TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

UNIVERSITY EXAMINATION FOR:

CERTIFICATE IN ELECTRICAL POWER ENGINEERING (CEPE 2)   PP1

ELECTRICAL INSTALLATION TECHNOLOGY 11

EEP 1105

END OF SEMESTER EXAMINATION

SERIES: MAY 2016

TIME: HOURS

DATE:

Instructions to Candidates

You should have the following for this examination

Answer booklet, examination pass and student ID

This paper consists of five Questions; Attempt any THREE Questions.*)*

DO not write on the question paper.

QUESTION ONE

(a)   (i) Define the following terms as used in electrostatics
  I.   Capacitor
  II.   Capacitance
  III. Die- electric   (6 marks)

 (ii) Derive an expression for the total capacitance of three capacitors connected in parallel (3marks)

(b)(i)Two capacitors having capacitance of 15 µ and 10µ respectively are connected in parallel across a 240 V supply.

Determine :-

  I.   The P.d across each capacitor
  II.   The charge on each capacitor
  III. Total energy stored in the circuit   (8marks)

(ii) State three types of capacitors   (3marks)

QUESTION TWO

a (i) With the aid of a well labeled diagram describe the moving coil measuring instrument (5marks)

(ii) A permanent magnet moving coil measuring instrument gives full scale deflection at 30mv and 10 ma current find the resistance of the multiplier necessary to convert to a

  I.   Ammeter 0-3A.range
  II.   Voltmeter 0 - 50v range   (7marks)

b(i) With the aid of a well labeled diagram describe the attraction type moving iron instrument.

(ii) State three advantages of this meter in b (i) above over the moving coil type   (8marks)

QUESTION THREE

(a)(i) Resistance of 10Ω and inductance 0.5 H and a capacitance µ   are connected in series across a 240V supply determine:-

  I.   The impendance
  II.   Current
  III. Voltage across R,L, and C
  IV.   Power factor angle
  V.   Active power
  VI.   Apparent power   (6marks)

b (i) with the aid of a well labeled diagram describe voltage, current and power wave forms for the following:-

    I.   Inductive circuit

    II.   Capacitive circuit   (6marks)

(ii) Explain the term "Series Resonance" as applied to an A.C. circuit.

(C) At what frequency will resonance occur in a circuit ? when L= 0.08 H and C = 6µ (5marks)

QUESTION FOUR

a (i) With the aid of a diagram describe a direct –on- line system using contactor type starter for a 3 phase motor.

(ii) State three reasons for using a starter to operate electrical machines   (9 marks)

b (i) Explain the effects of the following in motor operation

    I.   Dust
    II.   Oil and grease
    III.   Moisture

c. State three causes of electrical plant breakdown   (3marks)

QUESTION FIVE

a (i) Explain using a diagram two methods by which transformers windings are wound around the iron core   (6 marks)

(ii) Name all the losses which occur in a transformer, compare value of the losses when the transformer is (A) on no load (b) on full load   (5 marks)

b(i) State the tests carried out on the transformer to determine its efficiency (4marks)

(II) Explain the conditions which must be fulfilled so that two three phase transformer may operate in parallel   (5marks)