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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'. (4 marks)
  - (ii) Outline **four** differences between soldering and brazing. (10 marks)

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- (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)

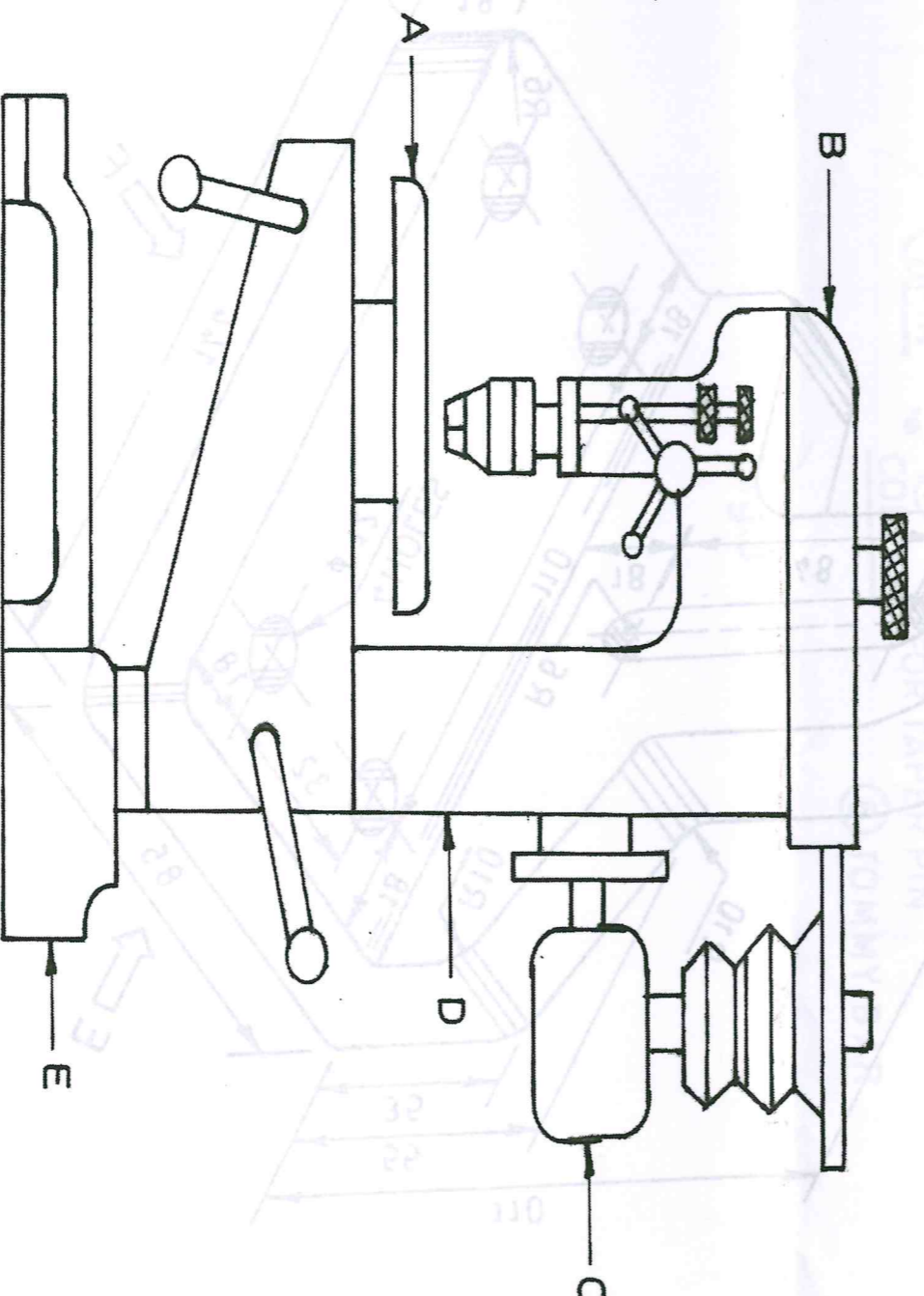


Fig.1 S.P.19

**SECTION B: ENGINEERING DRAWING**

*Answer TWO questions from this section.*

5. **Figure 2** shows a machined block. Draw in third angle projection, showing hidden details, the following views:

- (a) the plan in the direction of arrow P;
- (b) front elevation in the direction of arrow F;
- (c) end elevation in the direction of arrow E.

Insert six dimensions.

(20 marks)

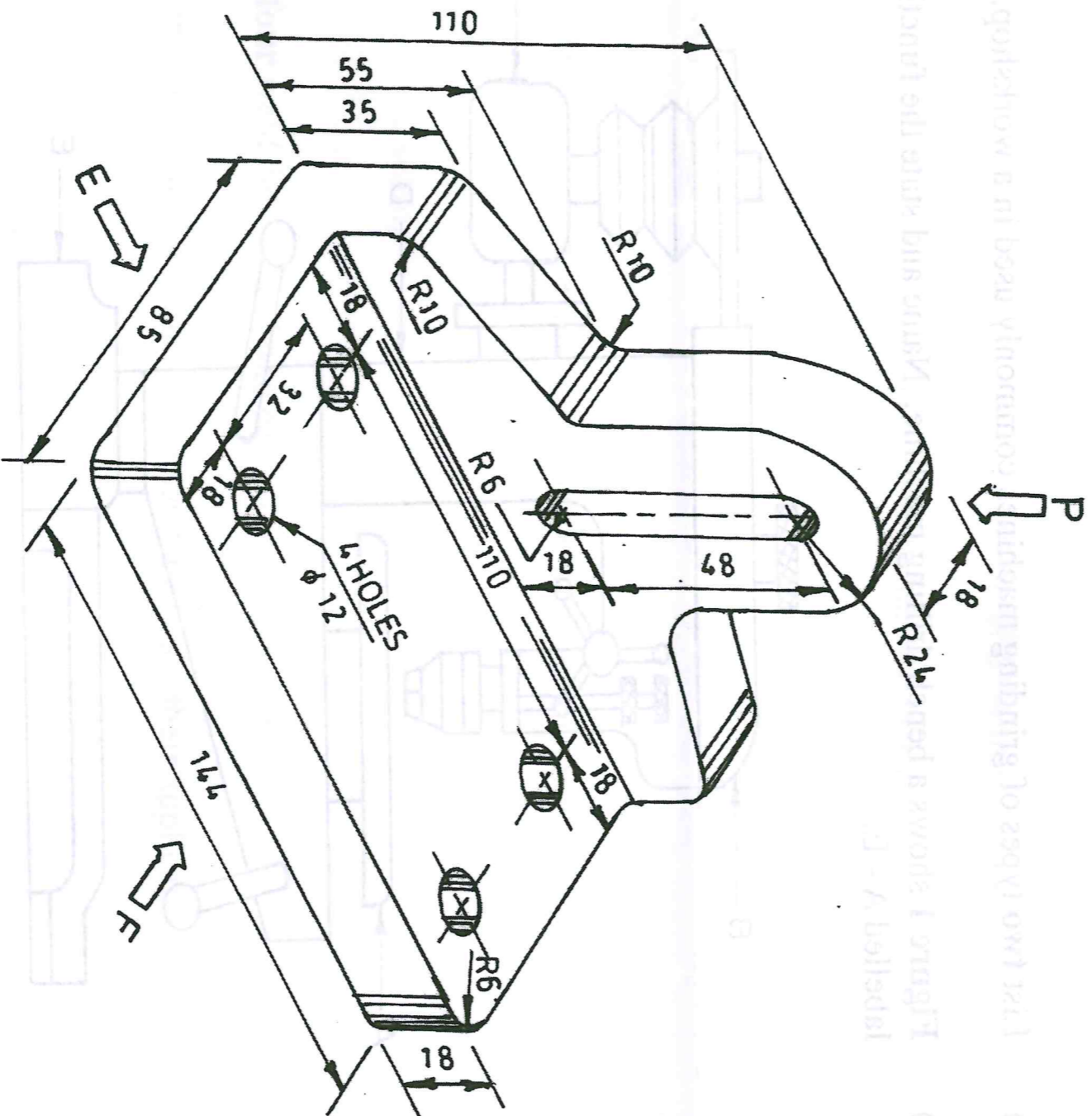


Fig. 2



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)

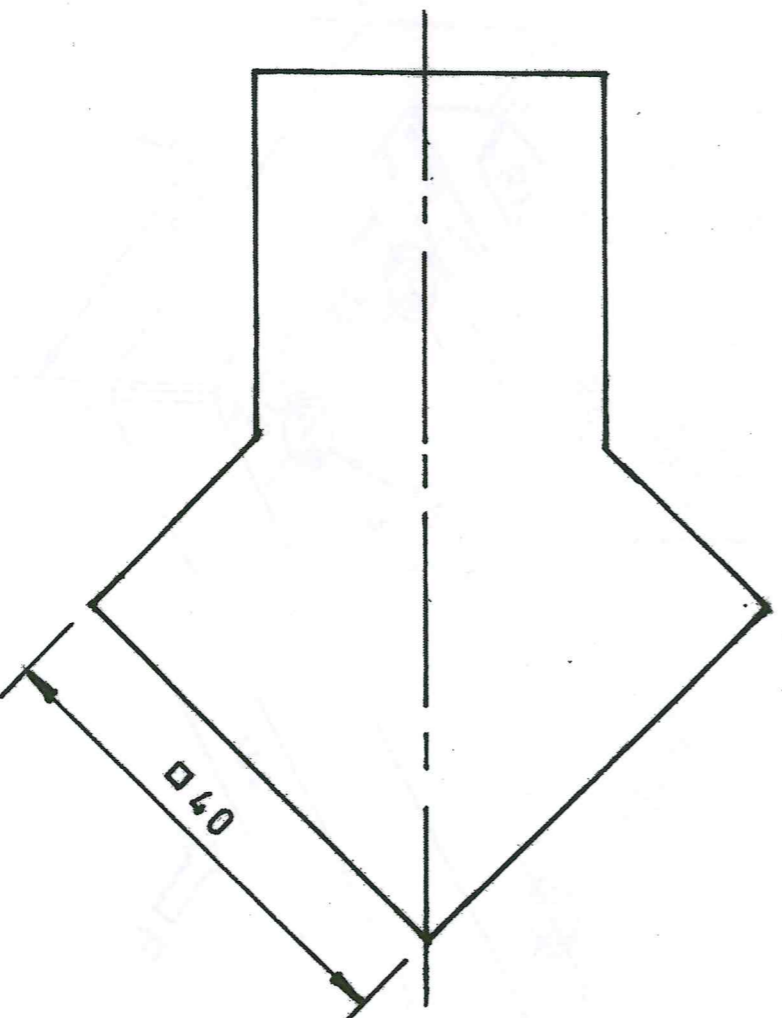
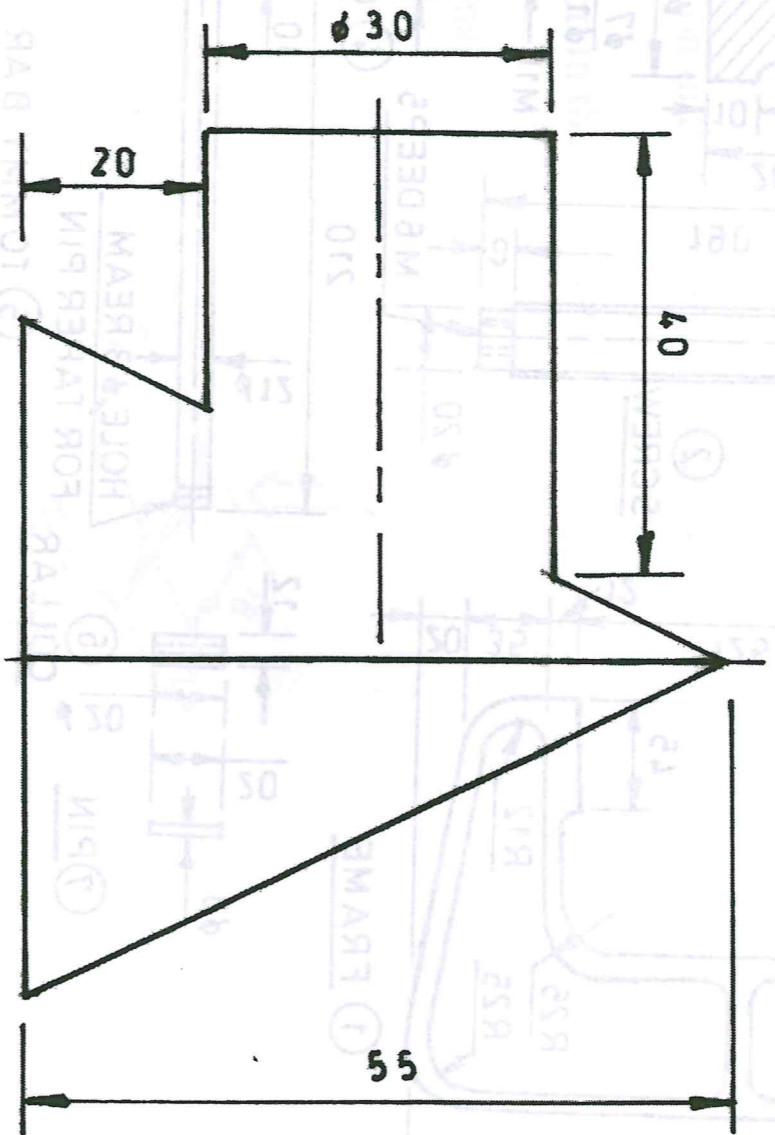


Fig. 4

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)

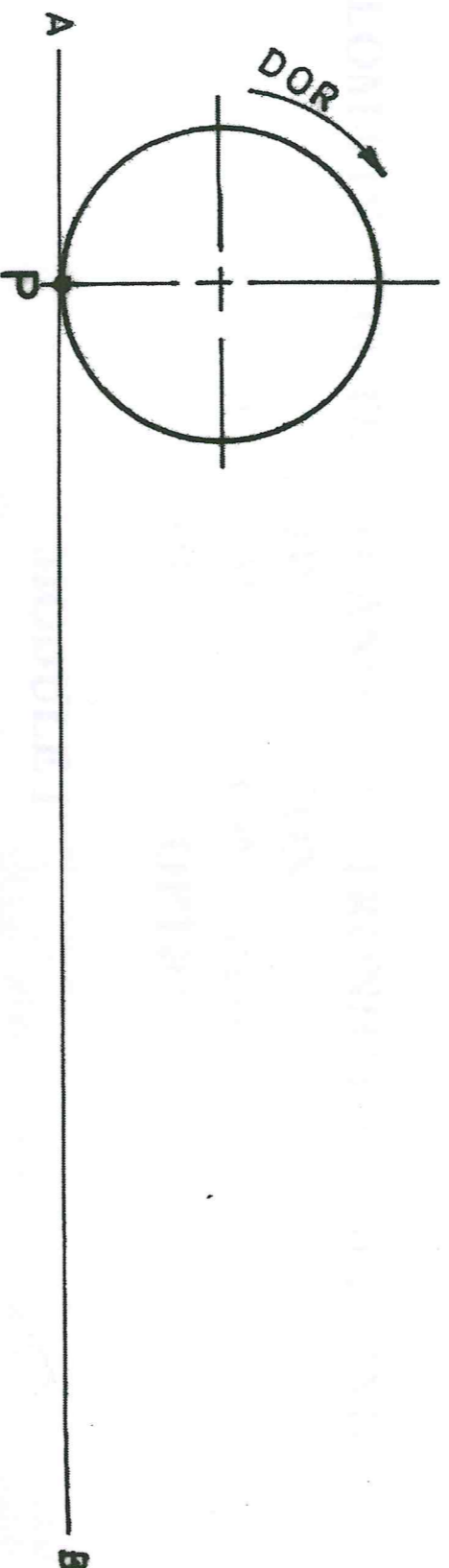


Fig. 5

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