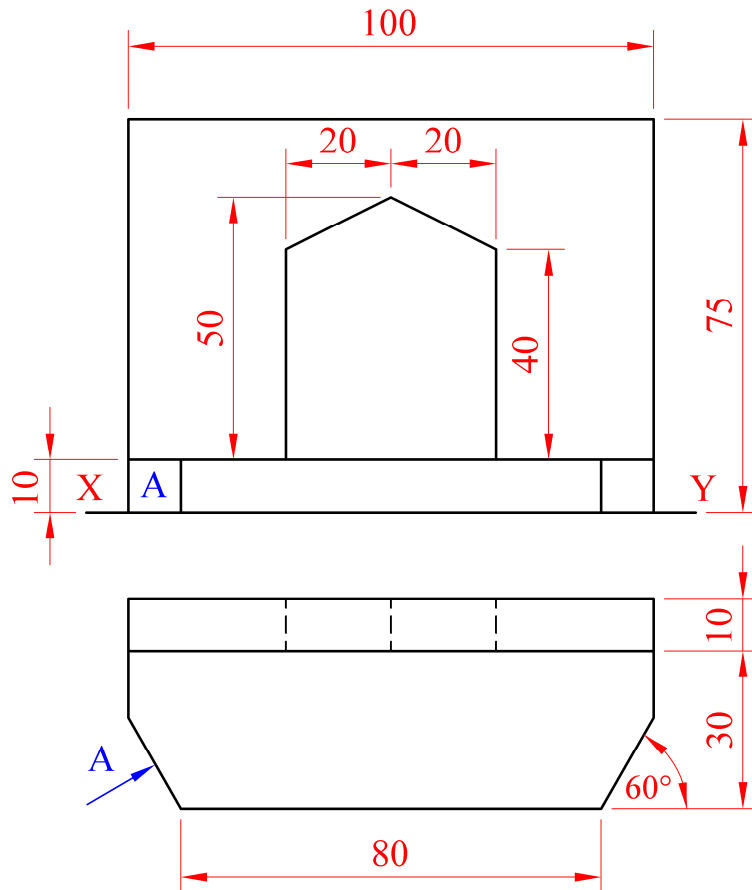


Fig. B-3

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 five metre vertical intervals.

- (a) On the drawing supplied, draw a vertical section (profile) on the line **AB**.
- (b) The valley to the right of point **A** floods during heavy rain. Draw a line on the profile to indicate the surface of the water when it is 8 metres in depth.
- (c) **CD** is the centreline of a proposed roadway which is level at an altitude of 25m.

Using side slopes of 1 in 1 for the cuttings, 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 image on the right shows a wire clothes hanger which was bent and then dipped into washing-up liquid, to produce a hyperbolic paraboloid surface film.

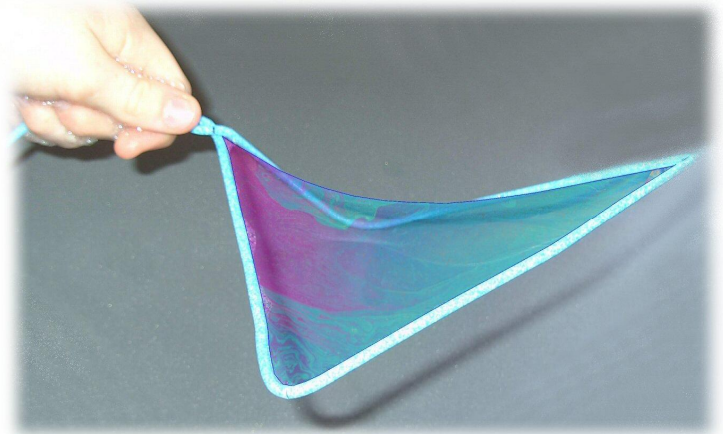


Fig. C-2 below shows the plan and elevation of a typical hyperbolic paraboloid surface **ABCD**.

The outline of the surface is a square in elevation.

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

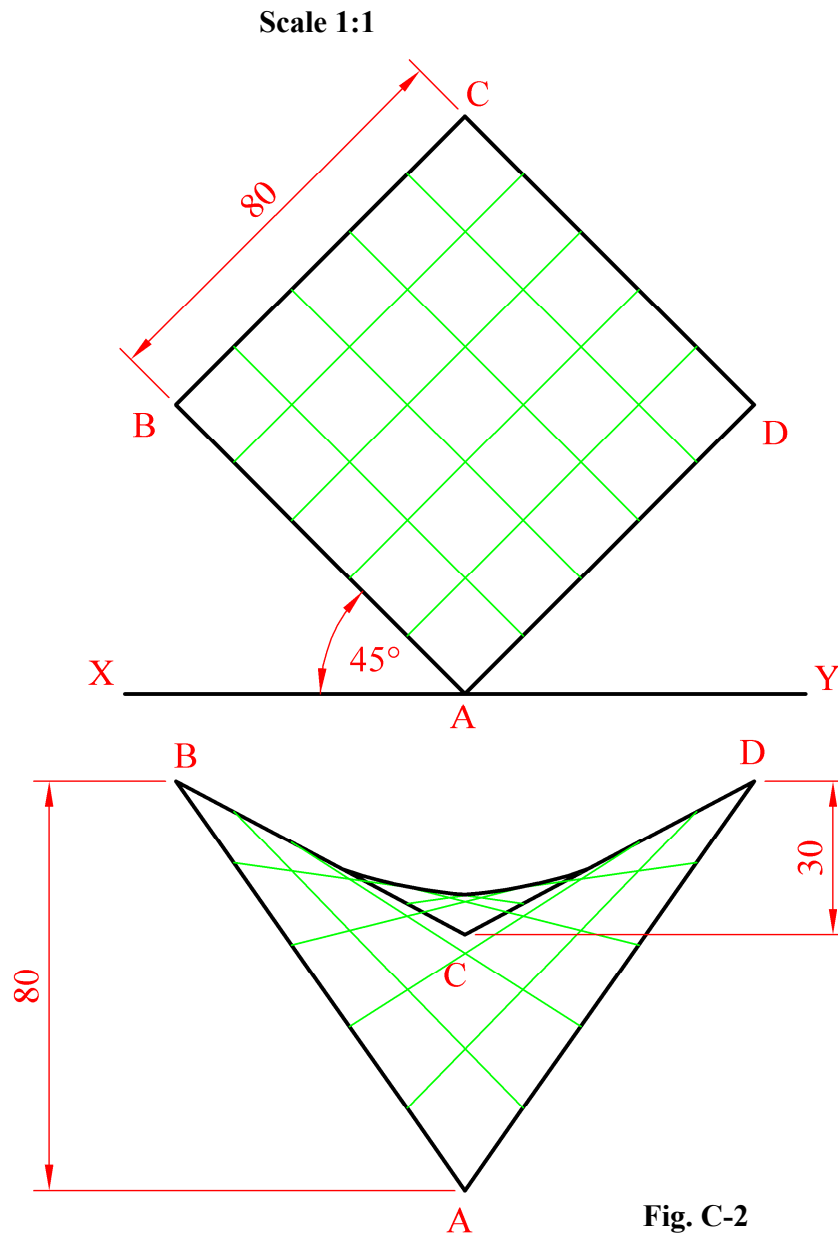


Fig. C-2

Surface Geometry

C-3. The 3D graphic on the right shows a design for a referee's whistle.

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



(a) Draw the given views.

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

Scale 1:1

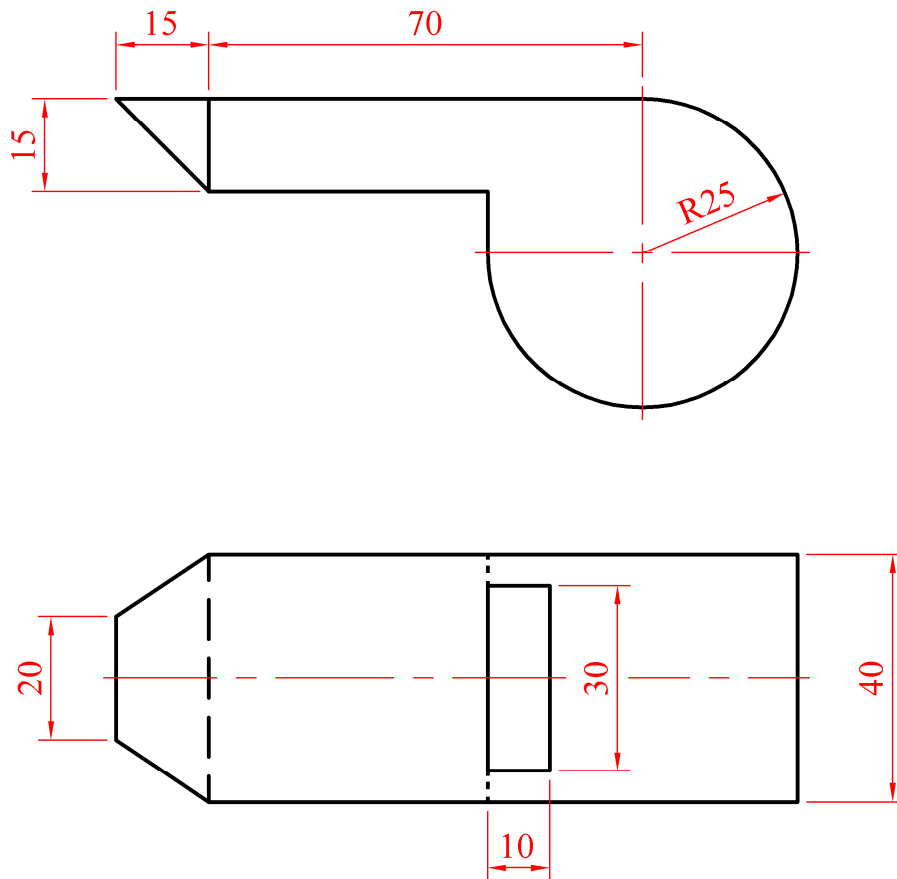


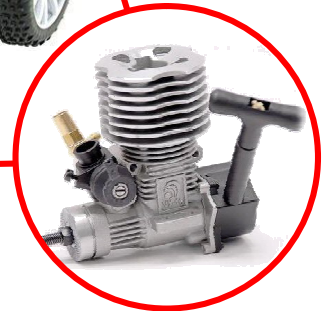
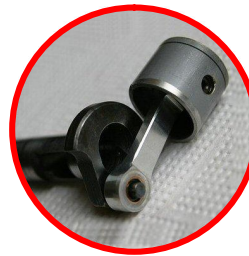
Fig. C-3

Dynamic Mechanisms

C-4. (a) The graphic on the right shows an enlarged view of the piston and crank mechanism from the engine of a remote control car. Fig. C-4 below shows the line diagram for this mechanism. Crank **OA** and arm **AC** are pin jointed at **A**. Point **B** is located 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.



Scale 1:1

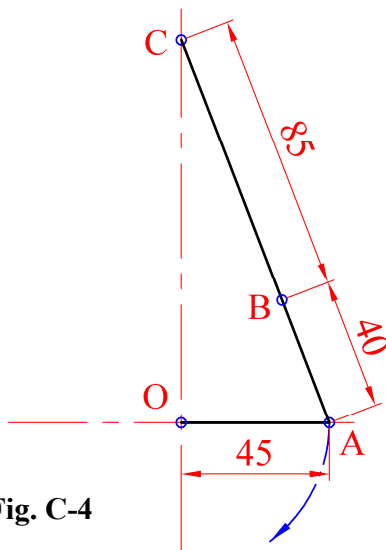


Fig. C-4

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

The cam imparts the following motion to the piston:

- 0° to 150° Rise 60mm with uniform velocity
- 150° to 180° Dwell
- 180° to 360° Fall 60mm with uniform acceleration and retardation.

Draw the displacement diagram.

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



Scale 1:1

Assemblies

C-5. The 3D graphic on the right shows a hand on a brass Door Knocker.

Details of the Door Knocker are given in Fig. C-5 with the parts list tabulated below. A 3D graphic of the individual parts is also shown.

Note: For clarity, some centrelines have been omitted.

Draw the elevation of the assembled Door Knocker.

(Any omitted dimensions may be estimated.)



Scale 1:1

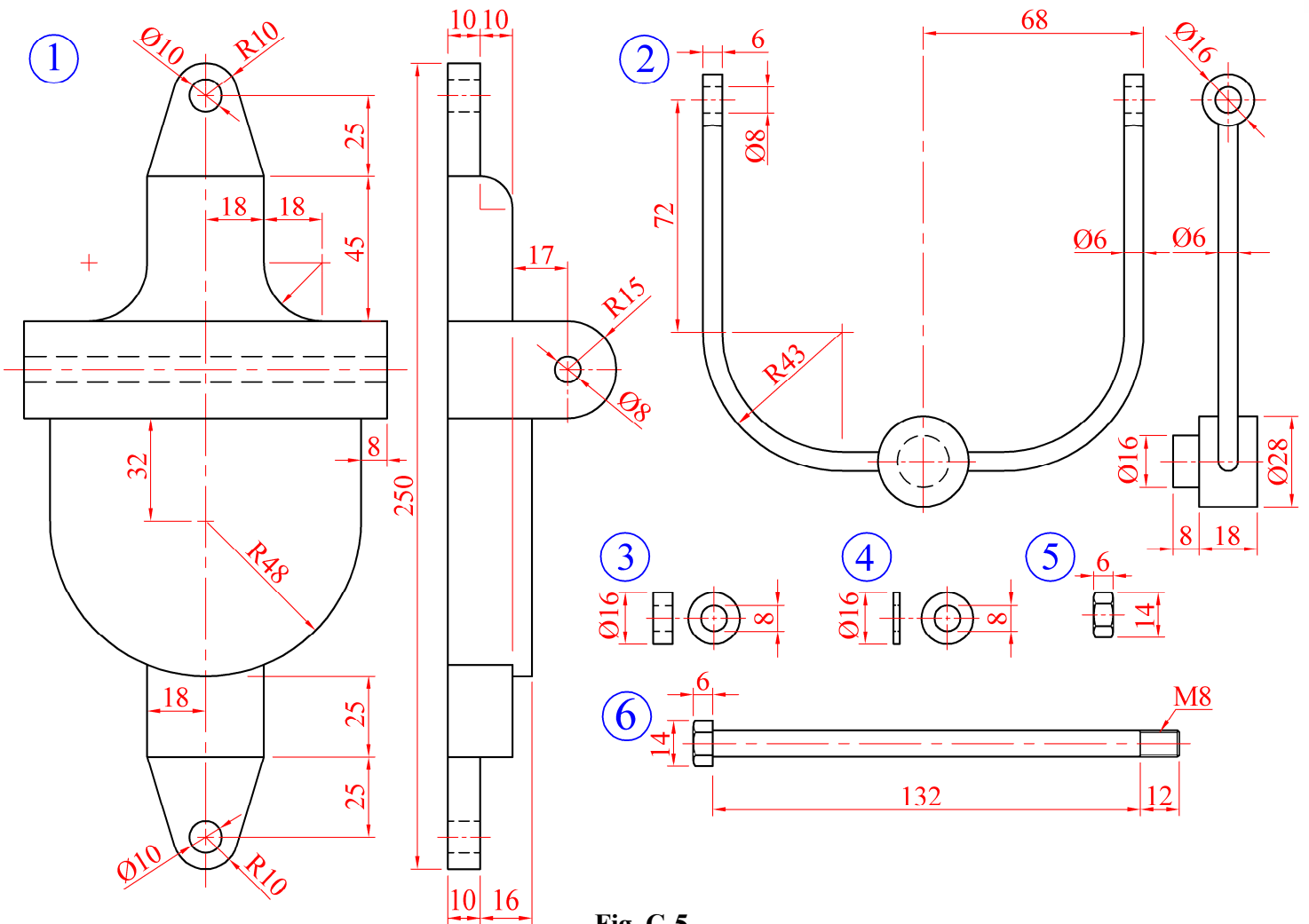
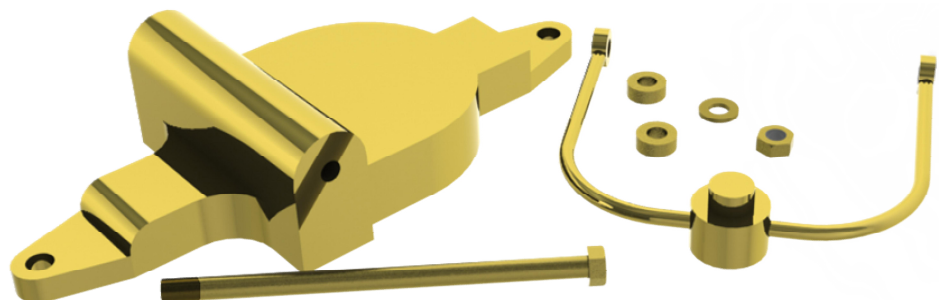


Fig. C-5

Part	Name	Qty.
1	Door Plate	1
2	Swing Arm	1
3	6mm Spacer	2
4	M8 Washer	1
5	M8 Nut	1
6	M8 Bolt	1



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