

2601/104 2603/104

2602/104

**ENGINEERING DRAWING, MATERIALS,  
PROCESSES AND WORKSHOP TECHNOLOGY**

**June/July 2021**

**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.*

*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) Distinguish between a centre punch and a dot punch. (2 marks)
- (b) With the aid of sketches, describe each of the following marking out tools:
- (i) try square;
  - (ii) odd leg caliper.
- (10 marks)
- (b) (i) Explain how the accuracy of 0.02 mm is obtained from the vernier caliper.
- (ii) State **four** precautions in using the vernier caliper. (8 marks)
2. (a) List **four** metals used in sheet metal work. (4 marks)
- (b) Explain each of the following sheet metal tools and state their respective uses.
- (i) mallets;
  - (ii) stakes;
  - (iii) pair of snips;
  - (iv) trammel points.
- (8 marks)
- (c) Illustrate the following sheet metal seams
- (i) double grooved;
  - (ii) paned down;
  - (iii) knocked-up.
- (8 marks)
3. (a) (i) State **two** tools and equipment necessary when cleaning a weld bead.
- (ii) Illustrate the manual metal arc welding set-up. (10 marks)
- (b) State **two** causes of each of the following weld defects
- (i) overlap;
  - (ii) undercut;
  - (iii) poor weld bead appearance.
- (6 marks)
- (c) List **four** arc welding positions. (4 marks)

4. (a) List five first aid materials. (5 marks)
- (b) Outline the procedure for mouth-to-mouth artificial respiration. (7 marks)
- (c) (i) Outline four safety precautions against fire in the workshop.
- (ii) Explain four safety measures against electric shock. (8 marks)

### SECTION B: ENGINEERING DRAWING

Answer any TWO questions from this section.

5. Figure 1, shows an isometric view of a V-block.

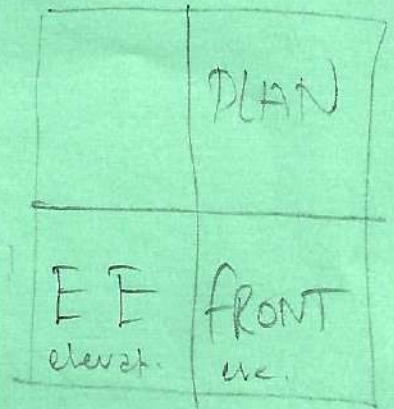
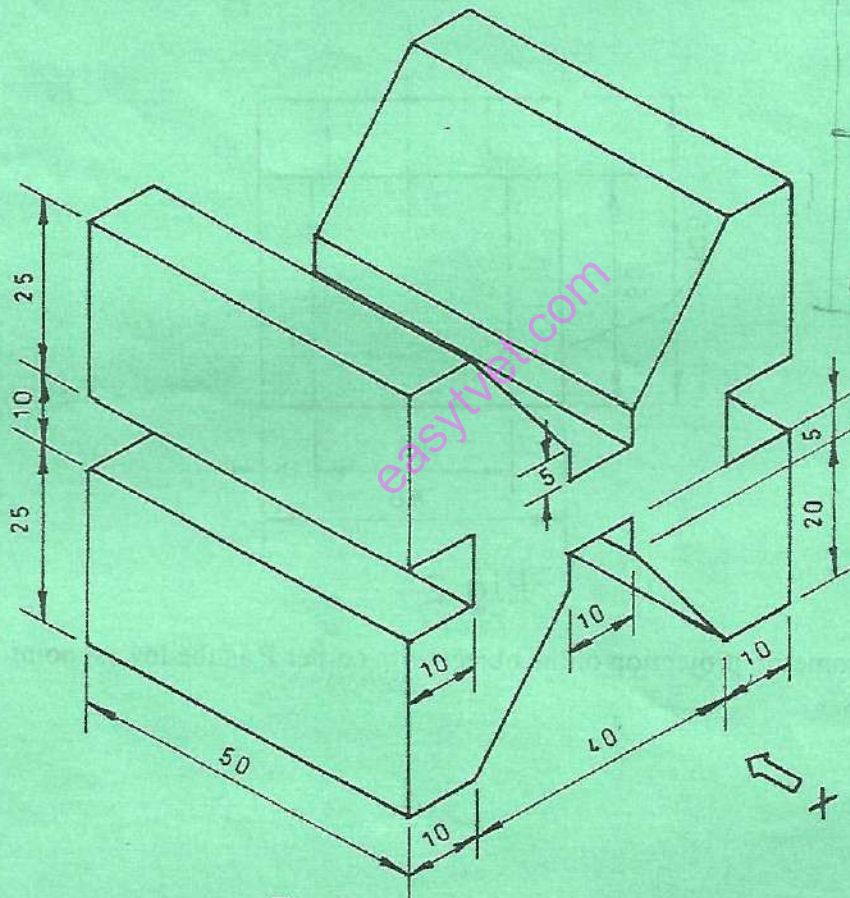


Fig.1

Draw the following using third angle orthographic projection:

- (i) front elevation in the direction of arrow X;
- (ii) side elevation;
- (iii) a plan.

Include six major dimensions and a projection symbol.

6. Figure 2, shows two views of a solid drawn in first angle projection.

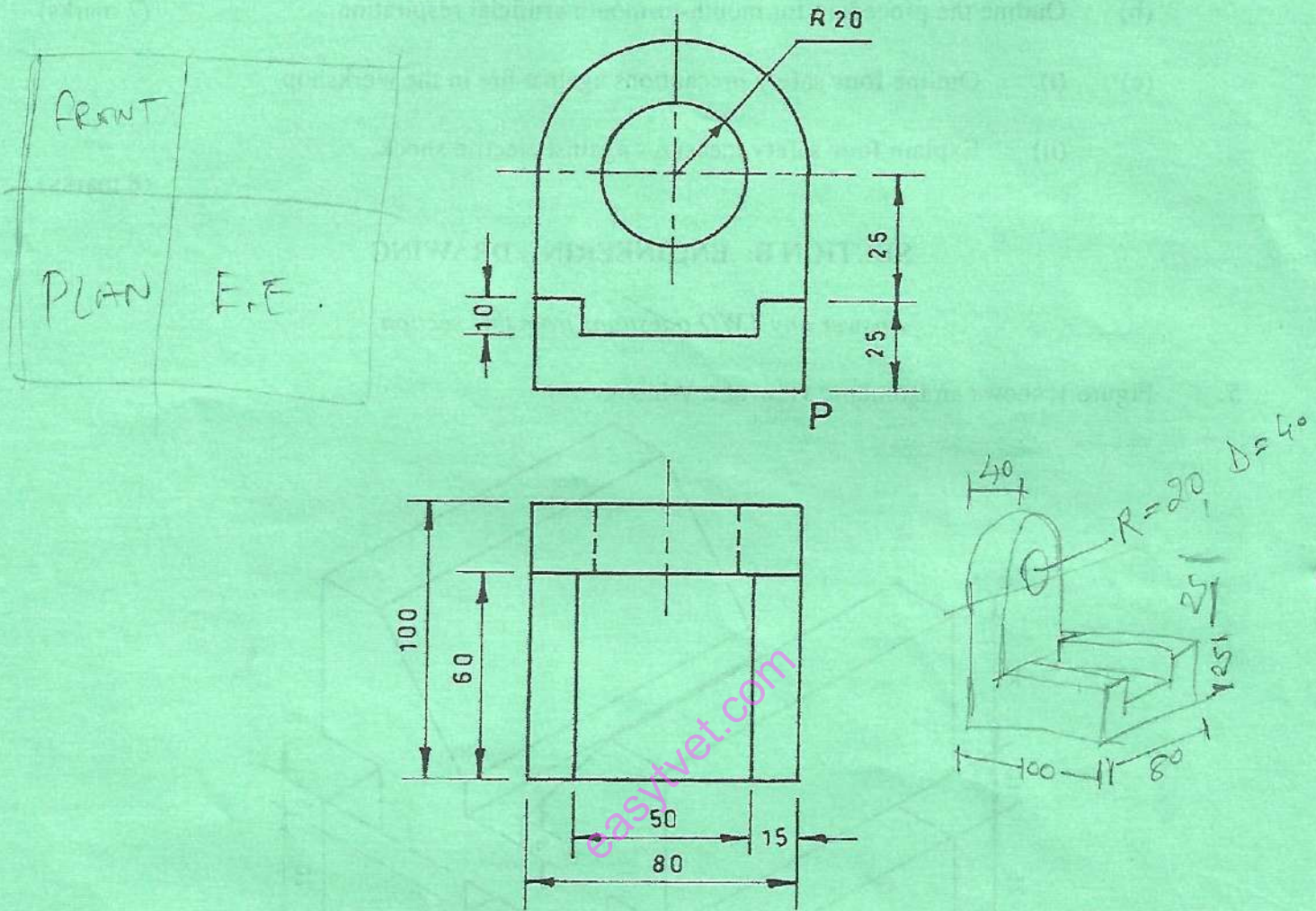


Fig.2

Make an isometric projection of the object with corner P as the lowest point. Include **six** major dimensions. (20 marks)

7. Figure 3, shows an elevation and plan of a right square pyramid cut obliquely at  $30^\circ$ .

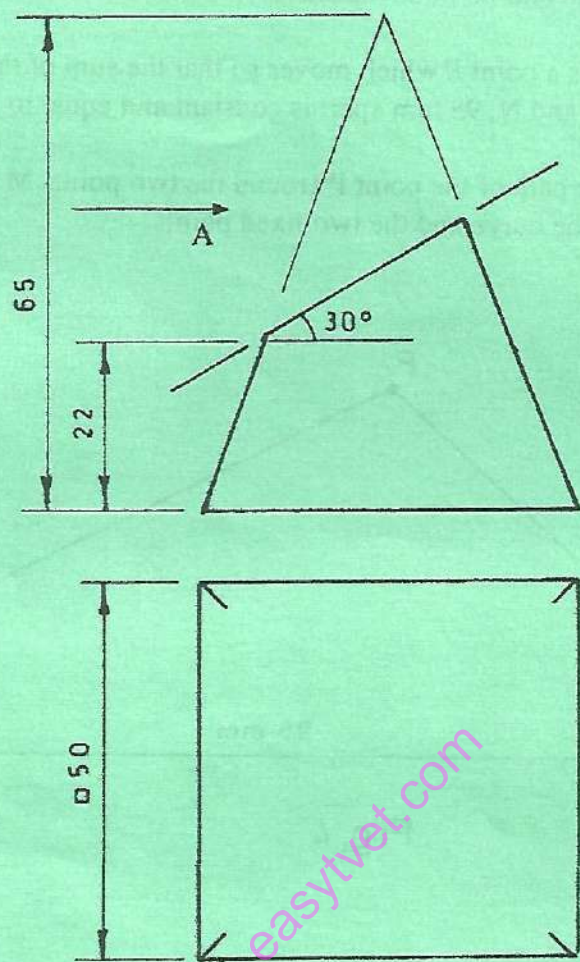


Fig. 3

Copy the elevation and draw the following:

- (i) end elevation in the direction of arrow A;
- (ii) complete truncated plan;
- (iii) true shape of the cut surface;
- (iv) development of the frustum.

(20 marks)

8. (a) Construct the common external tangent between two circles with centres 120 mm apart and radii 40 mm and 20 mm respectively. (8 marks)
- (b) Figure 4, shows a point P which moves so that the sum of the distances from P to two fixed points M and N, 95 mm apart is constant and equal to 120 mm.
- (i) Plot the path of the point P around the two points M and N;
- (ii) Name the curve and the two fixed points.

(12 marks)

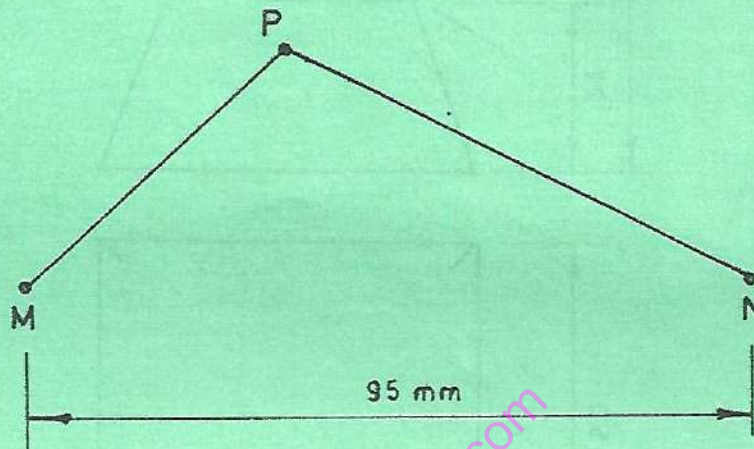


Fig. 4

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