2601/104
2602/104
2603/104
ENGINEERING DRAWING,
MATERIALS, PROCESSES AND
WORKSHOP TECHNOLOGY
June/July 2017
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.
Mathematical table/Non-programmable scientific calculator;
Drawing instruments
Drawing paper (size A3).
*The paper consists of **EIGHT** questions in **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.*
All questions carry equal marks.
Maximum marks for each part of the question are as indicated.
Candidates should answer all 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.

Turn over

SECTION A

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

1. (a) (i) Outline the procedure for extinguishing flames that have engulfed a person.

(ii) List **three** contents of a first aid kit.

(8 marks)

(b) Describe the following metal finishes and decorative processes:

(i) pickling;
(ii) annealing.

(4 marks)

(c) Explain the following metal forming processes:

(i) forging;
(ii) foundry work.

(4 marks)

(d) Draw a vernier scale to show a reading of 10.02 cm. (4 marks)

2. (a) List **three**:

(i) marking out tools;
(ii) cutting tools.

(6 marks)

(b) (i) Draw a labelled diagram of a flat file.

(ii) State **four** precautions in handling and storage of files.

(8 marks)

(c) Explain the following methods of joining metals:

(i) riveting;
(ii) bolting.

(6 marks)

3. (a) Explain the following drilling machine operations:

(i) Reaming;
(ii) boring.

(4 marks)

(b) Illustrate the following lathe machine left cutting tools:

(i) Facing;
(ii) Roughing;
(iii) Finishing.

(6 marks)

(c) Figure 1 shows a bench grinding machine. Name the parts labelled A - F. (6 marks)

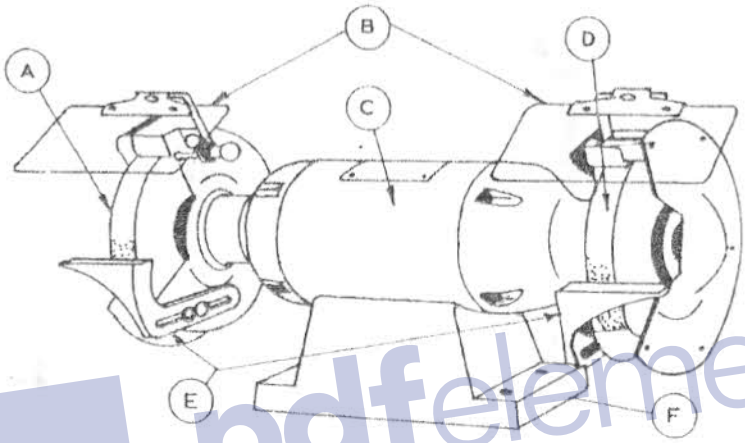

Fig. 1

(d) State the safety precautions when using the grinding machine. (4 marks)

4. (a) State:

(i) **two** properties of alluminium.

(ii) **three** classifications of electrical materials.

(5 marks)

(b) (i) Explain the term 'corrosion'.

(ii) List **three** factors that determine the corrosion of metals.

(5 marks)

(c) With the aid of a labelled diagram, describe the extraction of iron from the ore.

(10 marks)

$Al + O_2 \rightarrow Al_2O_3$

SECTION B

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

5. (a) Figure 2 shows a circular wheel of 40 mm diameter with point P attached to its periphery. The wheel rolls without slipping along a straight line while remaining on the same plane. Plot the path of point P for a full revolution of the wheel.

(10 marks)

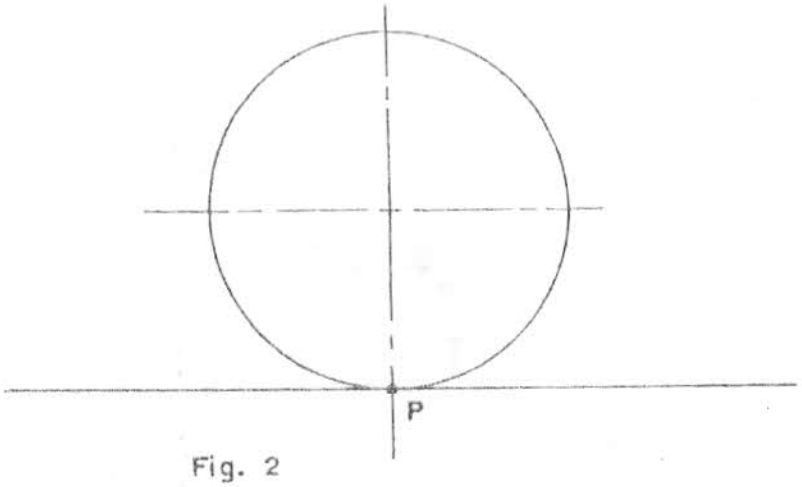

Fig. 2

(b) Inscribe **two** circles of radii 20 mm and 15 mm within a third circle of diameter 80 mm and all the three circles to touch each other. (5 marks)

(c) Construct a regular pentagon given the length of one side as 50 mm, using the compass method. (5 marks)

6. Figure 3 shows a pictorial view of a bracket. Draw full size in first angle projection the following views:

(a) Sectional front elevation A-A;

(b) An end elevation in the direction of arrow E;

(c) A sectional plan on B-B.

Include **six** major dimensions.

(20 marks)

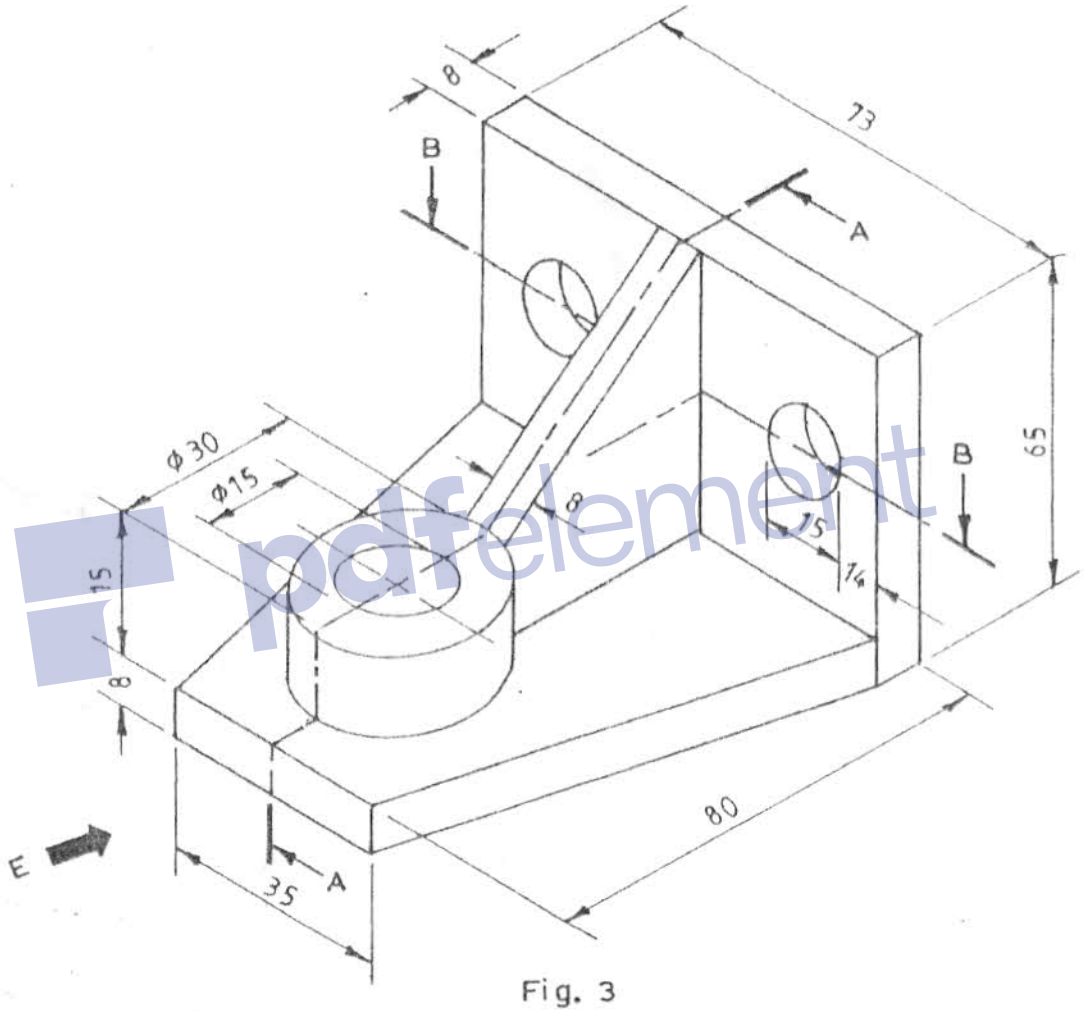

Fig. 3

7. Figure 4 shows the front elevation of a truncated cylinder. Copy the given view and draw the:

(a) plan;
(b) true shape at cutting plane X-X;
(c) surface development of the cylinder.

(20 marks)

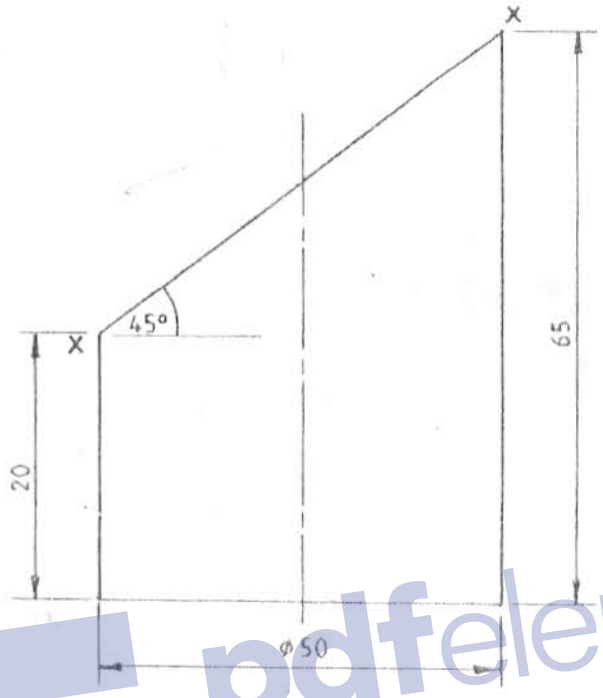

Fig. 4

8. Figure 5 shows two views of a bracket drawn in third angle projection.
Draw full size the bracket in isometric projection taking corner X as the lowest point.

(20 marks)

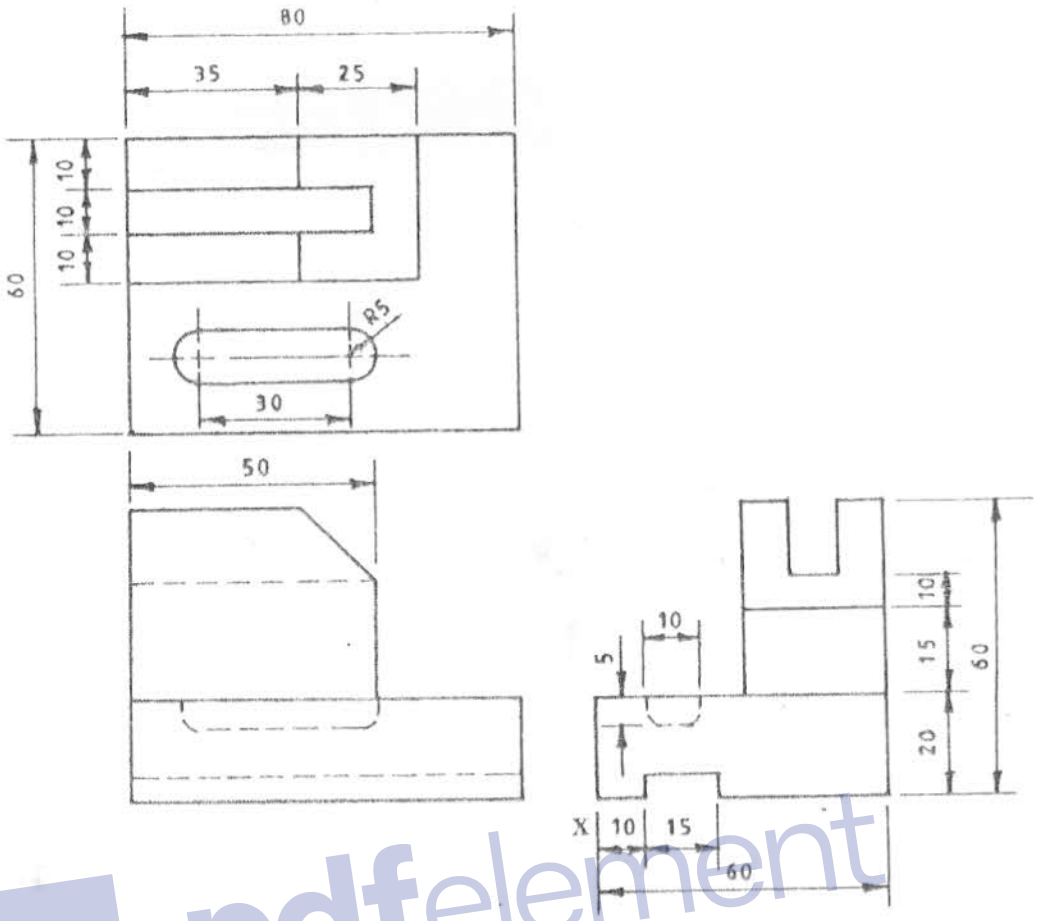

Fig. 5

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