THE KENYA NATIONAL EXAMINATIONS COUNCIL
Kenya Certificate of Secondary Education
DRAWING AND DESIGN
Paper 1
2½ hours

Instructions to candidates

(a) *You should have the following for this examination:*
Answer sheet;
Drawing instruments;
3 sheets of drawing paper size A3;
Scale rule.

(b) *This paper consists of **three** sections: A, B and C.*

(c) *Answer **all** the questions in sections A and **B** and any other **two** questions from section C.*

(d) *Questions in section A must be answered on the answer sheet provided.*

(e) *Questions in section **B** and C should be answered on A3 sheets of drawing paper provided.*

(f) *All dimensions are in millimetres unless otherwise stated.*

(g) ***Candidates may be penalised for not following the instructions given in this paper.***

(h) ***This paper consists of 10 printed pages.***

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

(j) ***Candidates should answer the questions in English.***

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SECTION A (50 marks)

*Answer **all** the questions in this section on the answer sheet provided.*

1. (a) State **one** disadvantage of using each of the following items to hold paper on the drawing board.

   (i)   Marking tape

   (ii) Thumb pins   (2 marks)

   (b) (i)   Give **one** disadvantage of oral communication when representing an engineering object.

   (ii) Give **one** reason for observing established standards in manufacturing industry.
                                                                                   (2 marks)

2. (a) Sketch each of the following lines:

   (i)   Hidden detail

   (ii) Folding line

   (iii) Centre line

   (iv) Cutting plane   (2 marks)

   (b) State the meaning of each of the symbols shown in **Figure 1**.

   (i)

   (ii)

   (iii)

   (iv)
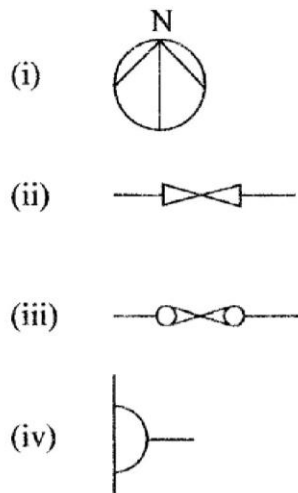
                                                                                   (4 marks)

Figure 1

3. (a) **Figure 2** shows an elevation of a template.
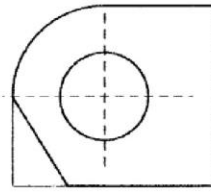
Figure 2

Measure the dimensions for the:

(i) Circle

(ii) Radius

(iii) Angle of the slanting face (3 marks)

(b) List six computer programs that can be used to produce a drawing. (3 marks)

4. (a) Define each of the following properties of materials:

(i) plasticity

(ii) elasticity (2 marks)

(b) State **four** ways in which design ideas are communicated. (2 marks)

5. (a) List **four** factors to consider when lettering. (2 marks)

(b) State **three** effects of poor disposal of engineering materials to the environment.
(3 marks)

6.   Enlarge **Figure 3** (ABCD) in the ratio of 5:7   (4 marks)
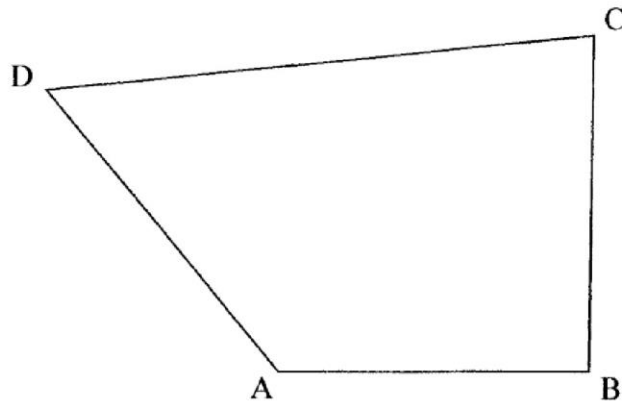
Figure 3

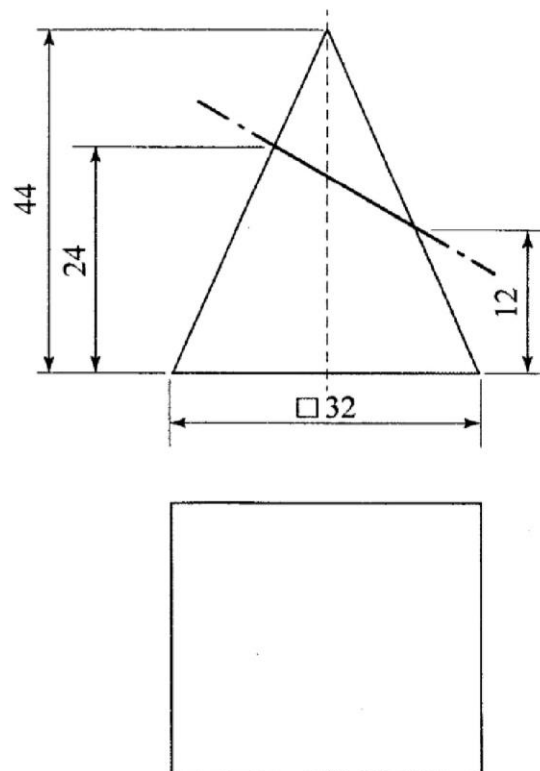**7.**   Construct a triangle whose perimeter is 240 mm and the sides are in the ratio 4.5:6.0:7.5.
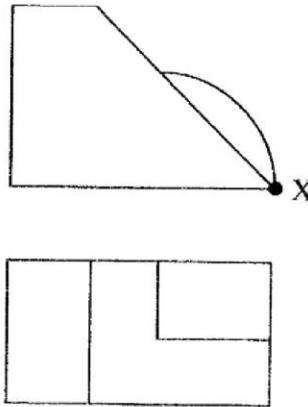   Measure the smallest angle.   (5 marks)

8.   **Figure 4** shows the front elevation and incomplete plan of a truncated square-based pyramid.

           (a)   complete the plan.

           (b)   draw the true shape of the cut face.

                                                                                             (5 marks)

Figure 4

9.   **Figure 5** shows two views of a machined bracket drawn in first angle project.
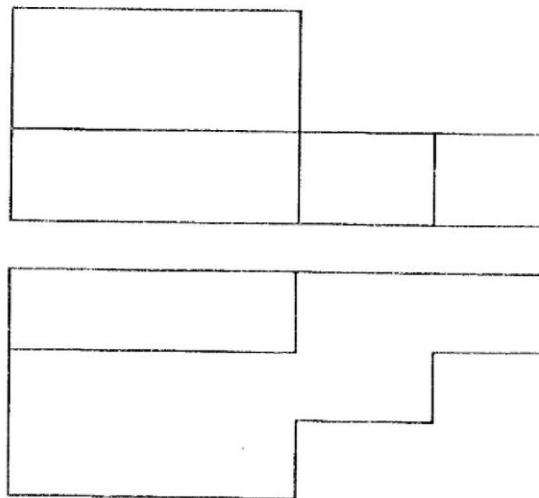

Figure 5

Sketch in good proportion, the isometric view of the block taking X as the lower point.

(5 marks)

10.   **Figure 6** shows two views of a block drawn in first angle project. In good proportion sketch the block in oblique projection.   (6 marks)

Figure 6

Turn over
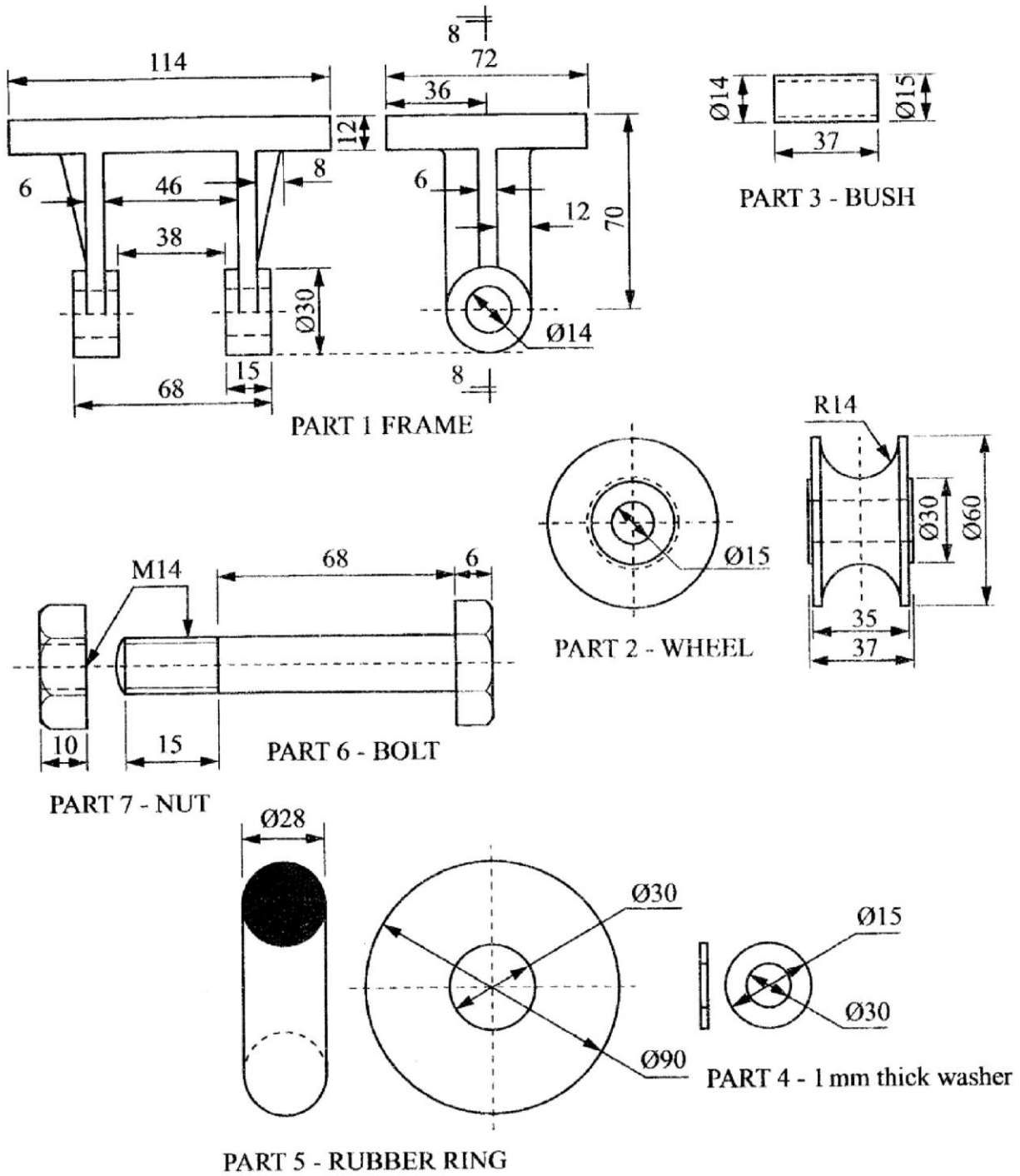
SECTION B (20 marks)

Question 11 is *compulsory*

It should be answered on the A3 paper provided.

11.   **Figure 7** shows parts of a machine component drawn in first angle projection. Assemble the parts and draw, FULL SIZE, the following:

(a)   sectional front elevation along the cutting plane B-B;

(b)   end elevation.

Insert three leading dimensions.

Unspecified dimensions are left to the candidate's discretion. Hidden details are not required.

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PART 1 FRAME

PART 3 - BUSH

PART 2 - WHEEL

PART 6 - BOLT

PART 7 - NUT

PART 5 - RUBBER RING

PART 4 - 1 mm thick washer

-- Dimensions in mm

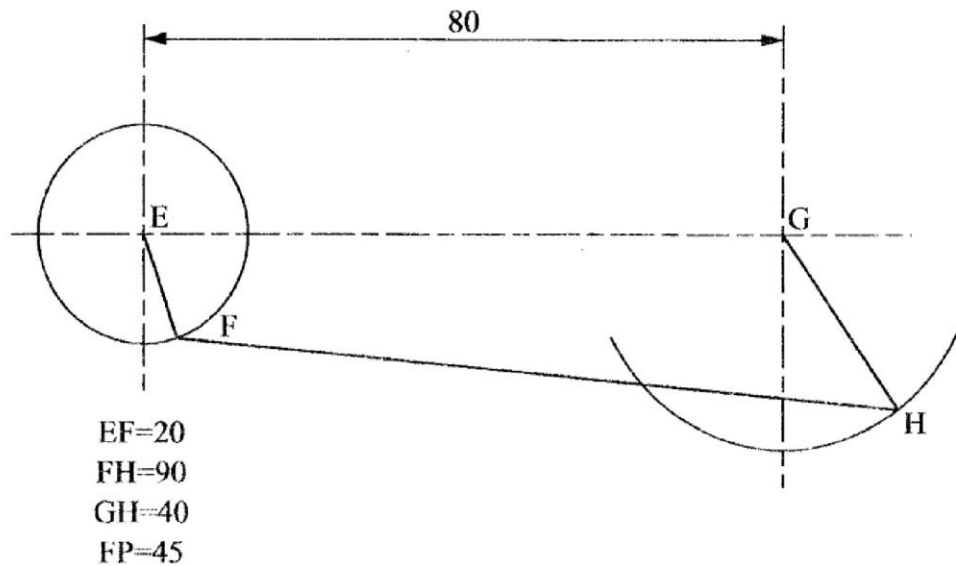-- Drawing not to scale

Figure 7

SECTION C (30 marks)

*Answer any **two** questions from this section on the A3 paper provided.*

12. In the mechanism shown in **Figure 8**, the crank EF rotates about centre E while GH oscillates about G.

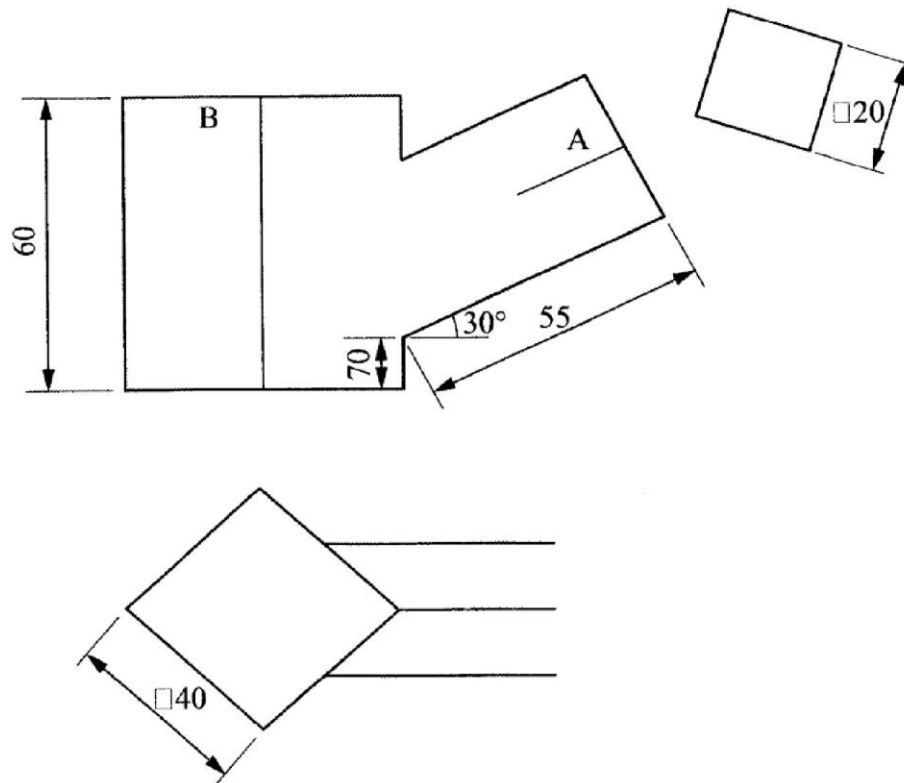   Plot the locus of point P for one complete revolution of EF. (15 marks)

EF=20
FH=90
GH=40
FP=45

Figure 8

13. **Figure 9** shows two intersecting square tubes A and B drawn in first angle projection.

Figure 9
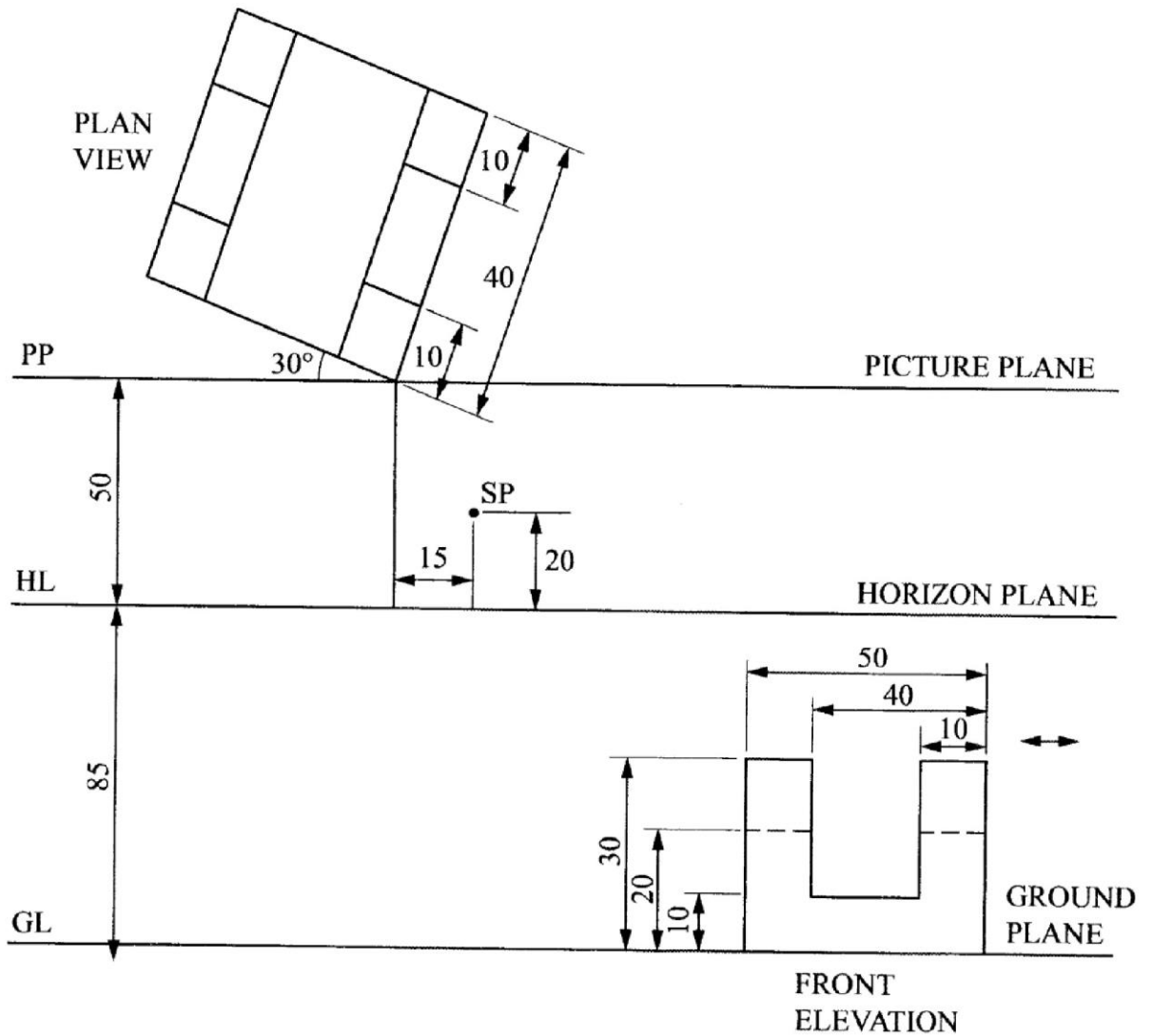
(a) copy the figure and complete:

    (i)   the front elevation;

    (ii)   the plan.

(b)   Draw the development of tube B.   (15 marks)

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14.   **Figure 10** shows an inclined plan of a block and its front elevation.

Figure 10

Copy the given layout and draw the two point perspective of the block showing all construction details.   (15 marks)

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