

449/1  
DRAWING AND DESIGN  
Paper 1  
Nov. 2016  
2½ hours



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

**Instructions to candidates**

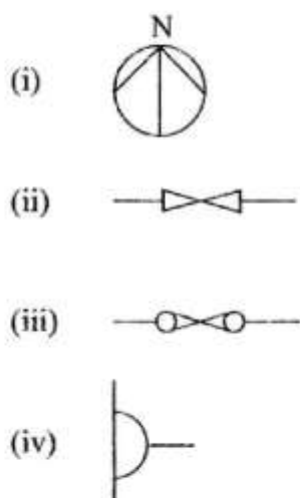
- (a) *You should have the following for this examination:*  
*Answer sheet;*  
*Drawing instruments;*  
*3 sheets of drawing paper size A3;*  
*Scale rule.*
- (b) *This paper consists of **three** sections: **A**, **B** and **C**.*
- (c) *Answer **all** the questions in sections **A** and **B** and 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.***



## SECTION A (50 marks)

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

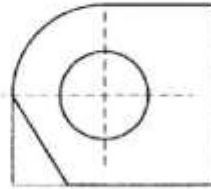
1. (a) State **one** disadvantage of using each of the following items to hold paper on the drawing board.
- (i) Marking tape
- (ii) Thumb pins (2 marks)
- (b) (i) Give **one** disadvantage of oral communication when representing an engineering object.
- (ii) Give **one** reason for observing established 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**.



(4 marks)

Figure 1

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



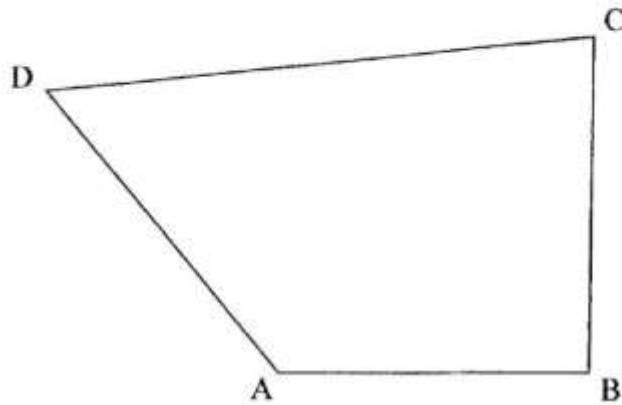
**Figure 2**

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)

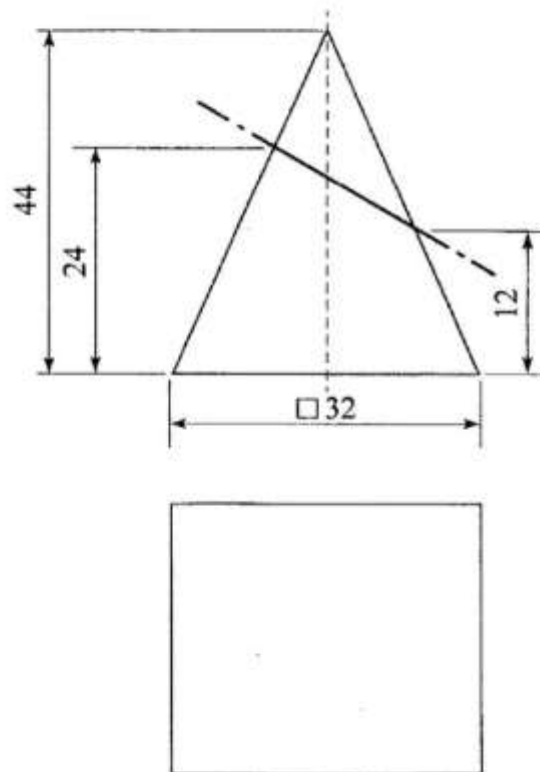


**Figure 3**

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)

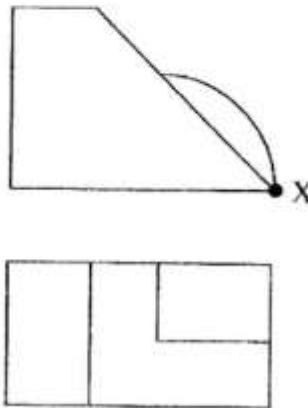
8. **Figure 4** shows the front elevation and incomplete plan of a truncated square-based pyramid. (5 marks)

- (a) complete the plan.  
(b) draw the true shape of the cut face.



**Figure 4**

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

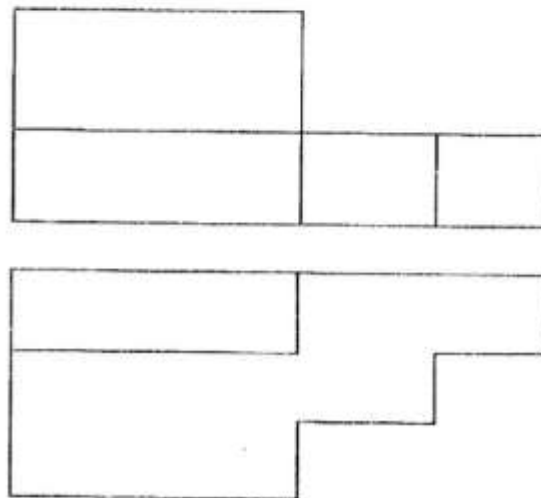


**Figure 5**

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**



**SECTION B** (20 marks)

*Question 11 is compulsory*

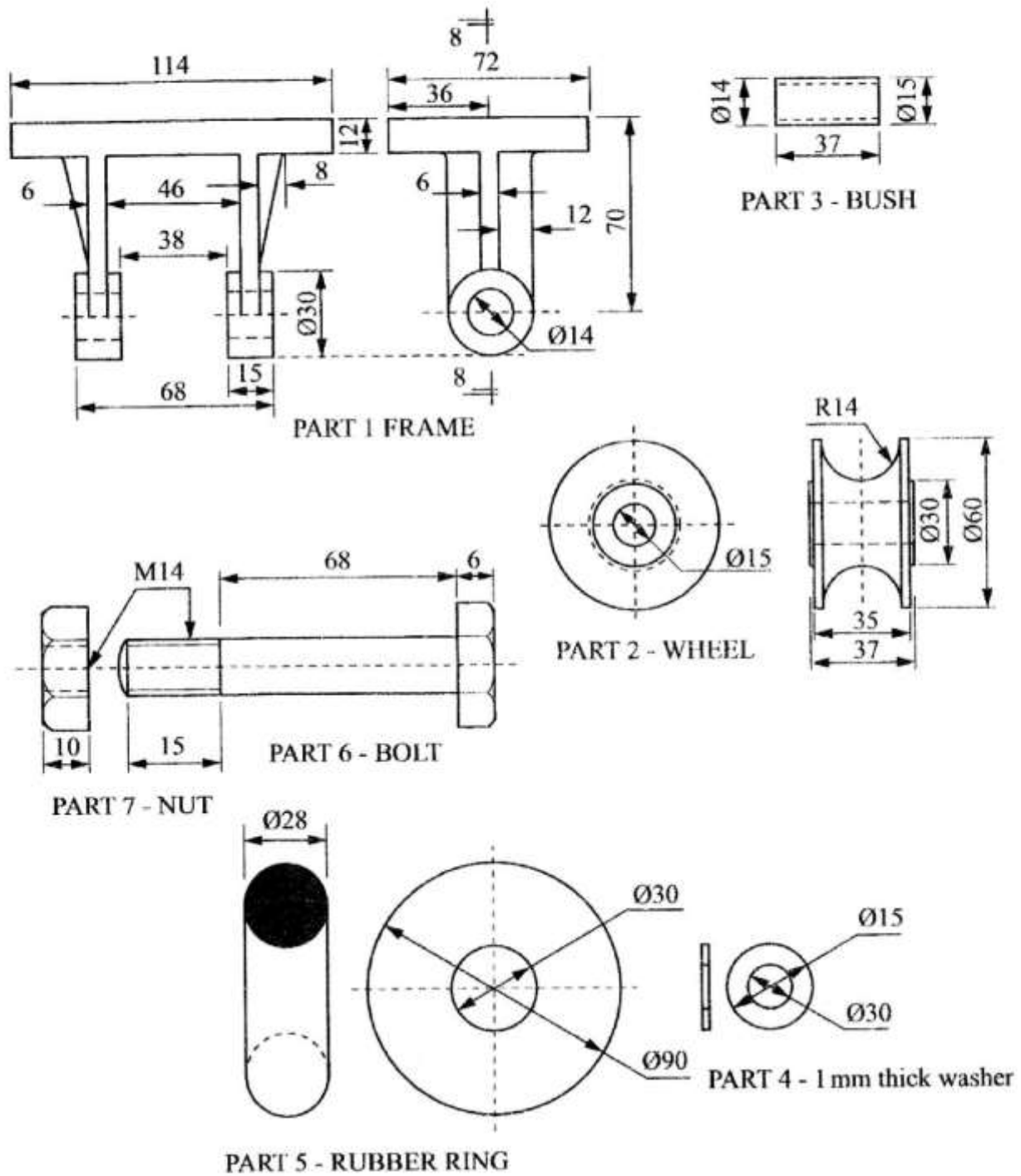
*It should be answered on the A3 paper provided.*

**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.



- Dimensions in mm
- Drawing not to scale

Figure 7

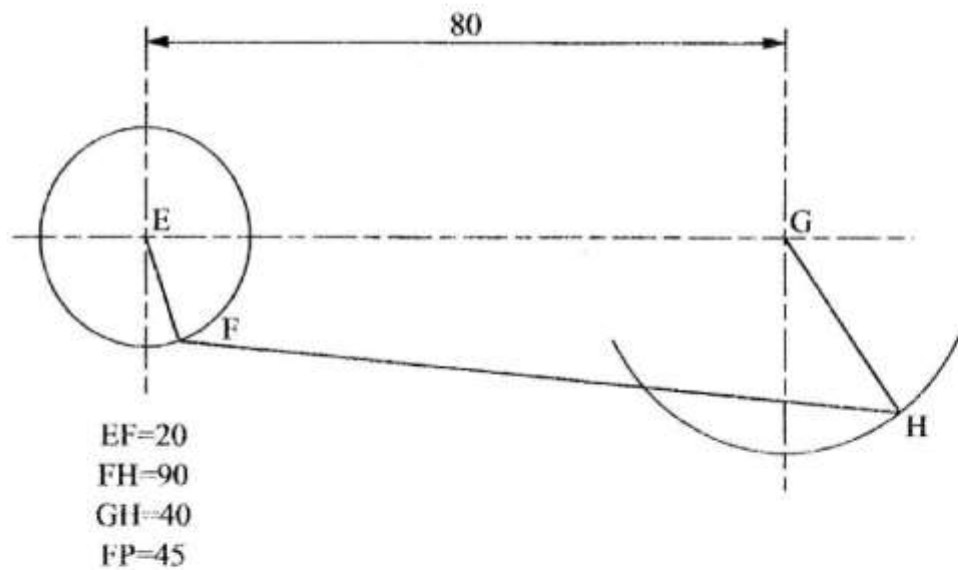
## SECTION C (30 marks)

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)



**Figure 8**



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

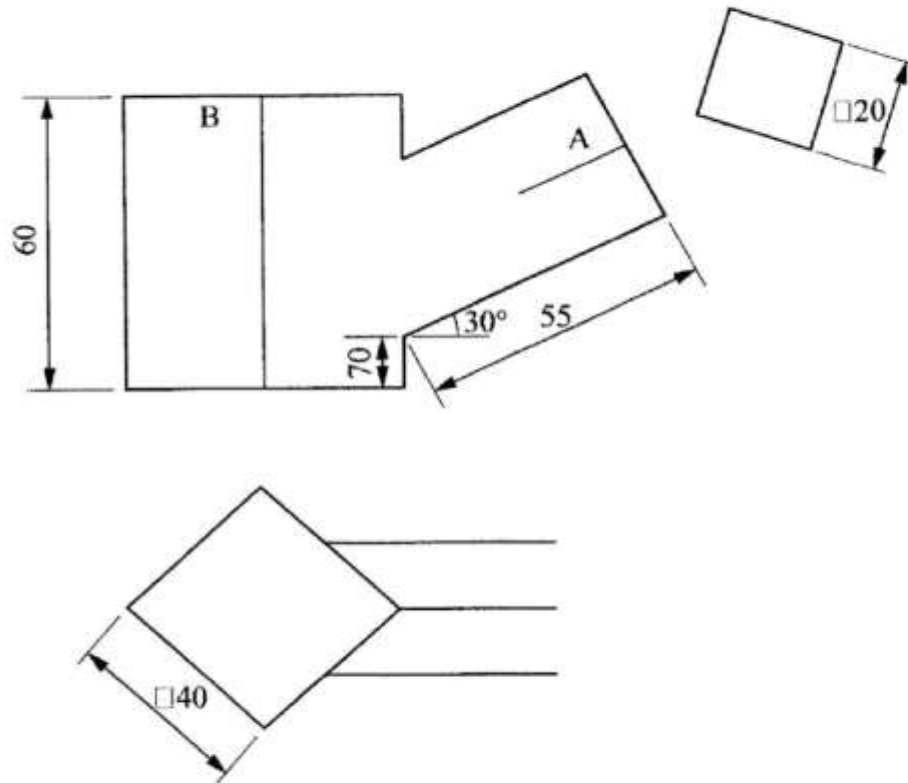


Figure 9

- (a) copy the figure and complete:

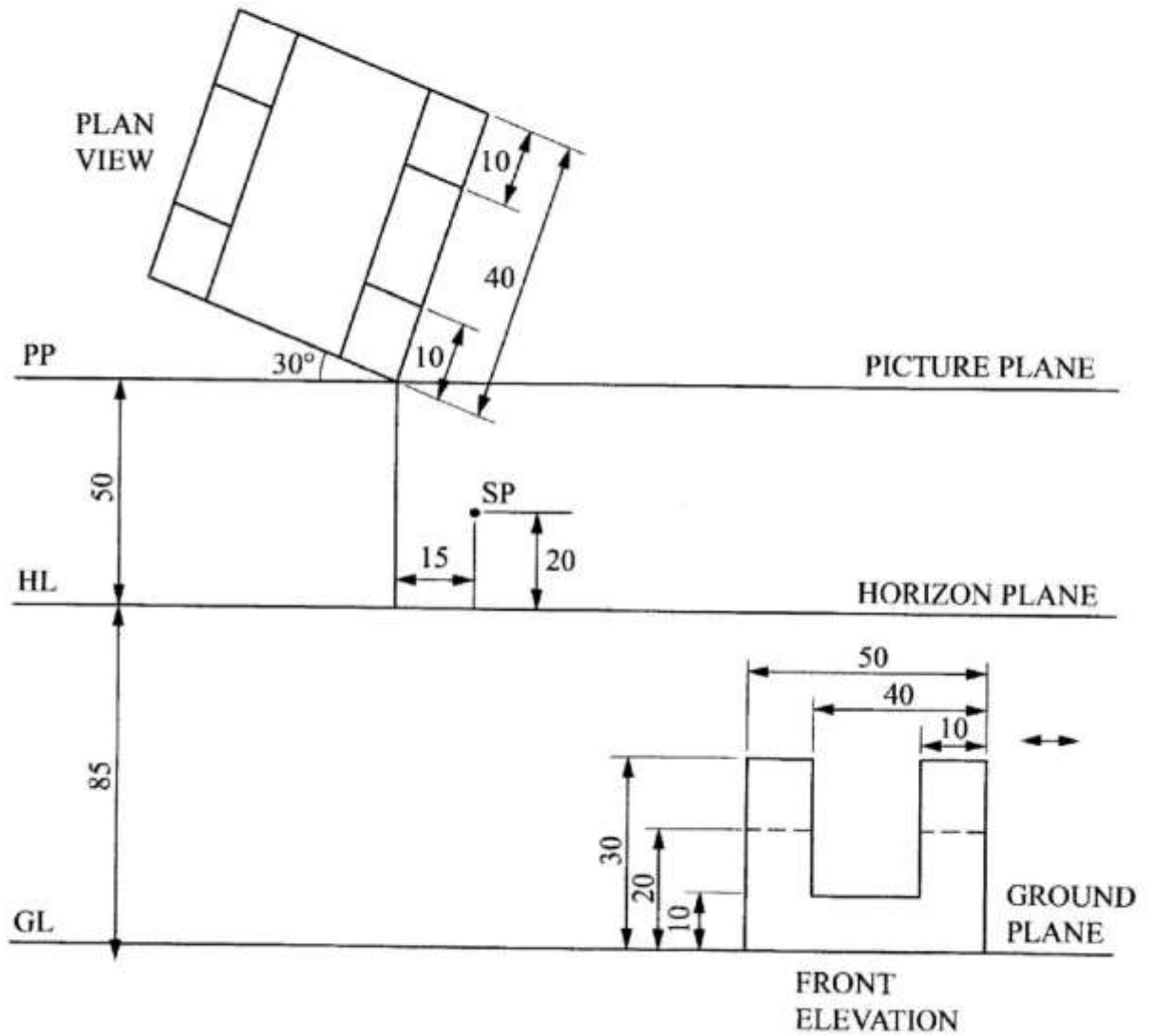
- (i) the front elevation;
- (ii) the plan.

- (b) Draw the development of tube B.

(15 marks)



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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