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 and drawing papers 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.

Turn over

SECTION A: MATERIALS, PROCESSES AND WORKSHOP TECHNOLOGY

*Answer **THREE** questions from this section.*

1. (a) List **three** safety practices to be observed in the workshop in regard to each of the following: → Clean after use
→ Wear protective clothes/devices

   (i) hand tools;
   (ii) tidiness. = The floor should be clean
   - Clean the tools after use
   - Dress Properly   (6 marks)

   (b) (i) List **four** electric hazards that may occur in the workshop. → Short Circuit → Electric shock → Fire breakout
   (ii) State **three** classes of fires and their respective sources.   (6 marks)
   ✓Burning substance ✓Electric ✓Friction → Fire → Electricity

   (c) (i) State **three** causes of burns that may occur in the workshop.
   ✓ (ii) Outline the procedure for treatment of burns and scalds.   (8 marks)
   ✓ Clean the affected area
   1 © ✓Clean the affected area
   (ii) ✓Apply cold water to reduce the blister formation

2. (a) State **two** parts of each of the following tools:

   (i) engineer's steel wire;
   (ii) odd leg caliper;
   (iii) divider.   (6 marks)

   (b) Illustrate the use of a vernier caliper in carrying out each of the following:

   (i) internal measurement;
   (ii) external measurement;
   (iii) depth measurement;
   (iv) stepped measurement.   (10 marks)

   (c) (i) Describe a micrometer.
   (ii) List **two** care and maintenance measures for the micrometer.   (4 marks)

3. (a) (i) List **four** arc welding tools and equipment. → Hack-Saw, → Hammer,
   (ii) State **four** safety precautions to be taken when carrying out manual metal arc welding.   (8 marks)

   (b) Illustrate the following arc welding defects:

   (i) unequal leg length;
   (ii) under cut;
   (iii) spatter;
   (iv) over reinforcement.   (8 marks)

   (c) Explain **two** differences between alternating current (AC) and direct current (DC) welding.   Dc || Ac   (4 marks)

Dc	Ac
✓Low voltage	✓High voltage
✓Can be used directly.	✓Passes through an inverter

4. (a) List **four** principal parts of a lathe machine. (4 marks)

(b) With the aid of sketches, explain the following lathe operations:

(i) step turning;
(ii) facing.

↗ Protective device (12 marks)

(c) State **four** safety measures associated with drilling machines. (4 marks)

SECTION B: ENGINEERING DRAWING

Answer TWO questions from this section.

5. Figure 1 shows an isometric view of an object. Draw the following for the object using first angle projection:

(a) front elevation in the direction of arrow X;
(b) side elevation in relation to (i);
(c) plan view.

Include **six** major dimensions and the projection symbol. (20 marks)
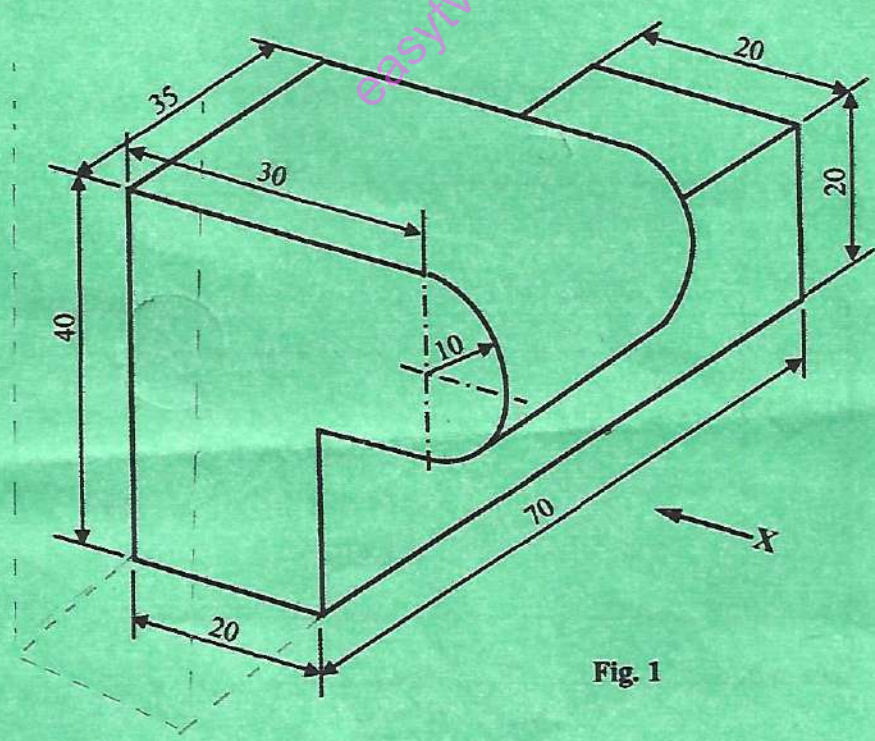

Fig. 1

6.   Figure 2 shows two views of a cast iron hinge block. Make an oblique drawing of this object
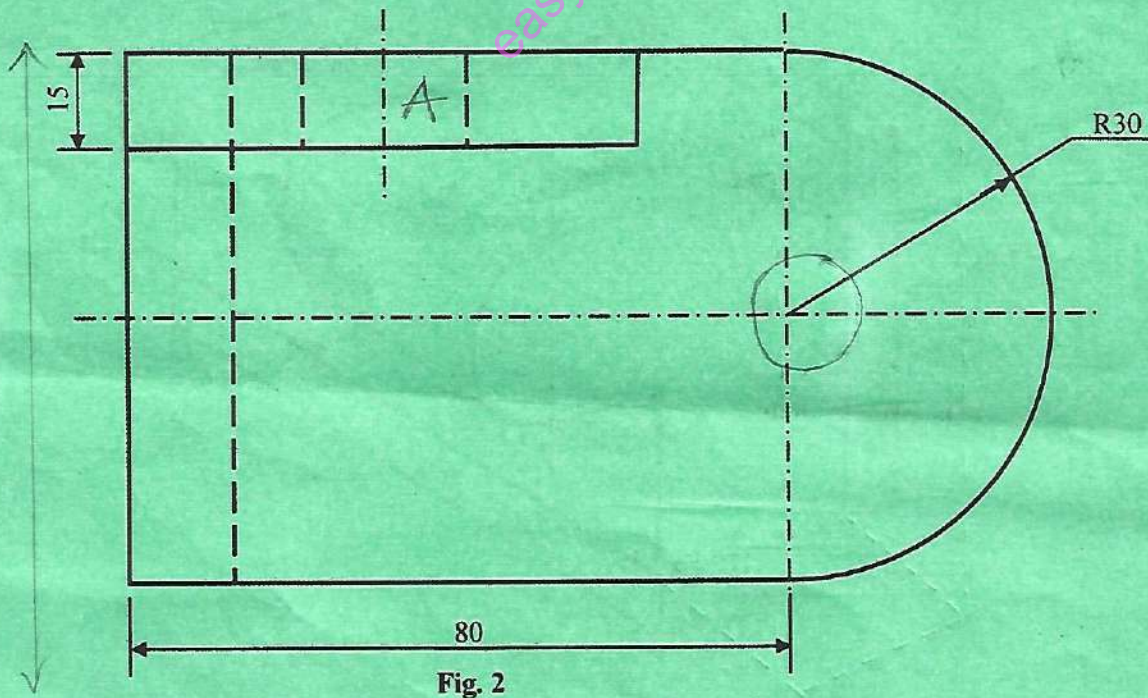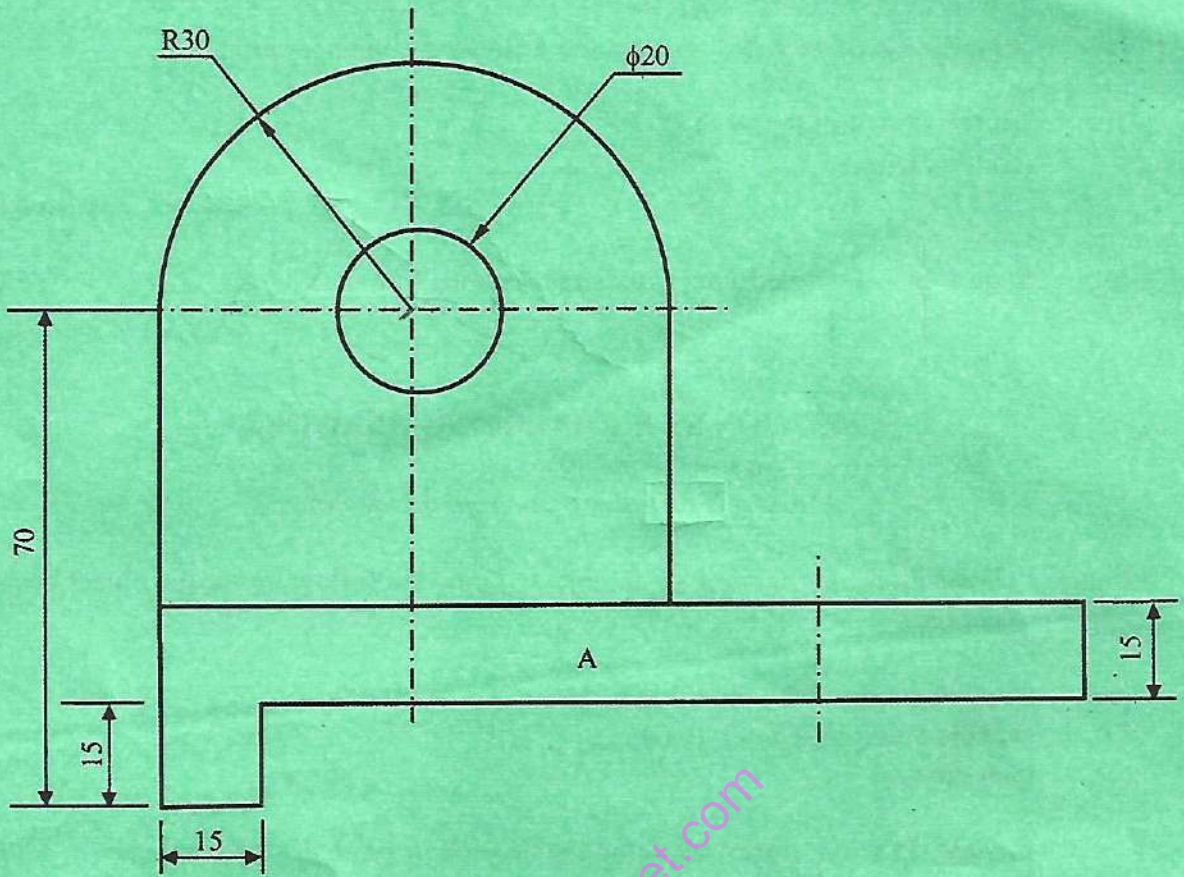   with face A being front view.   (20 marks)

R30

φ20

70

15

15

A

15

15

A

R30

80

80

Fig. 2

7. Figure 3 shows an incomplete front elevation of two unequal cylinders intersecting of two unequal cylinders intersecting at 30°. Copy the elevation and construct the following:

(i) complete front elevation showing the curve of intersection.
(ii) complete plan;
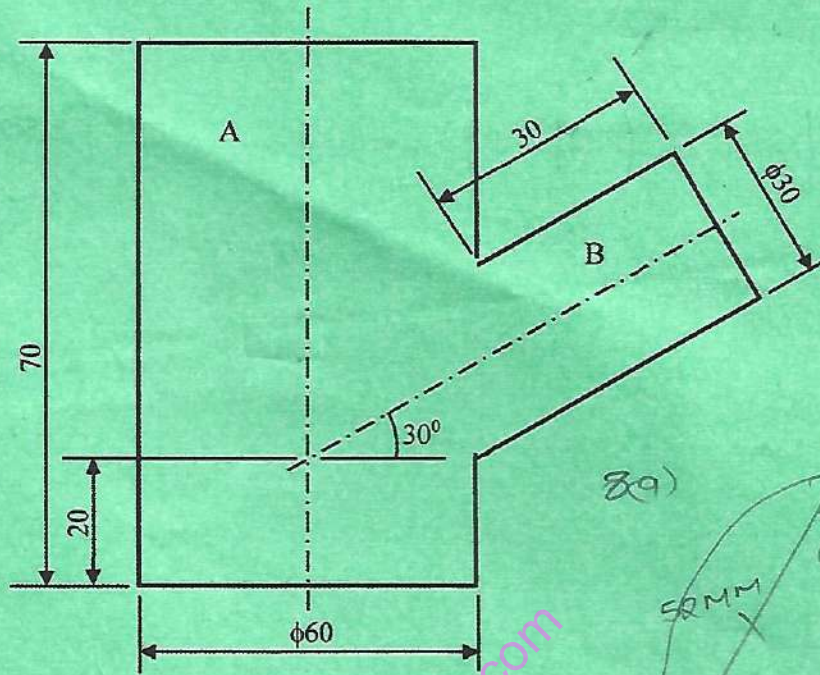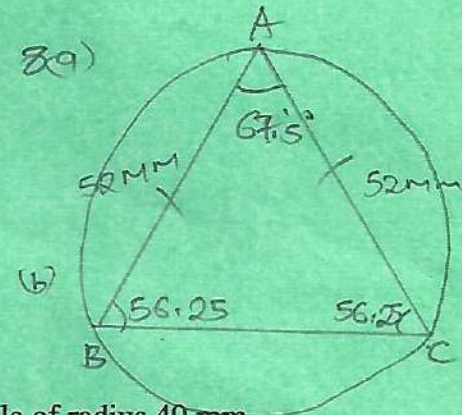(iii) surface development of cylinder B. (20 marks)

Fig. 3

8. (a) (i) Construct a regular heptagon within a circle of radius 40 mm.

(ii) Construct an isosceles triangle ABC whose included angle A is $67\frac{1}{2}°$, and AB = AC = 52 mm. Circumscribe the triangle. (11 marks)

(b) Make free hand sketches of the following engineering tools:

(i) vee block;
(ii) bench vice;
(iii) angle plate. (9 marks)

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