TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

UNIVERSITY EXAMINATION FOR:

CERTIFICATE IN ELECTRICAL POWER ENGINEERING (CEPE 3) PPI

ELECTRICAL TECHNOLOGY

EEP 1201

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) A resistance of 10Ω an inductance of 0.2h and capacitance of 100μ are connected in series across a 200V, 50hz supply:-

Determine :- (i) the impedance (ii) current
(iii) Voltage across R, L and C (iv) Power factor Angle
(v) Active power (vi) apparent power (9 marks)

(b) (i) A series circuit having R=12Ω, L= 0.2 H and C=100μ is connected to a constant voltage, variable frequency supply calculate :-

I. The resonant frequency
II. The P.D across the inductor and the capacitor when the supply voltage is 100V
III. The impedance when the frequency is 50HZ (8 marks)

(c) State two factors responsible for the production of transients in an A.C Circuit. (3mks)

QUESTION TWO

(a)(i) Explain :- (i) Slip as applied to an induction motor
(ii) Why an induction motor does not run at synchronous speed.
(ii) State two reasons why the rotor winding slots of an induction motor are skewed. (7 marks)

(a) With the aid of a diagram show the production of rotating field in the stator of a three phase machine (8marks)

(b) Explain the production of torque in the rotor of a three-phase induction motor. (5marks)

QUESTION THREE

a) (i) With the aid of a diagram describe the construction of a DC machine.

(ii) Explain the main features and purpose of a DC face plate starter. (8marks)

b) (i) Explain with the aid of speed- torque characteristic why a D.C series motor should not be started on no load (7 marks)

(ii) With reference to the characteristics in (b) (i) state any two applications for the motor. (5marks)

QUESTION FOUR

(a) (i)Define the following terms:-

I. Series resonance

II. Resonant frequency

III. Parallel resonance (6 marks)

(ii) Explain what is meant by the impedance of a coil and state the unit it is measured (4marks)

(b) (i) An aircored coil takes a current of 10 A when connected to a 100V d.c. Supply, but when it is connected to a 100v a.c supply, it takes 2.5A . State the reason for this and calculate the power taken by the coil in each case. (5marks)

(ii)Describe the transient response when discharging a capacitor. (5marks)

QUESTION FIVE

a) (i) With aid of a circuit diagram, explain the principle of operation of a capacitor start single phase induction motor.

(ii) State two applications for the motor in (a) (i) above (8marks)

(i)Draw the typical torque/speed characteristics of the single phase induction motor.

(ii) State how the direction of rotation of a single phase induction motor can be changed (7marks)

c) Explain briefly why a single phase motor is not self-starting (5 marks)