

2601/104

2602/104

2603/104

ENGINEERING DRAWING, MATERIALS,
PROCESSES AND WORKSHOP TECHNOLOGY

Oct./Nov. 2022

Time: 3 Hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN ELECTRICAL AND ELECTRONIC ENGINEERING
(POWER OPTION)
(TELECOMMUNICATION OPTION)
(INSTRUMENTATION OPTION)

MODULE I

ENGINEERING DRAWING, MATERIALS, PROCESSES AND WORKSHOP TECHNOLOGY

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Answer booklet;

Drawing instruments;

Drawing papers;

Non-programmable scientific calculator.

This paper consists of TWO sections: A and B.

Answer any THREE questions from section A and any TWO questions from section B in the answer booklet provided.

Maximum marks for each part of a question are as indicated.

Candidates should answer the questions in English.

This paper consists of 6 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

SECTION A: MATERIALS, PROCESSES AND WORKSHOP TECHNOLOGY

Answer **THREE** questions from this section.

1. (a) Explain one way each of the following can contribute to accidents in the workshop:
- (i) carelessness;
 - (ii) ignorance;
 - (iii) unsuitable clothings. (6 marks)
- (b) (i) Explain the term 'workshop layout'.
(ii) List four factors in workshop layout. (6 marks)
- (c) Outline the first aid procedure for treatment of burns and scalds. (8 marks)
2. (a) List four physical properties of engineering materials. (2 marks)
- (b) Define each of the following mechanical properties of engineering materials:
- (i) toughness;
 - (ii) elasticity;
 - (iii) hardness. (6 marks)
- (c) With aid of a diagram, describe the production of pig iron. (12 marks)
3. (a) (i) Explain the term 'datum' in reference to marking out.
(ii) Illustrate the marking out of a plate work piece using a scribing block and an angle plate. (7 marks)
- (b) List three parts of a vernier caliper. (3 marks)
- (c) Illustrate the following methods of filing in reference to hand tools:
- (i) cross filing;
 - (ii) straight filing;
 - (iii) draw filing. (6 marks)
- (d) (i) List three types of engineer's hammers.
(ii) State one safety precaution in use of engineer's hammers. (4 marks)

4. (a) (i) Distinguish between permanent and temporary joints in mechanical joining of metals, giving **one** example in each case.
(ii) List **four** tools and equipment used in soft soldering. (8 marks)
- (b) Sketch **two** surfaces or work produced by a shaping machine. (6 marks)
- (c) Explain the following parts of a drilling machine:
(i) spindle;
(ii) base;
(iii) head. (6 marks)

SECTION B: ENGINEERING DRAWING

Answer TWO questions from this section.

5. (a) (i) Construct a rectangle whose diagonal is 85 mm long and one side 35 mm long.
(ii) Construct a square side 100 mm. Within the square, construct a regular octagon. (12 marks)
- (b) Construct a triangle with a perimeter of 115 mm whose sides are in the ratio of 2 : 4 : 5. (8 marks)

6. Figure 1 shows a front elevation and plan of a block drawn in first angle projection. Construct its isometric view taking part marked C as the lowest point. (20 marks)

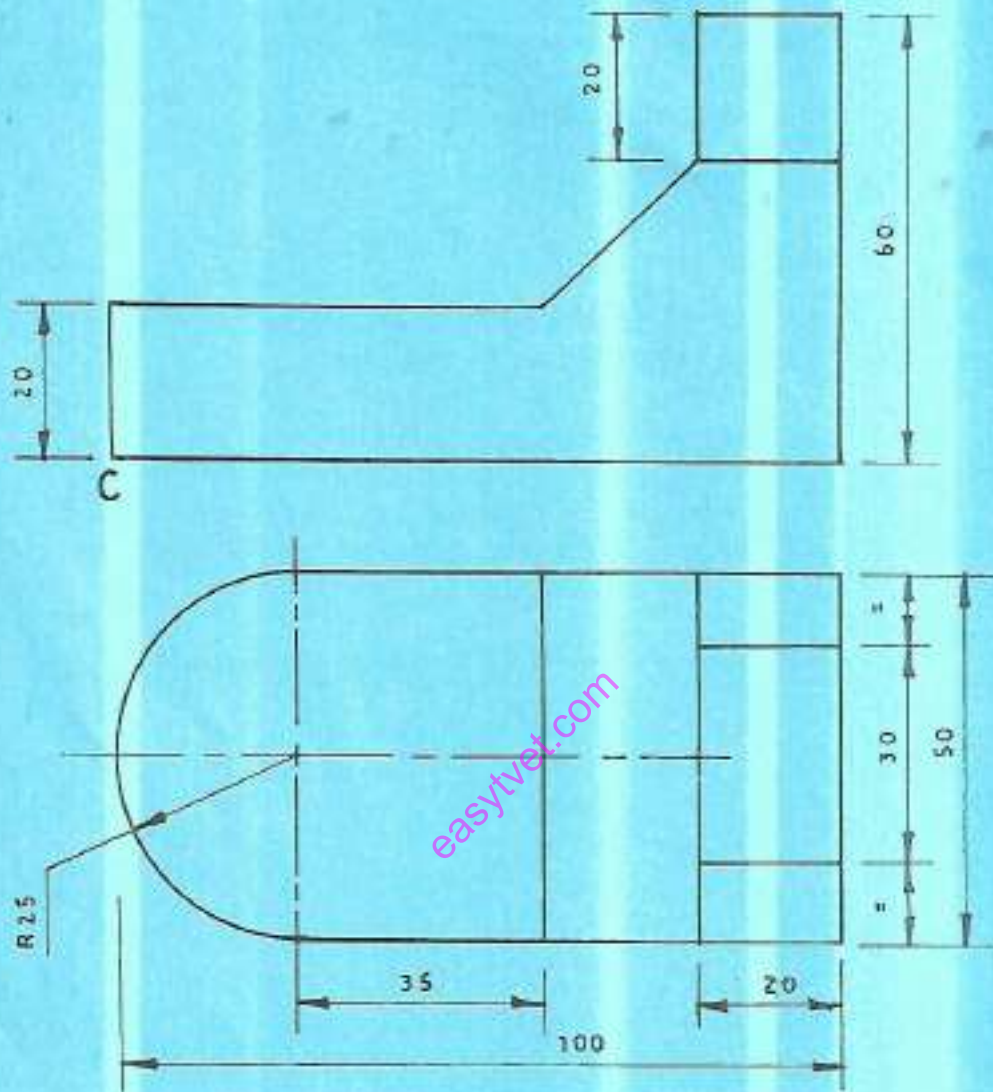


Fig.1

7. Figure 2 shows a plan and elevation of a solid square section with a square hole running through the centre. Using the figure, draw the following types of sections:

- (a) full section;
- (b) half section;
- (c) part (local) section;
- (d) revolved section;
- (e) removed section.

(20 marks)

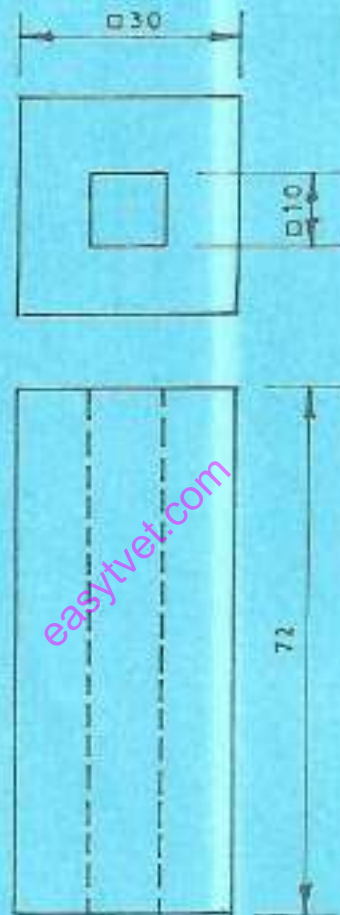


Fig. 2

8. Figure 3 shows a pictorial view of an object. Draw the following using third angle orthographic projection:

- (a) a front elevation in the direction of arrow A;
- (b) an end elevation;
- (c) a plan.

Insert at least six necessary dimensions.

(20 marks)

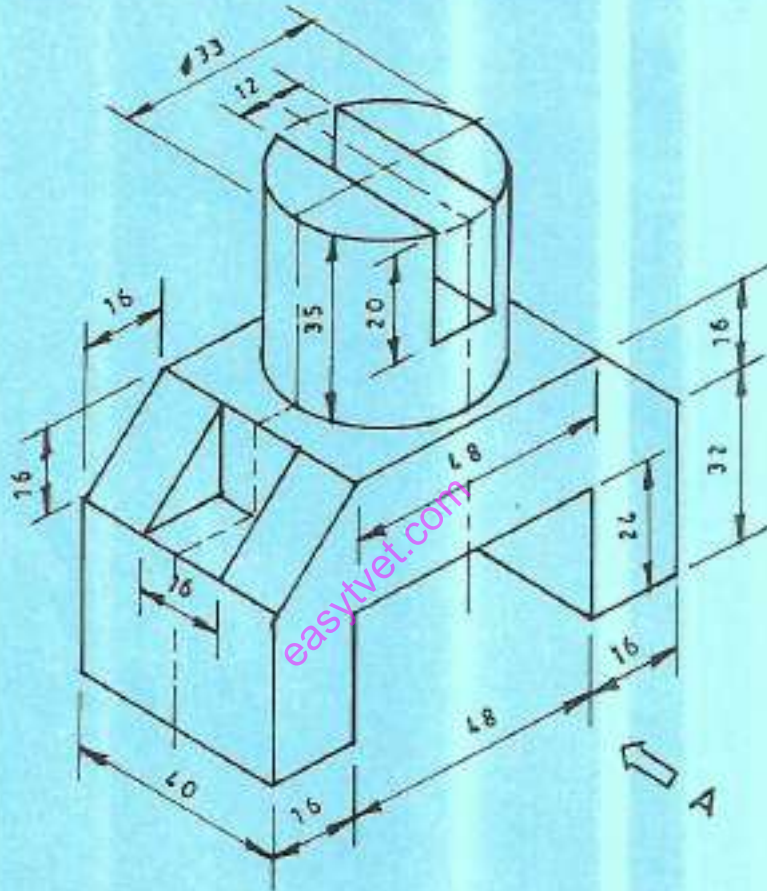


Fig. 3

THIS IS THE LAST PRINTED PAGE.