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2602/104

ENGINEERING DRAWING I, MATERIALS,
PROCESSES AND WORKSHOP TECHNOLOGY

Oct./Nov. 2017

Time: 3 hours

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THE KENYA NATIONAL EXAMINATIONS COUNCIL

**DIPLOMA IN ELECTRICAL AND ELECTRONIC ENGINEERING
(POWER OPTION)
(TELECOMMUNICATION OPTION)
(INSTRUMENTATION OPTION)**

MODULE I

ENGINEERING DRAWING I, 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.

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

Candidates should answer the questions in English.

This paper consists of 6 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) State:
- (i) the purpose of the Factory's Act (Electricity special regulation) in relation to industrial safety;
 - (ii) **four** factors to be considered in designing workshop layout. (6 marks)
- (b) Describe the procedure followed in rescuing a victim who is in contact with live electrical conductors and is in a state of electric shock. (8 marks)
- (c) Explain where the following types of fire extinguishers are used and state their colours:
- (i) foam;
 - (ii) vaporizing liquid. (6 marks)
2. (a) Outline:
- (i) **one** application in modern engineering where plastic has replaced metal parts and state any **two** of their advantages;
 - (ii) **three** factors to be considered when selecting a type of polish for a particular finish. (6 marks)
- (b) Explain the following properties of metals:
- (i) malleability;
 - (ii) ductility. (6 marks)
- (c) Describe the characteristics of the following engineering materials and state their applications:
- (i) tin;
 - (ii) aluminium;
 - (iii) rubber;
 - (iv) mild steel. (8 marks)
3. (a) (i) Draw a labelled diagram of a metric micrometer screw gauge.
- (ii) Make a sketch of a(i) above showing a scale reading of 10.67 mm. (10 marks)



(b) Explain the safety procedures and care when using and handling the following hand tools:

(i) hacksaw;

(ii) files.

(10 marks)

4. (a) With the aid of a diagram, explain the procedure of joining two pieces of metal using a snap rivet. (6 marks)

(b) Draw a labelled diagram of a screw thread and state the difference between a pitch and the lead. (6 marks)

(c) Distinguish between:

(i) soft soldering and brazing;

(ii) gas welding and arc welding.

(8 marks)

5. (a) Draw a labelled diagram of a twist drill and state the functions of the following parts:

(i) flute;

(ii) land.

(8 marks)

(b) Draw the following lathe machine tools shapes and state the function of each:

(i) round nose rougher;

(ii) knife tool;

(iii) form tool.

(6 marks)

(c) (i) Describe the following tools and state the function of each:

I. steel rule;

II. scribe;

III. engineer's square.

(ii) Sketch a pair of dividers and state its **two** functions.

(6 marks)



SECTION B: ENGINEERING DRAWING I

Answer any *TWO* questions from this section.

6. Figure 1 shows a bracket. Draw in first angle projection the following:

- (i) front elevation in the direction of arrow A;
- (ii) end elevation in the direction of arrow B;
- (iii) plan in the direction of arrow C.

Insert **six** major dimensions.

(20 marks)

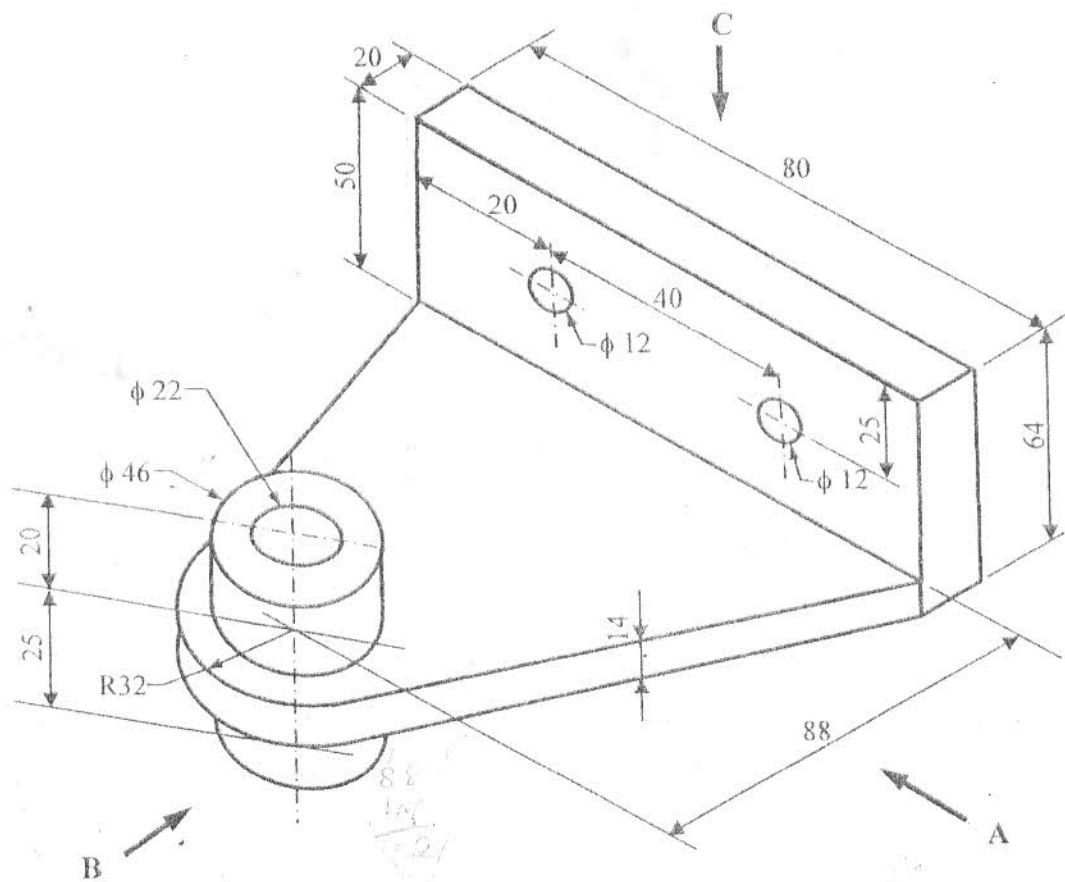


Fig. 1

8. Figure 3 shows two views of an object. Draw the isometric view of this casting making corner N as the lowest point.

Insert six dimensions.

(14 marks)

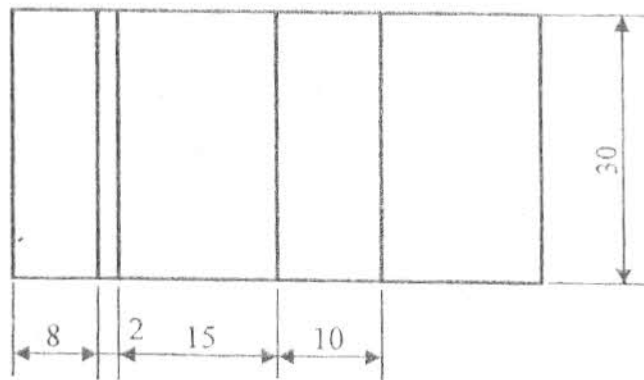
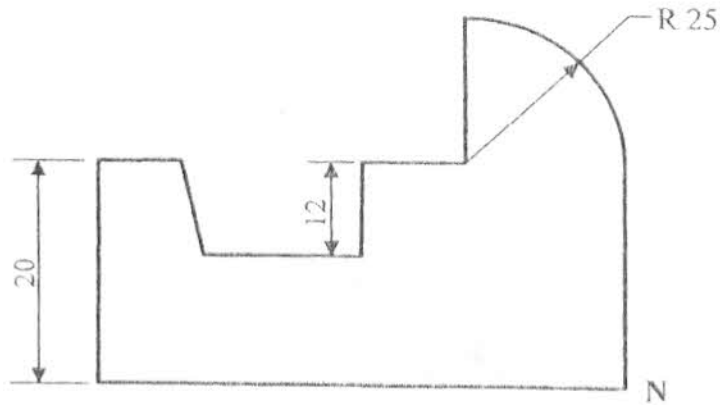


Fig. 3

(b) Sketch the following workshop tools:

- (i) wood chisel;
- (ii) combination pliers.

(6 marks)

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