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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

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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.

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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)

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(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. scriber;
III. engineer's square.

(ii) Sketch a pair of dividers and state its **two** functions. (6 marks)

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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)

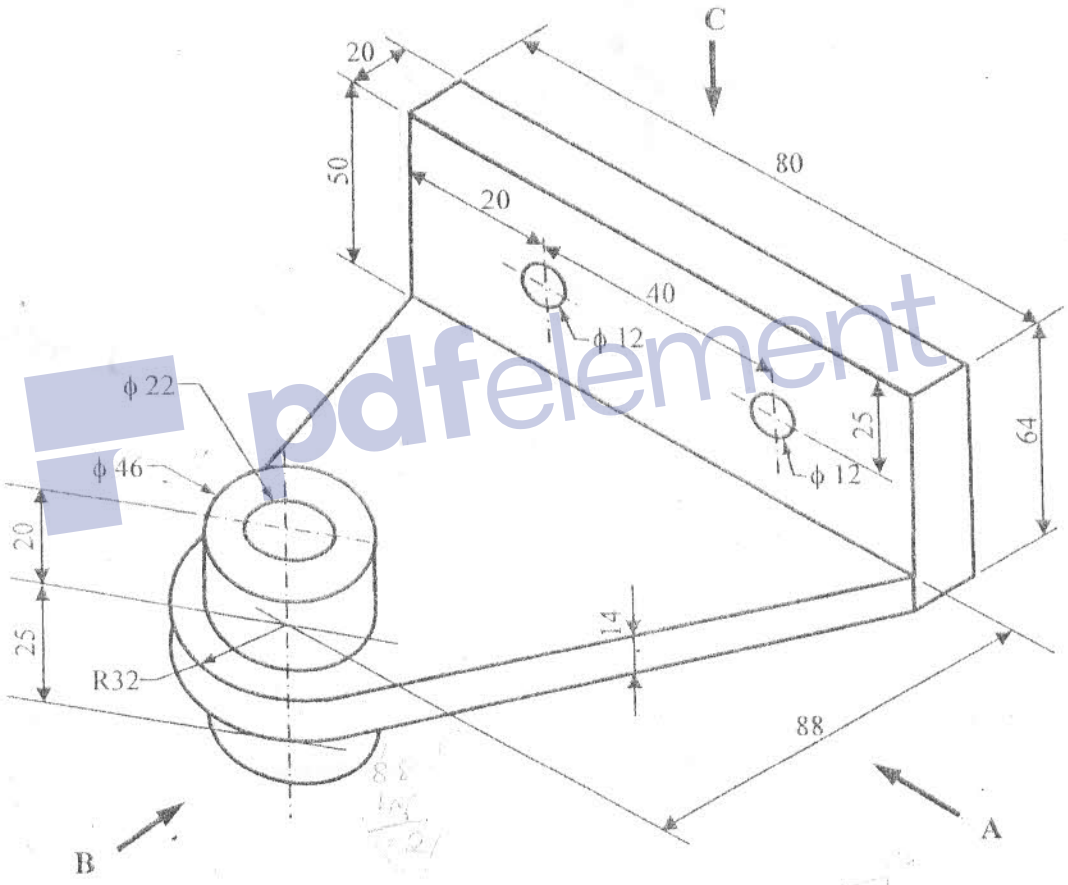

Fig. 1

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7. (a) Construct a pentagon given that the diameter of circle is 40 mm. (5 marks)

(b) Figure 2 shows the front elevation of truncated hexagonal base pyramid. Copy the front elevation and complete the :

(i) plan;
(ii) true shape;
(iii) auxiliary view at BB′. (15 marks)

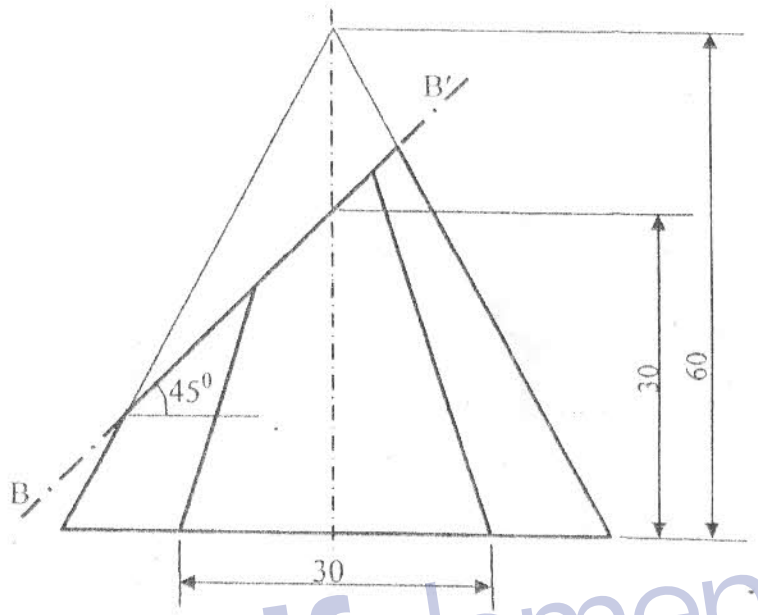

Fig. 2

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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)

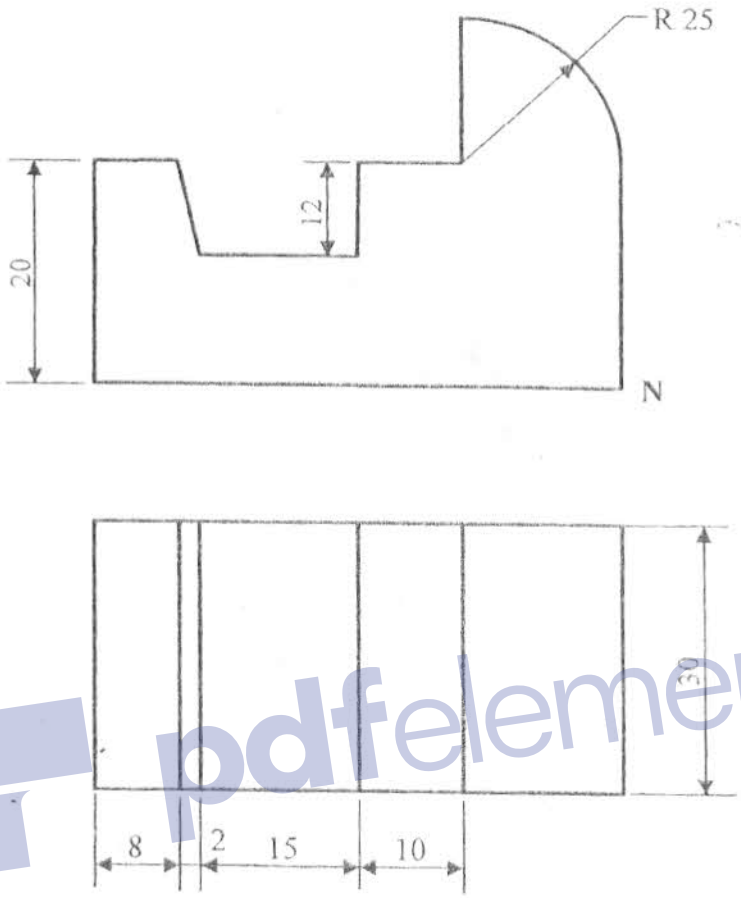

Fig. 3

(b) Sketch the following workshop tools:

(i) wood chisel;
(ii) combination pliers. (6 marks)

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