EAST AFRICAN SCHOOL OF AVIATION EXAMINATION

END TERM I EXAMS

DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

(TELECOMMUNICATION OPTION)

ELECTRICAL MEASUREMENT AND ANALOGUE ELECTRONICS I

STREAM: Module I (Telecom) **Duration: 3 Hrs**

DAY/DATE: 01/12/2016 **TIME: 9-12 PM**

INSTRUCTION TO CANDIDATES

You should have the following for this examination:

i) Answer booklet
ii) Mathematical table/ scientific calculator

*Answer **ALL THREE QUESTIONS IN SECTION A** and **ANY TWO IN SECTION B** in this paper*

All questions carry equal marks.

Maximum marks for each part of a question are as shown

This paper consists of THREE (3) 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 (ELECTRICAL MEASUREMENT)

Answer ALL THREE questions from this Section.

1. (a) Define the following terms as used in measurement
   (i) Absolute unit
   (ii) Derived unit (5 marks)

   (b) Differentiate between fundamental and derived unit (5 marks)

   (c) Explain the following types of measurement errors: -
   (i) Environmental errors
   (ii) Instrumental errors
   (iii) Gross errors
   (iv) Residue errors (10 marks)

2. (a) State which unit the following abbreviation refer to :-
   (i) A (ii) C (iii) J (iv) N (v) W (5 marks)

   (b) Express
   (i) A length of 52 mm in meter
   (ii) $20{,}000mm^2$ in square meters
   (iii) $10{,}000{,}000mm^3$ in cubic meter
   (iv) 6.3 liters in cubic meter
   (v) 7.2 tone in kilogram (15marks)

3. (a) State three causes of faults on a printed board. (3 marks)

   (b) List five tools used in the repair and maintenance of electronic equipment (5 marks)

   (c) Explain three points a service engineer should consider when fault finding on electronic equipment. (6 marks)

(d) Outline three operational objectives and three cost objectives of a good maintenance. (6 marks)

SECTION B (ANALOGUE ELECTRONICS I)

Answer any TWO questions from this Section

4. (a) Explain the salient feature of Bohr's atomic model. (4 marks)

(b) Draw and explain the V-I characteristics of a *pn* junction. (6 marks)

(c) State **Two** properties of semiconductors. (4 marks)

(d) Explain how the following extrinsic semiconductors are formed. (6 marks)

i. N- type

ii. P- type.

5. (a) Explain why is the energy of an electron more in higher orbits. (4 marks)

(b) Explain the concept of energy bands in solids. (6 marks)

(c) Discuss the effect of temperature on semiconductors. (4 marks)

(d) State **three** applications of semiconductor diodes. (6 marks)

6. (a) Describe the following with the help of energy level diagram

(i) Valance band

(ii) Conduction band

(ii) Forbidden energy gap. (6 marks)

(b) Describe the following with the help of energy level diagram;

(i) Conductor

(ii) Insulator

(iii) Semiconductor. (6 marks)

(c) Distinguish between the following term as applied in semiconductor;

(i) Intrinsic and Extrinsic

(ii) Majority and Minority Carriers. (4 marks)

(d) State **two** advantages and **two** disadvantages of Semiconductor diodes (or crystal diodes) as compared to the electron-tube counterparts (i.e., vacuum diodes). (8 marks)

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