MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

P.O. Box 972-60200 – Meru-Kenya.
Tel: 020-2069349, 061-2309217. 064-30320 Cell phone: +254 712524293, +254 789151411
Fax: 064-30321
Website: www.must.ac.ke Email: info@must.ac.ke

University Examinations 2013/2014

FIRST YEAR, FIRST SEMESTER EXAMINATION FOR CERTIFICATE IN ELECTRICAL INSTALLATION

EEE 0101: ELECTRICAL ENGINEERING PRINCIPLES I

DATE: APRIL 2014   **TIME: 1 ½ HOURS**

INSTRUCTIONS: *Answer question **one** and any other **two** questions*

QUESTION ONE – (30 MARKS)

(a) Using atomic theory, distinguish between the following materials:
   (i)   Conductors
   (ii)   Insulators
   (iii)   Semiconductors   (3 Marks)
(b) Define the following terms giving their uses.   (3 Marks
   (i)   Resistance
   (ii)   Electromotive force
(c) Calculate the resistance of a conductor 25.9metres long whose cross-sectional area is 44mm^2 and resistivity is $1.7 \times 10^{-8} \Omega M$.   (4 Marks)
(d) Explain the following characteristics of materials stating appropriate examples:
   (i)   Negative temperature coefficient of resistance
   (ii)   Positive temperature coefficient of resistance   (4 Marks)
(e) A copper wire has resistance of 120Ω at $0°C$. Determine the resistance at $70°C$ if the temperature coefficient of copper at $0°C$ is $0.00431°C$.   (4 Marks)
(f) State the following Kirchoffs laws
   (i)   Current law
   (ii)   Voltage law   (3 Marks)
(g) Explain the following problems in chemical cells and state how they can be remedied
   (i) Polarization
   (ii) Local action   (6 Marks)

1

(h) Distinguish between primary cells and secondary cells giving examples.   (3 Marks)

QUESTION TWO – (15 MARKS)

(a) A conductor which is 185 metres long and cross-sectional area of 0.52mm^2 and resistivity of $0.03\mu\Omega - M$ is connected to a DC source of 90volts.
    (i) Calculate the resistance of the conductor
    (ii) Calculate current flowing in the circuit
    (iii)Calculate the amount of energy consumer for a period of 3 hours.   (10 Marks)
(b) State three methods of testing the state of charge of lead acid cells.   (3 Marks)
(c) State two Faradays laws of electrolysis.   (2 Marks)

QUESTION THREE – (15 MARKS)

(a) State Ohms law.   (2 Marks)
(b)

Calculate the amount of current flowing in the circuit.   (5 Marks)
(c) Using well labelled diagram, explain the construction and operation of lead acid cells.
                                                                                 (8 Marks)

QUESTION FOUR – (15 MARKS)

   (a) Explain three
       (i) Methods of charging batteries
       (ii) Methods of connecting batteries to each other   (6 Marks)

   (b) State any three considerations in the care and maintenance of lead acid cells.

                                                         (3 Marks)

   (c) Three resistors were connected in series across 15 volts source. Calculate voltage drop
       across each resistor.   (6 Marks)