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, SECOND SEMESTER EXAMINATION FOR DIPLOMA IN ELECTRICAL ENGINEERING

EEE 0203: ELECTRICAL ENGINEERING PRINCIPLES II

DATE: APRIL 2014 **TIME: 1 ½ HOURS**

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

QUESTION ONE – (30 MARKS)

(a) Define the following terms as used in A.C circuits
  (i) Instantaneous value
  (ii) Form factor
  (iii) Amplitude (3 Marks)

(b) Describe the generation of A.C voltage with the aid of a diagram. (4 Marks)

(c) State two advantages of A.C transmission over D.C transmission. (4 Marks)

(d) The following three impedances are connected in series across a 40V, 200KHZ supply
  (i) A resistance of 8Ω
  (ii) A coil of inductance $130\mu H$ and 5Ω resistor
  (iii) A 10Ω resistor in series with $0.25\mu H$ capacitor

  Determine
  (i) The circuit current
  (ii) The phase angle
  (iii) The voltage drop across each element. (10 Marks)

(e) State Faradays law of electromagnetic induction. (2 Marks)

(f) With the aid of diagrams differentiate between self inductance and mutual inductance. (4 Marks)

(g) Describe a resonance RLC series circuit and derive the formula for resonance for the circuit. (3 Marks)

QUESTION TWO – (15 MARKS)

(a) A resistor of 25Ω is connected in series with a capacitor of $45\mu F$. Determine
   (i) The impedance of the circuit.
   (ii) The current taken from the supply of 240V, 50HZ
   (iii) The phase angle between current and voltage (10 Marks)

(b) With aid of a circuit diagram and a phasor diagram derive the equation for determining impedance in a series RL circuit. (5 Marks)

QUESTION THREE – (15 MARKS)

(a) Show that the total inductance in a parallel connection of three inductances is given by the reciprocal of the sum of the three inductances. (2 Marks)

(b) State two applications of inductors. (2 Marks)

(c) A coil of inductance 318.3mH and negligible resistance is connected in series with 200Ω resistor to a 240V, 50HZ supply. Determine
   (i) The inductance of the coil
   (ii) The impedance of the circuit
   (iii) The p.d across each component
   (iv) The circuit phase angle. (10 Marks)

QUESTION FOUR – (15 MARKS)

(a) With the aid of a circuit diagram differentiate between an RLC series circuit and an RLC parallel circuit. (4 Marks)

(b) Define the term impedance as used in A.C circuits. (1 Mark)

(c) A coil of negligible resistance and inductance 100mH is connected in series with a capacitance of $2\mu F$ and a resistance of 10Ω across a 50V, variable frequency supply. Determine:
   (i) The resonant frequency
   (ii) The current at resonance
   (iii) The voltages across the coil and the capacitor at resonance. (10 Marks)