2601/104   2603/104
2602/104
ENGINEERING DRAWING, MATERIALS,
PROCESSES AND WORKSHOP TECHNOLOGY
June/July 2023
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

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

MODULE 1

ENGINEERING DRAWING, MATERIALS,
PROCESSES AND WORKSHOP TECHNOLOGY

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination.
    Answer booklet;
    Drawing papers;
    Drawing instruments;
    Non-programmable scientific calculator.
This paper consists of TWO sections; A and B.
Answer any THREE questions from section A and TWO questions from section B in the answer booklet and drawing papers provided .
All questions carry equal marks.
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.

Turn over

SECTION A: MATERIALS, PROCESSES AND WORKSHOP TECHNOLOGY

Answer THREE questions from this section.

1. (a) (i) List **four** factors considered in the workshop layout;

    (ii) State **four** objectives of workshop layout.

    (8 marks)

   (b) Outline the procedure for performing mouth to mouth resuscitation.   (6 marks)

   (c) State **two** safety precautions with regard to each of the following:

    (i) Machinery;
    (ii) Electricity;
    (iii) Hand tools.

    (6 marks)

2. (a) (i) List **three** types of drilling machines.

    (ii) Illustrate "reaming" and "boring" operations with regard to drilling.

    (7 marks)

   (b) Illustrate the following lathe operations:

    (i) plain turning;
    (ii) undercutting.

    (6 marks)

   (c) (i) List **three** parts of a shaping machine;

    (ii) Sketch **two** surfaces that can be produced by a shaper.

    (7 marks)

3. (a) State **two** safety precautions with regard to each of the following tools:

    (i) Chisels;
    (ii) Files;
    (iii) Hacksaws.

    (6 marks)

   (b) Explain the term 'datum' in reference to marking out.   (2 marks

(c)   (i)   Define the following terms used in measurement:

       (I)   Limits;
       (II)   Fit;
       (III)   Tolerance.

     (ii)   Explain **two** purposes of marking out.

                                (7 marks)

(d)   Sketch:

     (i)   a Try Square;
     (ii)   Odd-leg caliper being used to mark the centre of the end of a round bar.

                                  (5 marks)

4.   (a)   Define the following properties of materials giving **one** example in each case:

     (i)   Stiffness;
     (ii)   Ductility;
     (iii) Tensile strength;
     (iv) Semiconductor.

                                  (6 marks)

(b)   (i)   Define soft soldering as a joining method.

     (ii)   List **four** sheet metal operations.

     (iii) Outline the procedure for soft-soldering.

                                 (11 marks)

(c)   (i)   State **two** arc-welding equipment.

     (ii)   List **one** mechanical joining process.

                                  (3 marks)

SECTION B: ENGINEERING DRAWING

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

5. Figure 1 shows a pictorial view of an object. Draw the following views in first angle orthographic projection:

   (a)   front elevation in the direction of arrow X;

   (b)   end elevation;

   (c)   plan.

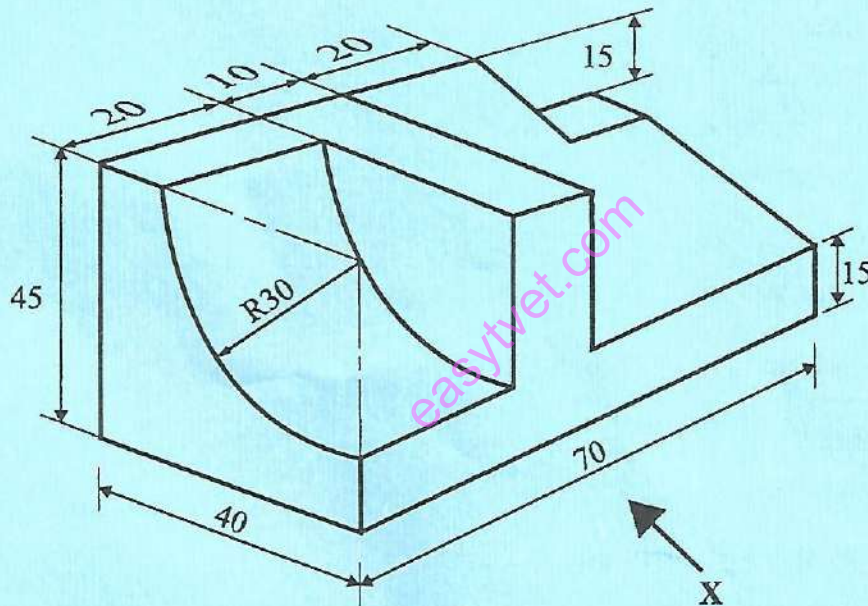   Insert **six** major dimensions.   (20 marks)

Fig. 1

6. Figure 2 shows two views of a cylinder intersecting a square prism at right angle. Draw the following:

   (a) the given views.

   (b) curve of intersection;

   (c) development of the cylinder.

   (20 marks)

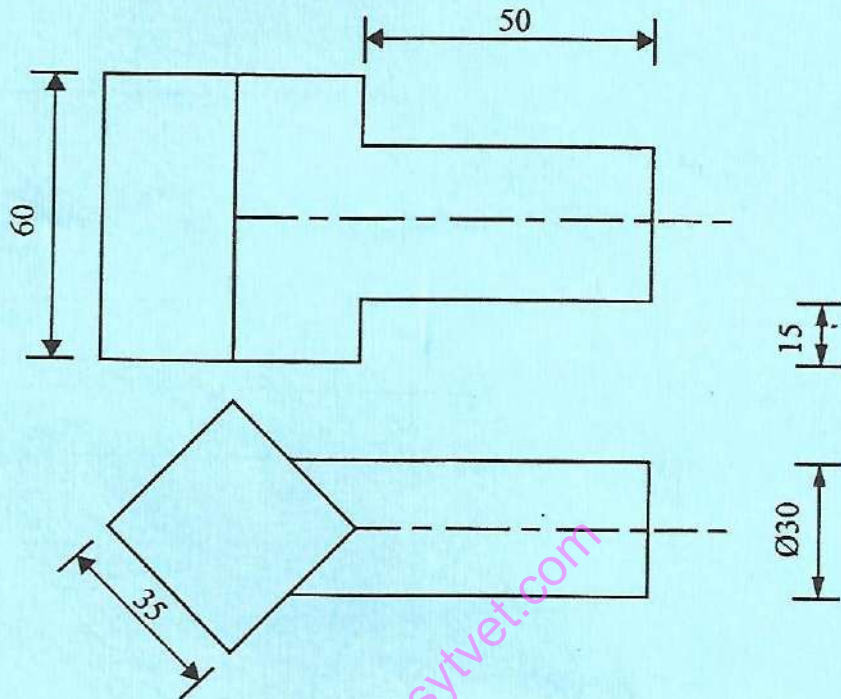Fig. 2

7. (a) (i) Draw a triangle whose perimeter is 100 mm and the ratio of the sides is 3:4:5 respectively. Circumscribe the triangle.

   (ii) Construct a regular heptagon, sides 33 mm.

   (13 marks)

   (b) Plot the locus of a point P on the circumference of a wheel 70 mm diameter which rolls without slipping along a straight path for one complete revolution.

   (7 marks)

8.   Figure 3 shows orthographic views of a machined block drawn in third angle projection. Draw, full size, oblique view of the block.   (20 marks)
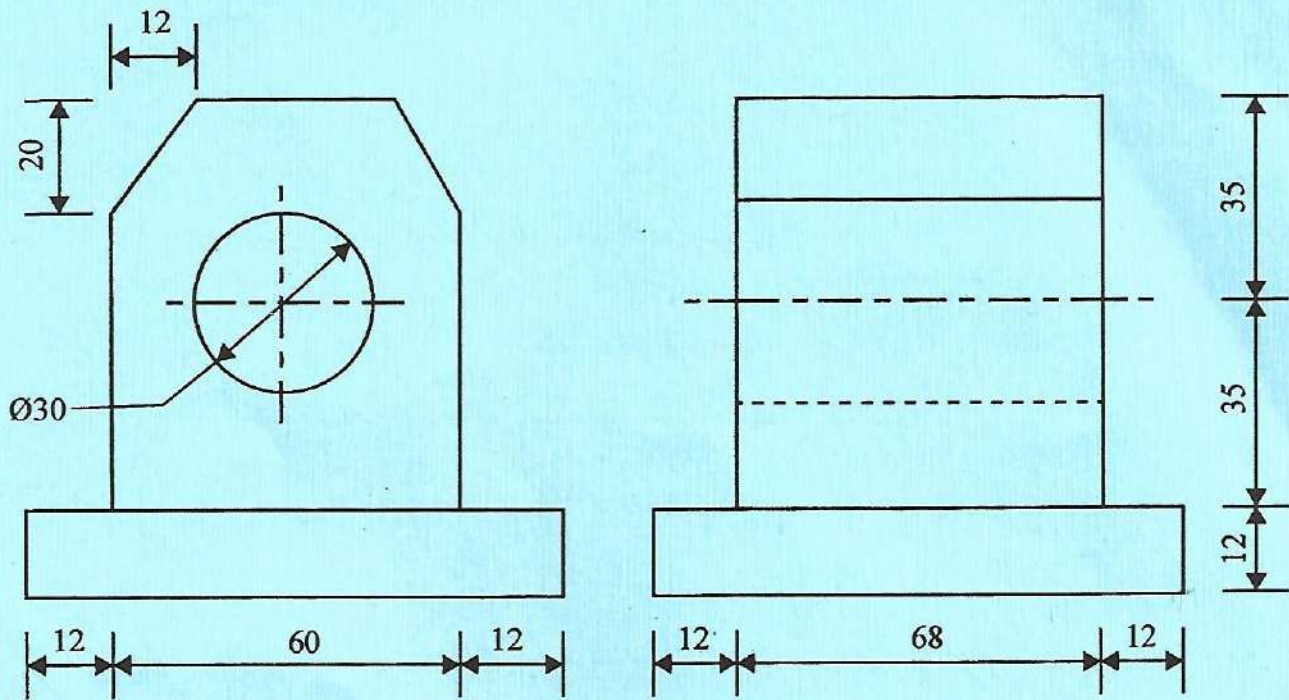

Fig. 3

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