MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD

UNIVERSITY OF MALTA, MSIDA

MATRICULATION EXAMINATION
ADVANCED LEVEL
SEPTEMBER 2014

SUBJECT:	ENGINEERING DRAWING/GRAPHICAL COMMUNICATION
PAPER NUMBER:	I
DATE:	2nd September 2014
TIME:	9.00 a.m. to 12.00 noon

Directions to Candidates

Write your index number where indicated at the top of all drawing sheets.

Attempt **any five** questions.

Programmable calculators **cannot** be used.

Unless otherwise stated:

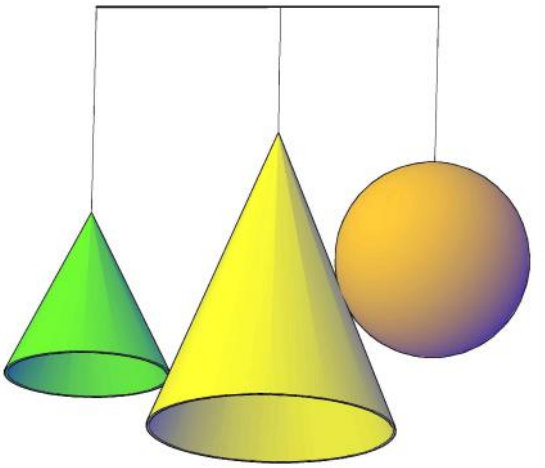
a. drawings should conform to B.S. or equivalent (ISO) standards;
b. all dimensions are in millimetres;
c. all answers are to be accurately drawn with instruments;
d. unless otherwise stated, all construction lines must be left in each solution;
e. drawing aids may be used.

Dimensions not given should be estimated.

Careful layout and presentation are important.

Marks will be awarded for accuracy, clarity and appropriateness of constructions.

Question 1



A design of a hanging light is illustrated. The two unequal right cones and the sphere are in mutual contact with each other to form the desired arrangement of the hanging light.
Copy, full size;

a) the auxiliary elevation of the required sphere, with P as the point of contact of the sphere with the cone. Show how the centre of the sphere is obtained,
b) by projection obtain the position of the centre and the point of contact of:
    i) P on the plan, representing the required projections of the sphere and the cone,
    ii) Q on the plan, representing the required projections of the two cones,
c) determine the position of the points of contact P and Q by projection on the front elevation.

(20 marks)

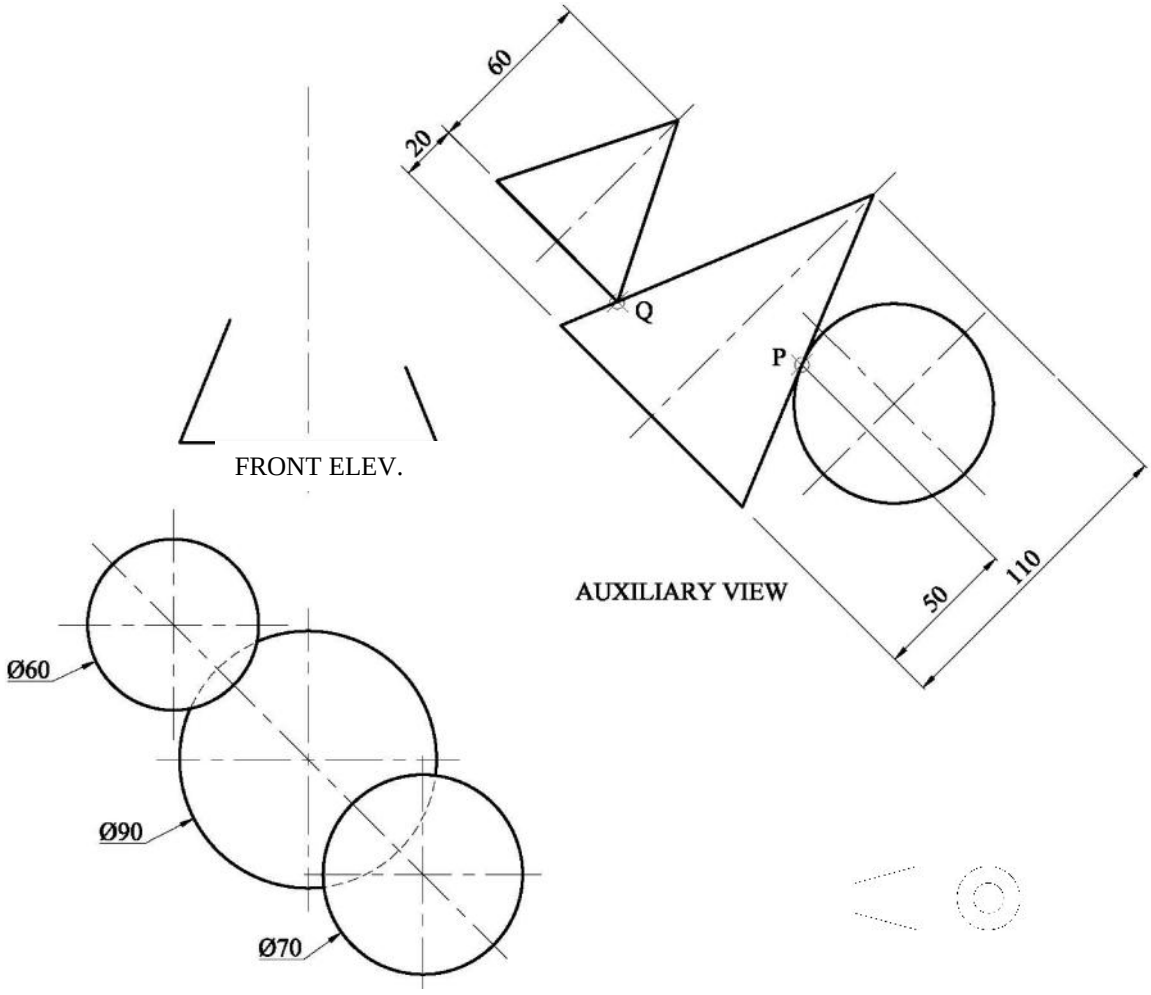


Figure 1

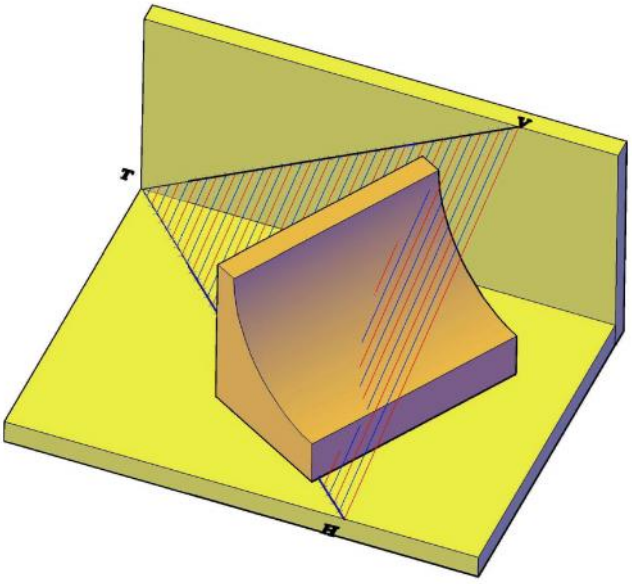
Question 2

A cross section of a moulding is shown in Figure 2. The moulding is resting on the horizontal plane with its side inclined at 60º to the vertical plane as shown in the plan. The position of the traces and their apparent angles are also included.

a) Draw an auxiliary elevation showing the oblique plane as an inclined plane. Include in this elevation the moulding, showing how the section is passing through the moulding.

b) Show on the given plan the section of the moulding which lies below the oblique plane.

c) Draw a true shape of the section of the moulding.



(20 marks)

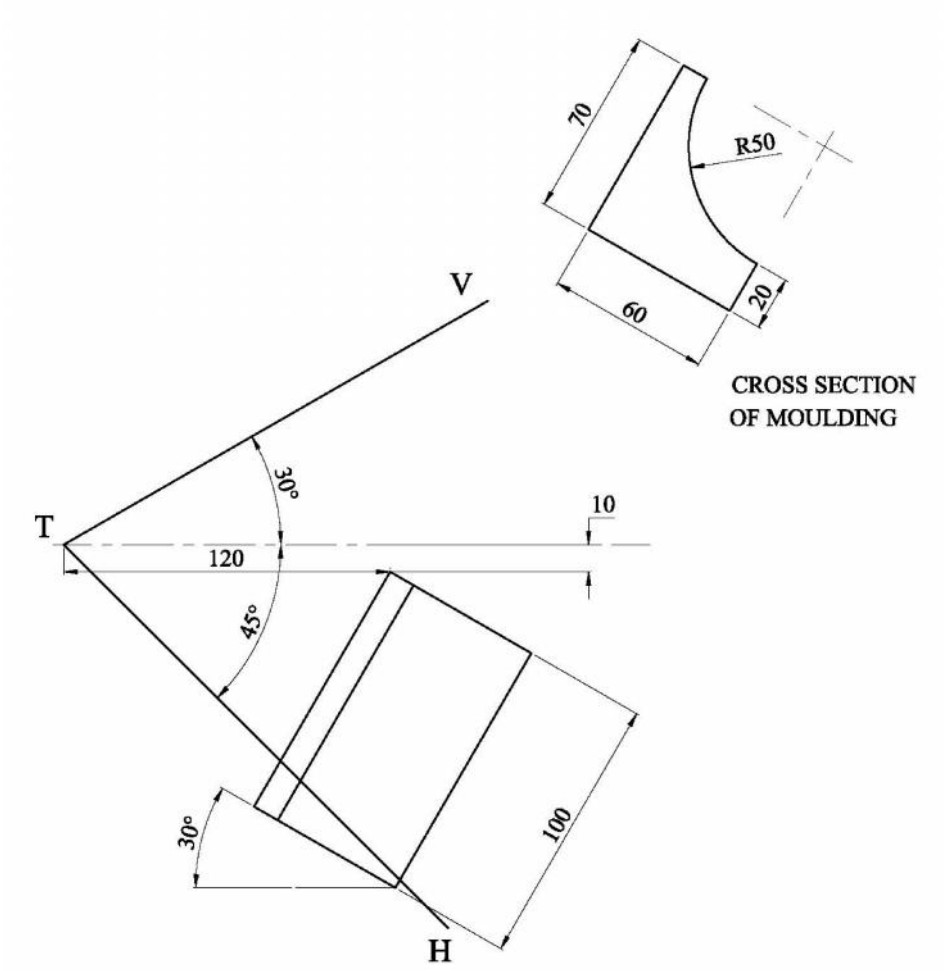


Figure 2

Question 3

The loaded beam shown in Figure 3 carries a uniformly distributed load and two point loads one of which at its overhanging end.

a) Copy the space diagram using a scale of 10mm representing 0.5m.
b) Using a scale of 10mm representing 0.5kN, draw the vector diagram and a polar diagram using a polar distance of 120mm.
c) Draw the shear force and bending moment diagrams for the loaded beam shown,
d) Determine graphically:
   i) the magnitude of the left and right reactions;
   ii) the position and magnitude of the greatest bending moment.

(20 marks)

SPACE DIAGRAM

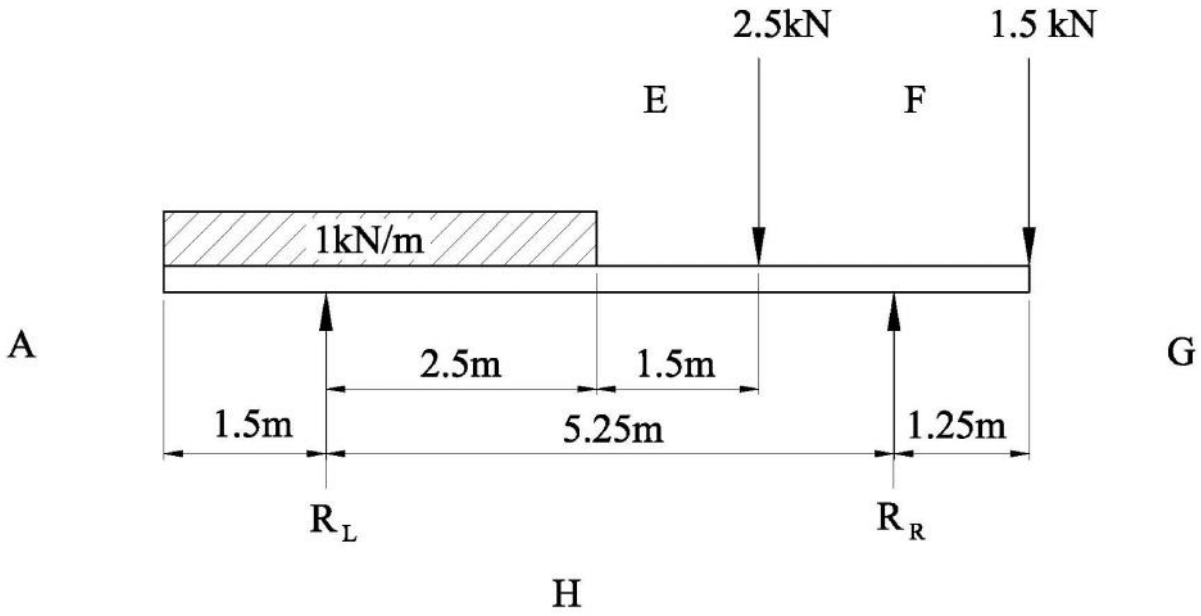
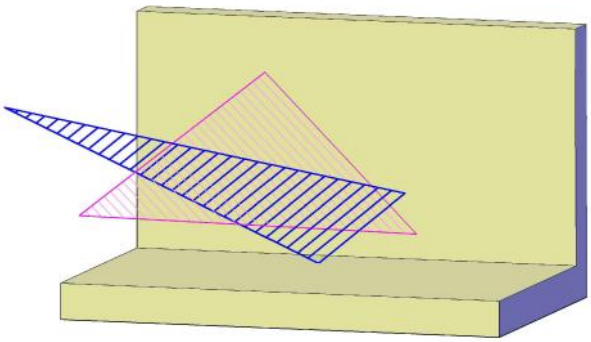


Figure 3

Question 4

Incomplete orthographic projections of two intersecting triangles are shown in Figure 4.
To a scale of 1:1:



a) Copy the given views

b) Construct a first auxiliary view of the two triangles, showing the triangular lamina ABC as a straight line in this view

c) Draw a complete front elevation and plan showing clearly the intersecting line between the two triangles

d) Construct the true shape of the triangular lamina ABC by drawing a second auxiliary view.

(20 marks)

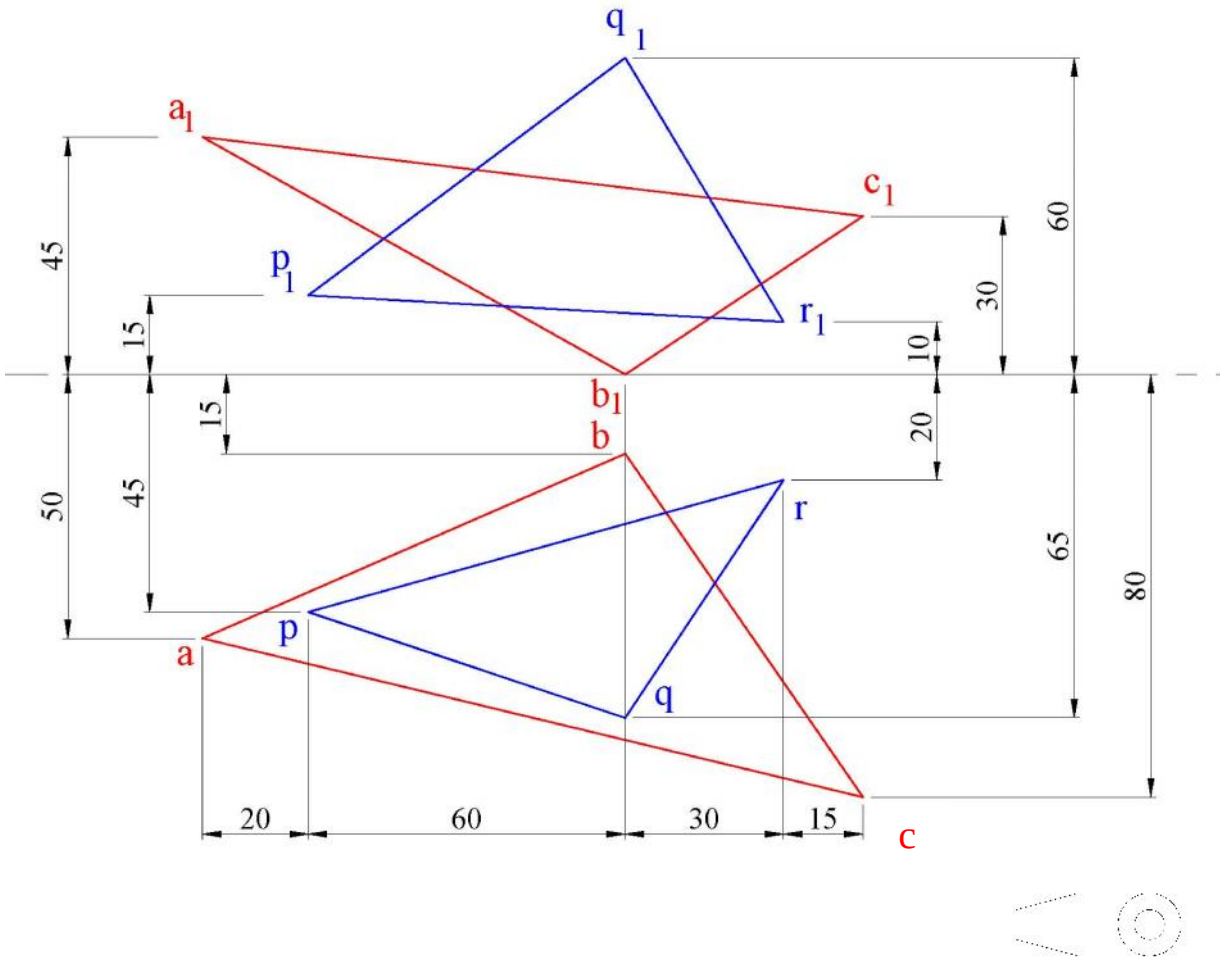


Figure 4

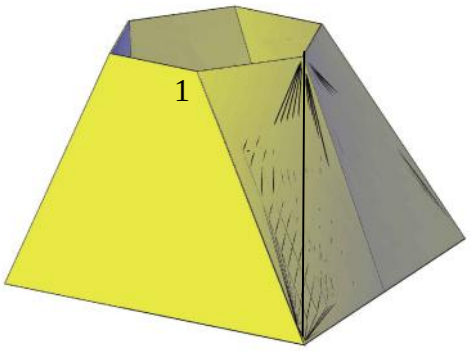
Question 5

A ventilation duct, which is manufactured from sheet metal, is shown in Figure 5. The duct is used for ventilation in a workshop.
Construct, to a scale of 1:1:

a) the given views;

b) the necessary true lengths to construct the development of the surface of this duct before bending. The joint line is to be made along A-1. Ignore material thickness.

(20 marks)



A

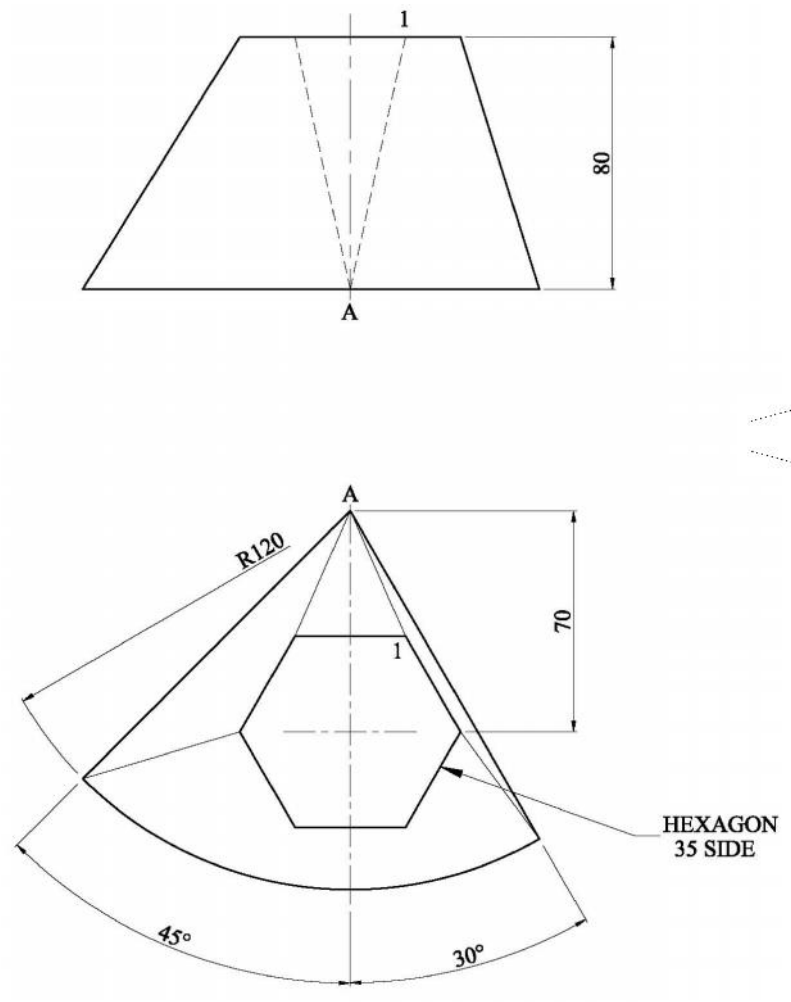


Figure 5

Question 6

A horizontal right cylinder is 70 mm diameter and penetrates an inverted right cone as shown in Figure 6.

a) Draw, full size, the given views.
b) Obtain the curves of intersection on the plan.
c) Project the points of intersection from the plan to the front elevation and join by a smooth continuous curve to complete the view.

Include hidden detail.

(20 marks)

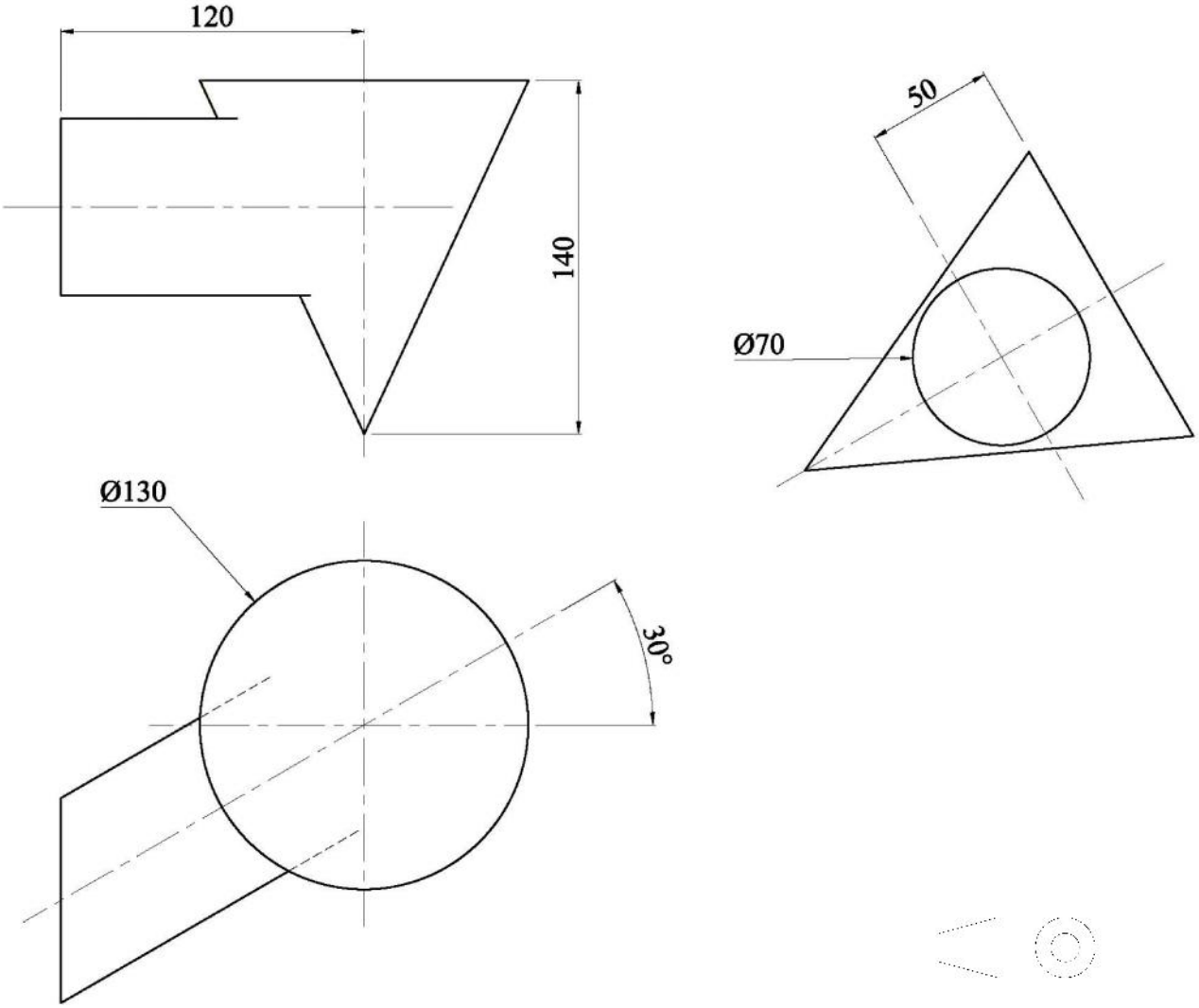


Figure 6