Register Number: ………….

B.E DEGREE EXAMINATIONS: JUNE 2015

(Regulation 2013)

Second Semester

U13EET211: BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to AUTO & MECH)

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions

PART A (10 x 1 = 10 Marks)

1. Electric charge is measured in which of the following units?

   a) Joules   b) Joules/ second

   c) Coulombs   d) Coulombs/ Second

2. _____ is called the rate of flow of charge

3. The self-inductance of a coil is given by the relation as

   a) $N \phi/V$ b) $N \phi/I$

   c) $N^2 \phi /I$ d) $N^2 \phi / V$

4. When the current changing at the rate of one-ampere/second induces one volt in a coil is said to have a self inductance of one _____.

5. The relationship between frequency (F) and Time period (T) of the AC wave is given as

   a) $F = T$ b) $F = 1/T$

   c) $F = T^2$ d) $F = 1/ T^2$

6. An AC circuit has a resistance of 10 Ω and impedance of 20 Ω. The power factor of the circuit is _____.

7. The back EMF (E_b) of a DC motor is given by the relation as

   a) $E_b = V - I_a R_a$ b) $E_b = V + I_a R_a$

   c) $E_b = I_a R_a / V$ d) $E_b = V/ I_a R_a$

8. Power transformer transfers electric power from primary circuit to secondary circuit without change of _____.

9. The Common-Emitter forward amplification factor is given as

   a) I_c/ I_e b) I_c/ I_b

   c) I_e/ I_b d) I_b/ I_e

10. A Common-Emitter amplifier produces a phase reversal of _____ degrees in the input signal.

PART B (10 x 2 = 20 Marks)
(Not more than 40 words)

11. State Ohms law and how will you relate current, voltage and resistance?

12. Find the power of the electric kettle carries a current of 8 A when it is connected across 240 V supply.

13. Relate magnetic flux, MMF and reluctance in a magnetic circuit?

14. Draw the hysteresis loop for iron and silicon steel.

15. Determine the frequency of the AC sinusoidal voltage whose angular velocity is 318 radians / second.

16. Define the term RMS value of an alternating current

17. Name the type of input and output energy of a DC motor

18. What are the attributes of ideal transformer?

19. Draw the symbol and name the terminals of semi-conductor diode and PNP transistor.

20. Draw the symbol and write its truth table of logical NAND gate.

PART C (5 x 14 = 70 Marks)
(Not more than 400 words)

Q.No. 21 is Compulsory

21.   (i)   Show that the capacitance for a parallel plate capacitor having uniform dielectric (6) medium is directly proportional to the area of plates and inversely proportional to distance between the plates

    (ii) Evaluate the capacitance and energy stored in a parallel plate capacitor which (8) consists of two metal plates each 100 sq-cm separated by a dielectric of 1.5 mm thickness and relative permittivity of 3.5. The voltage applied across the capacitor is 1 KV.

22 a)   (i)   State and explain the Faradays laws of electro-magnetic induction.   (8)

      (ii) A coil of resistance 50 Ω is placed in a magnetic field of 1.5 m Web. The coil (6) has 200 turns and a galvanometer of 500 Ω resistance is connected in series with it. Find the average EMF and the current if the coil is moved in 0.1 second from the given field to field strength of 0.5 m Web.

(OR)

  b)   (i)   Describe about the following terms: (8)

      (A) Self inductance   (B) Mutual inductance   (C) Coefficient of coupling

(ii) The inductance of a coil is 0.2 H. The coil has 200 turns. Determine the (6) following:

    (A) Total magnetic flux through the coil when the current is 5A.

    (B) Energy stored in magnetic field.

    (C) Voltage induced in the coil when the current is reduced to zero in 0.01 second.

23. a) (i) Prove that the average power absorbed by a pure inductance circuit connected to (6) AC sinusoidal voltage is Zero.

    (ii) A coil of pure inductance of value 318 mH and a resistance of 200 Ω are (8) connected in series. This series combination is connected to a 240 V, 50 Hz, AC supply. Evaluate the following:

(A) Inductive reactance (B) Impedance (C) Supply current (D) Voltage across inductance (E) Voltage across R (F) Phase angle   (G) Power factor of the circuit (H) Active power of the circuit.

(OR)

b) (i) Build the relationship between the line and phase currents, line and phase (6) voltages for a 3-phase star and delta connected systems.

    (ii) Three loads, each of resistance 50 Ω are connected in star to a 400 V, 50 Hz (8) 3-ph AC supply. Determine the following :

(A) Phase voltage   (B) Phase current   (C) Line current (D) 3-phase power absorbed by the circuit.

24. a) (i) Explain with a neat diagram the construction and working of cage and slip ring (10) Induction motor.

    (ii) Construct the Torque –slip characteristics of 3-ph Induction motor and comment (4) on its shape.

(OR)

b) (i) Describe characteristics of DC shunt and DC series motor. (7)

     (A) Torque versus armature current   (B) Speed versus armature current

    (C) Speed versus Torque

    (ii) Explain with a neat diagram the principle of operation of single phase (7) Transformer.

25. a) Draw the circuit of Full-wave bridge rectifier circuit and explain its working with the help of input and output waveforms. Also show the effect of filter capacitance on its output waveform.

(OR)

b) Draw a neat common–emitter test circuit of NPN transistor and plot all the static characteristics.

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