

2601/104 2603/104

2602/104

ENGINEERING DRAWING, MATERIALS,  
PROCESSES AND WORKSHOP TECHNOLOGY

June/July 2019

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;*

*Mathematical tables/ Scientific calculator;*

*Drawing paper A3.*

*This paper consists of EIGHT questions in TWO sections; A and B.*

*Answer THREE questions from section A and 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 7 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 **THREE** questions from this section.*

1. (a) List **four** safety measures observed in a mechanical workshop. (4 marks)
- (b) Explain the following metal finishing processes:
  - (i) enameling;
  - (ii) electroplating. (4 marks)
- (c) (i) State **four** properties of engineering materials.
- (ii) Distinguish between non-metals and alloys, giving **one** example of each. (8 marks)
- (d) Sketch part of a micrometer to show a reading of 5.54 mm. (4 marks)
2. (a) With the aid of sketches, describe the following workshop tools and state **one** application of each:
  - (i) scriber;
  - (ii) centre punch. (8 marks)
- (b) With the aid of a sketch, explain the following sheet metal joints:
  - (i) folded seam;
  - (ii) grooved seam. (8 marks)
- (c) Name **four** weld defects and **one** cause for each defect. (4 marks)
3. (a) Sketch the following mechanical fasteners and state their application:
  - (i) lock nut;
  - (ii) pan head screw. (6 marks)
- (b) (i) Define the term 'soldering'.
- (ii) Outline **four** differences between soldering and brazing. (10 marks)



(c) Describe the following parts of a shaping machine and state **one** function for each:

- (i) column;
- (ii) ram.

(4 marks)

4. (a) Explain the function of the following lathe machine components:

- (i) tailstock;
- (ii) headstock.

(4 marks)

(b) Explain the following lathe machine operations:

- (i) turning;
- (ii) drilling.

(4 marks)

(c) List **two** types of grinding machines commonly used in a workshop.

(2 marks)

(d) **Figure 1** shows a bench drilling machine. Name and state the functions of the parts labelled A - E.

(10 marks)

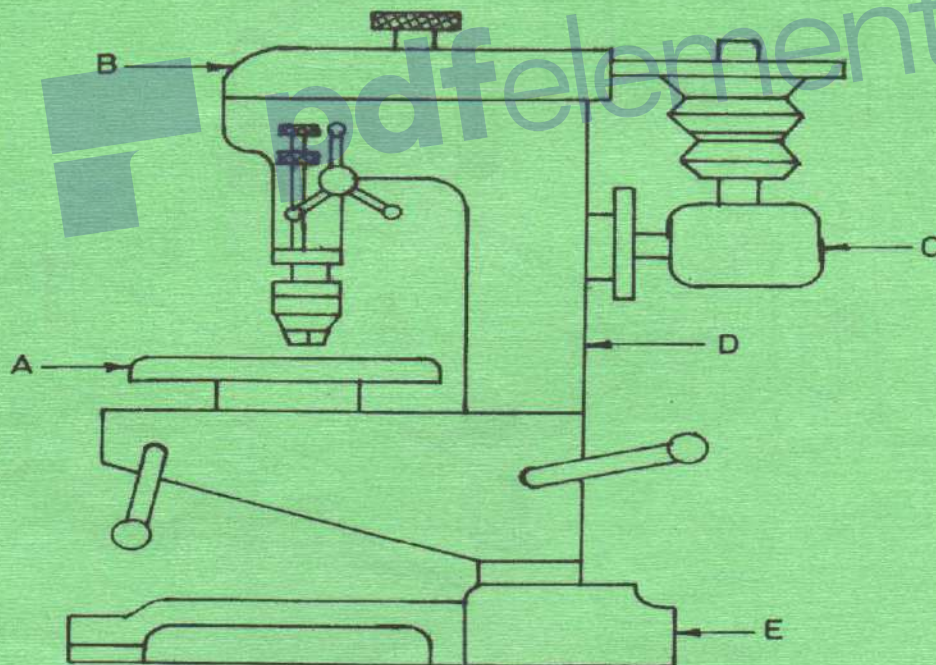
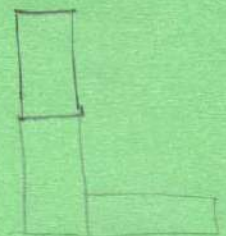
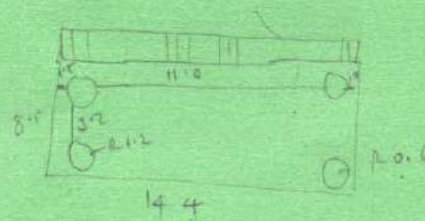
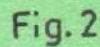


Fig.1



- (20 marks)





6. Figure 3 shows parts of a C-clamp. Draw an assembly of the C-clamp and include a parts list.

(20 marks)

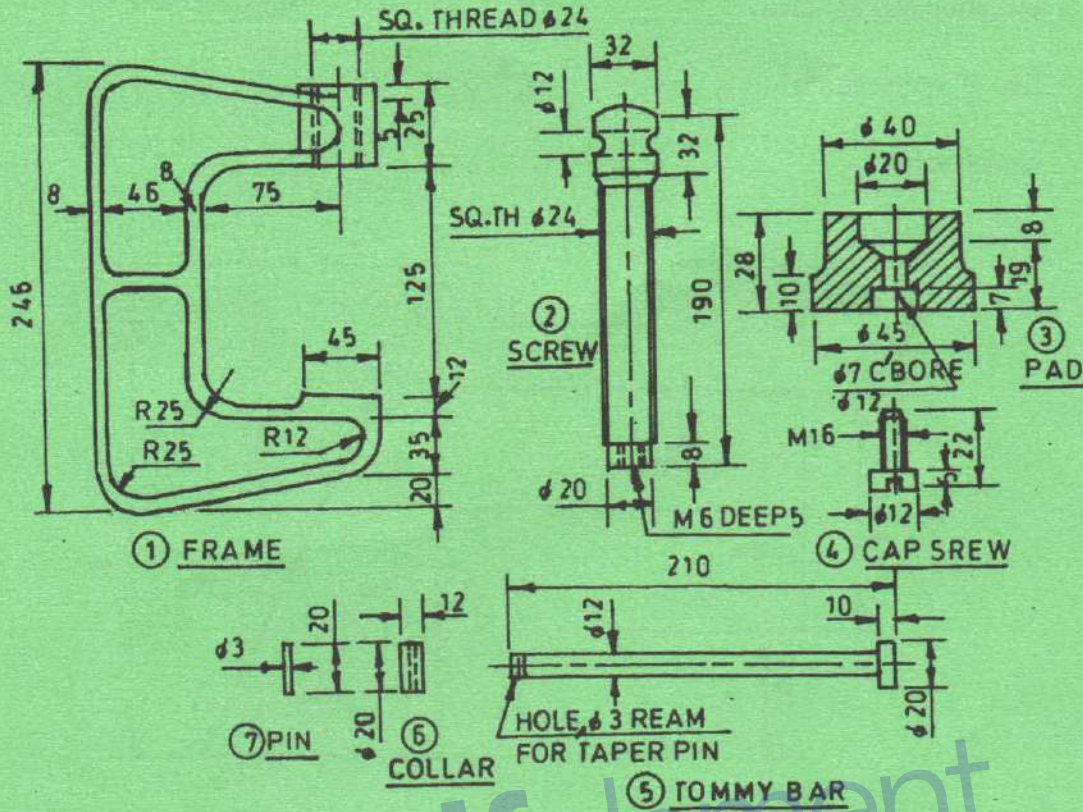


Fig.3



7. **Figure 4** shows two incomplete views of a cylinder meeting a square pyramid at right angles. Copy the given views and complete the:

- (a) elevation and the plan;
- (b) line of intersection;
- (c) end elevation.

(20 marks)

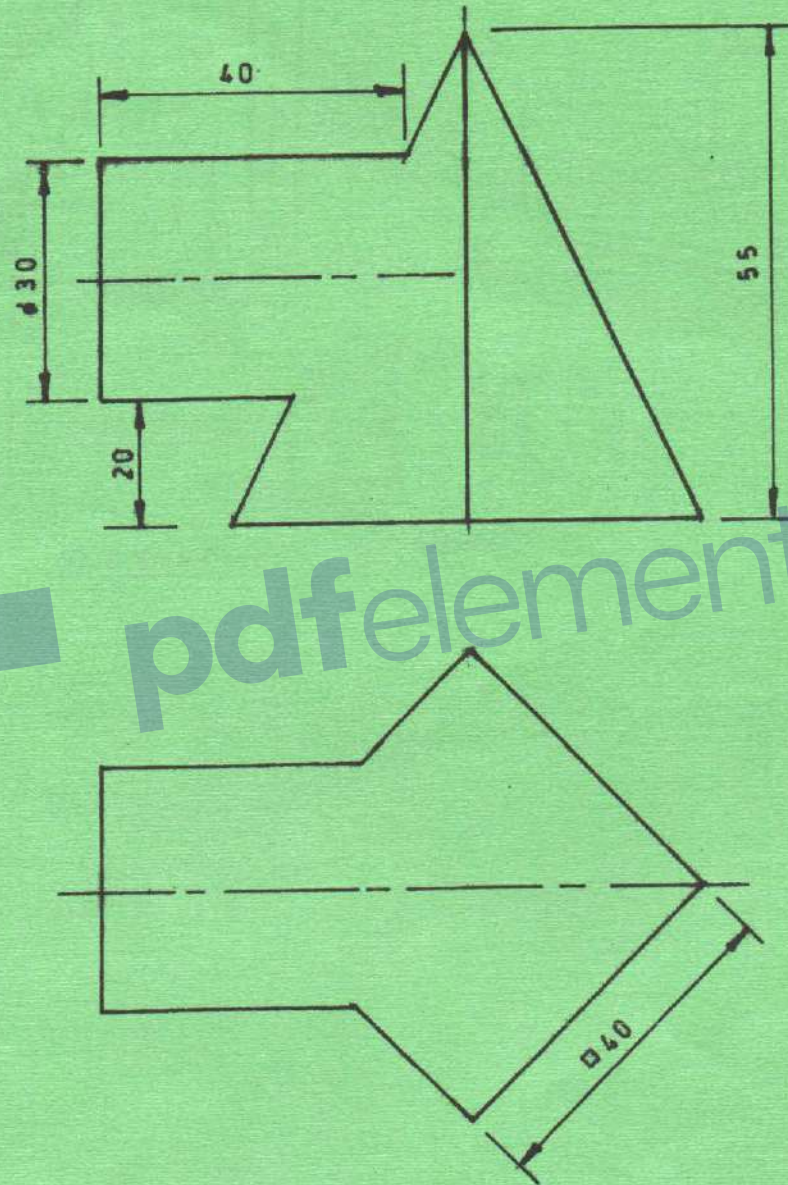


Fig. 4



8. (a) Make free hand sketches of the following engineering hand tools:

- (i) tin snips;
- (ii) cold chisel;
- (iii) flat screw driver;
- (iv) engineers square;
- (v) electric soldering iron.

(10 marks)

(b) **Figure 5** shows a point P on a circle of diameter 40 mm. Draw the locus of point P as it rotates 360° along a flat surface AB without slipping. (10 marks)



Fig 5

**THIS IS THE LAST PRINTED PAGE.**