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.

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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.  

(b) Describe the following metal finishes and decorative processes:  
(i) pickling;  
(ii) annealing.  

(c) Explain the following metal forming processes:  
(i) forging;  
(ii) foundry work.  

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

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

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

(b) (i) Draw a labelled diagram of a flat file.  
(ii) State **four** precautions in handling and storage of files.  

(c) Explain the following methods of joining metals:  
(i) riveting;  
(ii) bolting.
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)
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.  

(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.  

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