2601/104 2603/104
2602/104
ENGINEERING DRAWING, MATERIALS,
PROCESSES AND WORKSHOP TECHNOLOGY
Oct./Nov. 2018
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:
Drawing instruments;
Mathematical tables/ Scientific calculator;
Drawing paper A3.
*This paper consists of **EIGHT** questions in **TWO** sections; **A** and **B**.*
*Answer **THREE** questions from section **A** in the answer booklet provided and **TWO** questions from section **B** on the drawing paper.*
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 any **THREE** questions from this section.*

1. (a) (i) State **two**:

(I) functions of a soldering bit;
(II) factors that determine the size of a soldering bit.

(4 marks)

(ii) Outline **two** requirements of a good soldering flux. (2 marks)

(b) (i) Explain the oxy-acetylene welding process. (2 marks)

(ii) Draw and label the neutral flame used in oxy-acetylene welding. (4 marks)

(c) Distinguish between 'forging' and 'casting' with reference to metalwork. (2 marks)

(d) Sketch the following locking devices in their final positions:

(i) the stud;
(ii) set bolt.

(6 marks)

2. (a) Explain the following properties of engineering materials:

(i) toughness;
(ii) conductivity.

(4 marks)

(b) Distinguish between cast iron and wrought iron. (6 marks)

(c) State **two**:

(i) properties of copper;
(ii) applications of rubber.

(4 marks)

(d) Draw a labelled diagram showing the extraction of iron from its ore. (6 marks)

3. (a) Explain the difference between linear scale and non-linear scale. (2 marks)

(b) (i) State the functions of a divider.

(ii) Draw a labelled diagram of a spring divider. (8 marks)

(c) (i) Draw a micrometer screw gauge, reading 8.90 mm.

(ii) Outline the procedure of reading the 8.90 mm on the scale in c(i). (7 marks)

(d) State **three** safety precautions observed in the care of scribers. (3 marks)

4. (a) (i) List **three** hazards that may be found in a workshop.

(ii) With regard to safety, explain the dressing code used in the workshop. (8 marks)

(b) Explain the following lathe machine operations:

(i) knurling;
(ii) facing. (4 marks)

(c) Draw a labelled diagram of a bench drilling machine. (8 marks)

SECTION B: ENGINEERING DRAWING

*Answer any **TWO** questions from this section.*

5. **Figure 1** shows a cast-iron web bracket. Draw in first angle projection:

(a) sectional front elevation along X-X in direction of arrow A;

(b) end elevation in the direction of arrow B.

Insert **six** major dimensions. (20 marks)

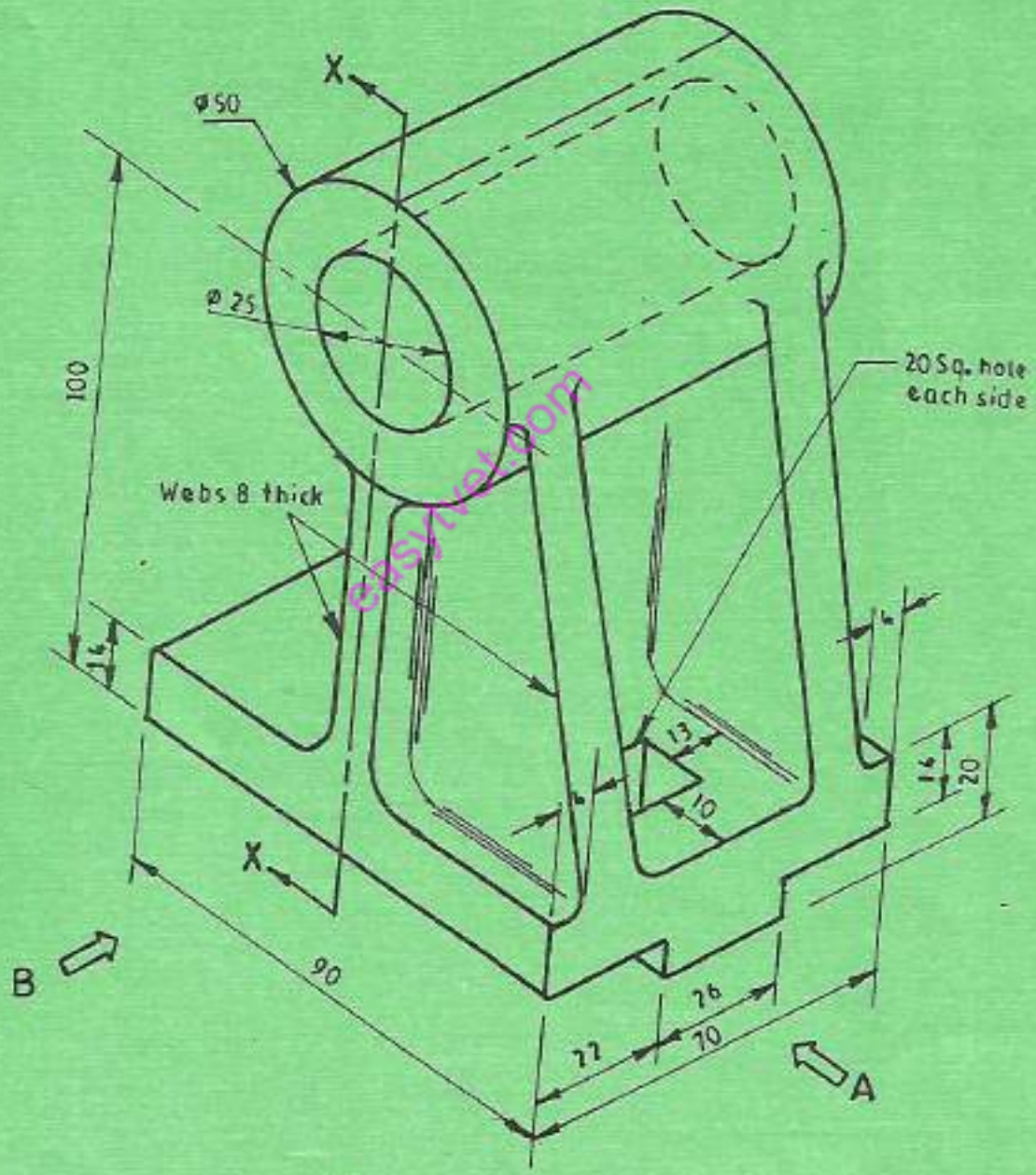

Fig. 1

6. **Figure 2** shows the elevation of a truncated cone. Redraw the given elevation and complete the following:

(a) plan;
(b) end elevation from the direction of arrow E;
(d) true shape.

(20 marks)

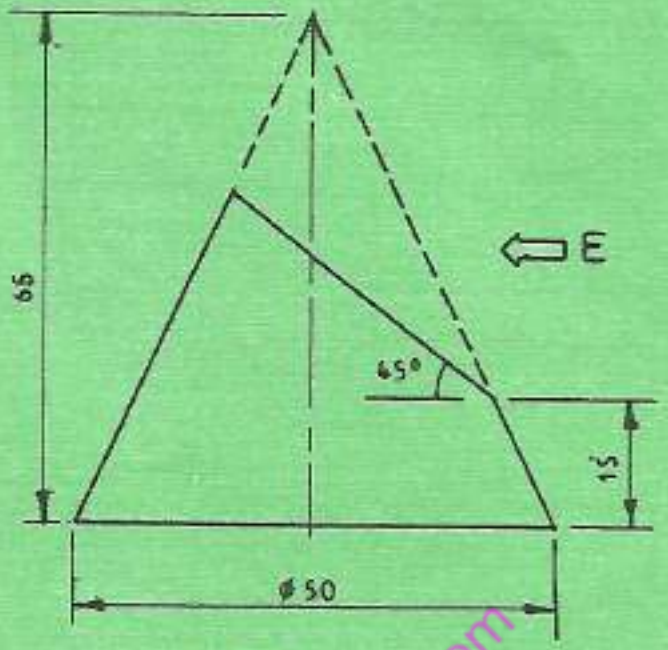

Fig. 2

7. **Figure 3** shows two views of an object drawn in third angle projection. Draw an isometric view of the object taking corner P as the lowest. (20 marks)

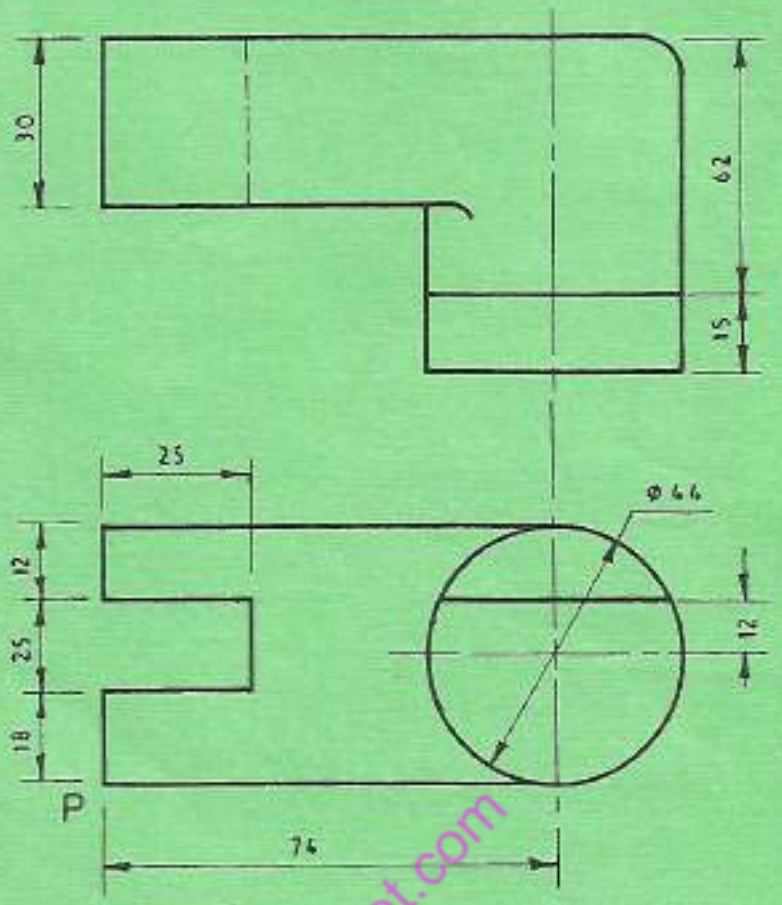

Fig. 3

8. (a) Construct an internal tangent to two unequal circles of diameters 40 mm and 60 mm with their centres 90 mm apart. (4 marks)

(b) Make free hand sketches of the following engineering hand tools:

(i) Ball pein hammer;
(ii) Flat screw driver;
(ii) Centre punch;
(iv) Combination pliers.

(8 marks)

(c) Construct the locus of a point P on the circumference of a circle 35 mm diameter as it rolls for one revolution without slipping. (8 marks)

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