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

June/July 2020

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 in the answer booklet provided.

Maximum marks for each part of a question are as indicated.

Candidates should answer the questions in English.

This paper consists of 5 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 **three** conditions necessary to keep a fire burning. *- supply of O₂
- enough fuel*
- (ii) Table 1 shows classes of fires. Complete the table by stating **one** source of fire and **two** extinguishing agents for each class. (9 marks)

Table 1

	Class	Source of fire	Extinguishing agents
1	A	✓	
2	B	✓	

- (b) Outline the procedure for mouth-to-mouth resuscitation. (6 marks)
- (c) Highlight **five** actions to be taken in case of a fire outbreak. (5 marks)
2. (a) (i) List **six** physical properties of engineering materials. *malleability ✓ elasticity ✓
ductility ✓ fusibility ✓*
- (ii) State **three** factors that affect the properties of engineering materials. *✓ fire resistance* (6 marks)
- (b) With the aid of a labeled sketch, describe the production of iron from iron ore, using the blast furnace. (10 marks)
- (c) List **four** properties of aluminium that makes it popular in engineering applications. *✓ it is a good conductor of electricity ✓* (4 marks)
3. (a) (i) State **three** objectives of marking out;
- (ii) Explain the term 'datum' with reference to marking out. (5 marks)
- (b) Illustrate the use of a vernier caliper in taking the following measurements:
- (i) internal diameter; *✓*
- (ii) depth of a blind hole. (6 marks)
- (c) (i) State **four** factors that determine the choice of a rivet.
- (ii) Outline the procedure for riveting a lap joint. (9 marks)
4. (a) (i) List **four** components of the oxy-acetylene welding equipment. *✓ High bp ✓
✓ low M.P*
- (ii) Define arc welding. (6 marks)
- (b) (i) List **four** types of drilling machines. *✓ Drilling bit ✓*
- (ii) State **three** safety precautions to be observed when drilling. *✓ wear protective gloves and mask, goggles
✓ hold the drill firmly to the intended point* (7 marks)

(c) Illustrate the following types of lathe operations:

- (i) parting-off;
- (ii) parallel turning.

(7 marks)

SECTION B: ENGINEERING DRAWING

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

5. Figure 1 shows a pictorial view of a towing hook. Draw full size, the following views in first angle projection:

- (a) a sectional front elevation along cutting plane 'A - A';
- (b) an end elevation in the direction of arrow B;
- (c) the plan.

(20 marks)

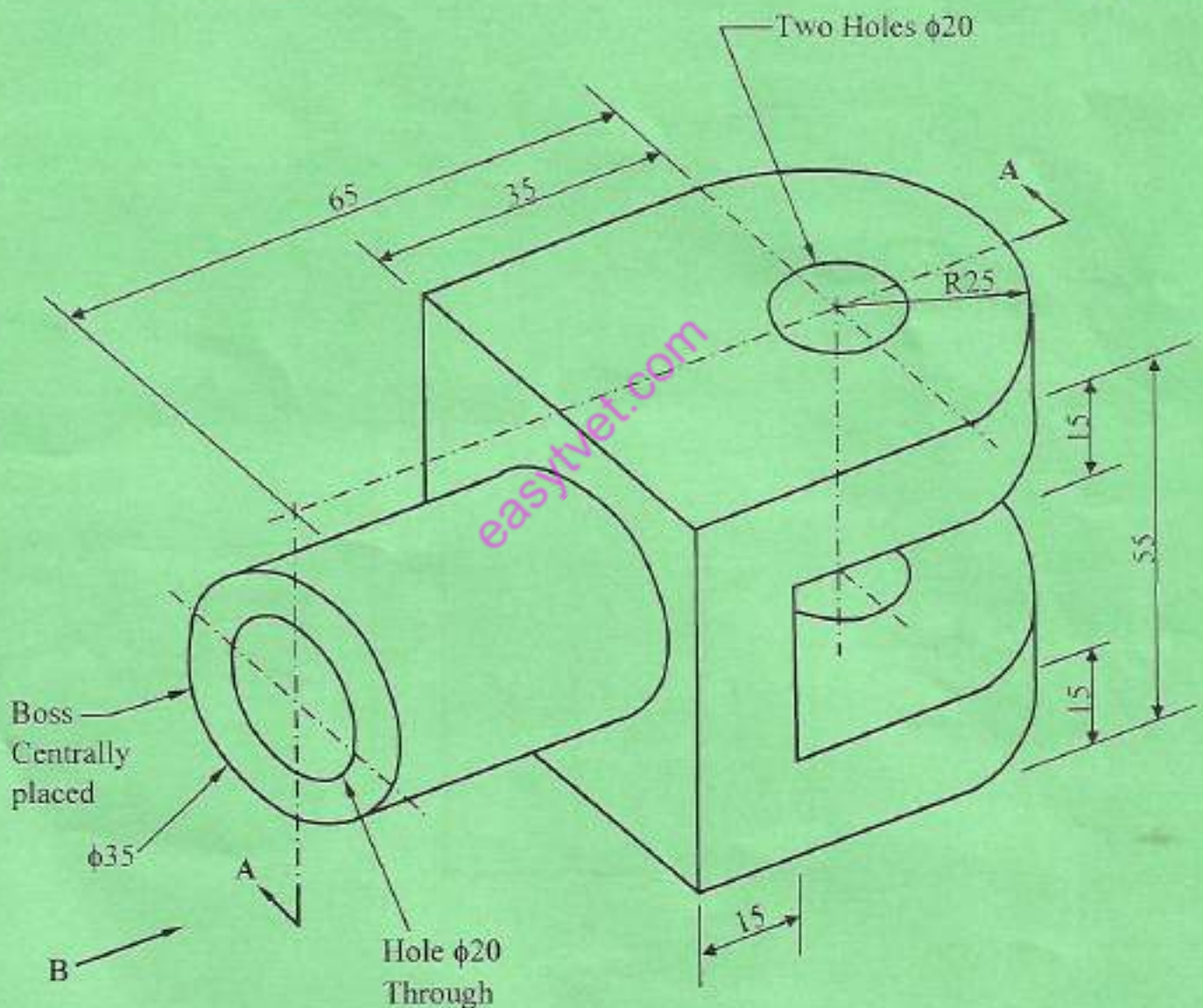


Fig. 1: TOWING HOOK

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6. Figure 2, shows front and end elevation of an object. Draw the isometric view of the object with corner 'X' as the lowest point. (20 marks)

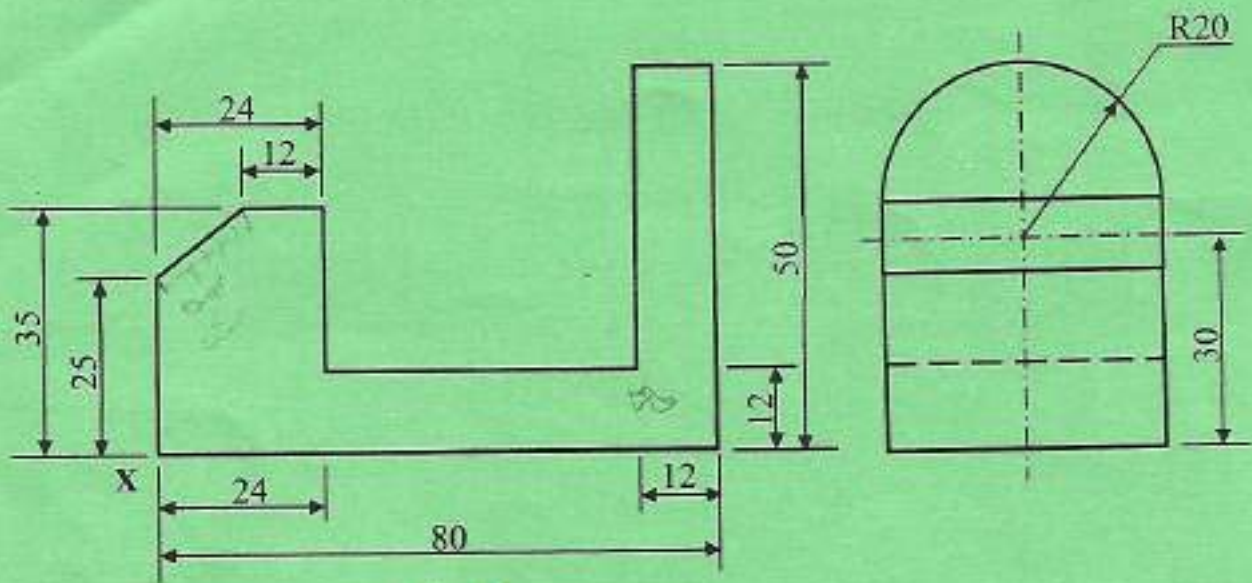


Fig. 2

7. Figure 3 shows an elevation of a truncated cylinder. Draw the given view and construct the following:

- end elevation in the direction of arrow 'A'
- the plan;
- development of the truncated cylinder.

(20 marks)

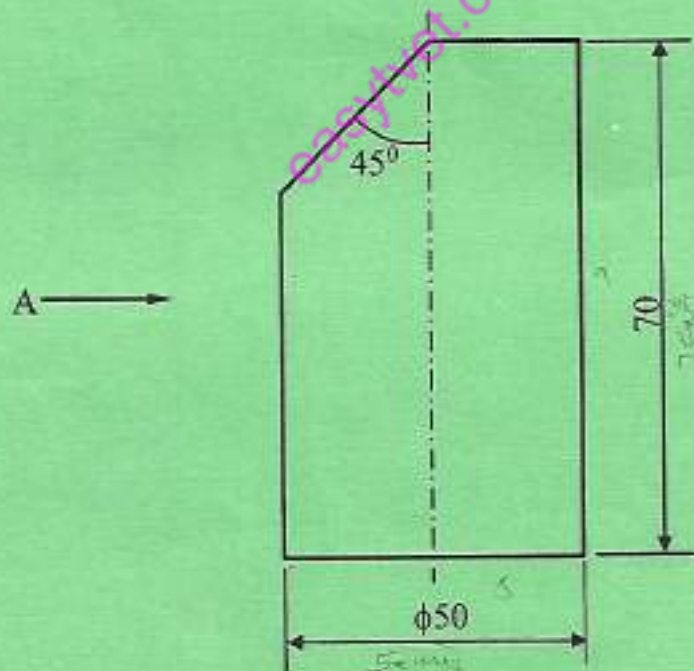


Fig. 3

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8. (a) A triangle has sides 70 mm, 90 mm and 40 mm long. Draw the triangle and construct the following:
- (i) the inscribed circle;
 - (ii) the circumscribed circle;
 - (iii) the smallest escribed circle. (10 marks)
- (b) Make free hand sketches of the following:
- (i) ball pein hammer;
 - (ii) angle plate;
 - (iii) bench vice. (10 marks)

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