

Code: CSIT5, IT1T5

I B. Tech - I Semester – Regular Examinations - January 2015

BASIC ELECTRICAL ENGINEERING
(Common to CSE & IT)

Duration: 3 hours

Max. Marks: 70

PART – A

Answer *all* the questions. All questions carry equal marks

11 x 2 = 22 M

1. a) What are the Kirchhoff's laws?
- b) Define self and mutual inductance of the magnetic circuits.
- c) Define Average and RMS values and form factor.
- d) Explain the difference between dynamically and statically induced emf.
- e) Define the resonance and prove that the power factor of RLC circuit is unity at resonance condition and draw its phasor diagram.
- f) What are the types of DC motors?
- g) Explain the necessity of 3 pt starter.
- h) Explain the principle of operation of 3 Φ induction motor.
- i) Explain why an induction motor cannot run at synchronous speed?
- j) Explain the various losses occurring in transformer.
- k) Explain the various requirements for successful operation of any indicating Instruments.

PART – B

Answer any **THREE** questions. All questions carry equal marks. 3 x 16 = 48 M

2. a) Derive the necessary expressions for the network transformation from star to delta and delta to star? 8 M

b) A combination of two resistors, of 3 ohms and 6 ohms in parallel, is connected to resistance of 4 ohms in series. The network is supplied current from a 6 volts battery. Determine 8 M

- i) current in each branch
- ii) the power dissipated in the circuit
- iii) the power dissipated in the each branch

3. a) Compare the magnetic and electric circuits in terms of their similarities and dissimilarities? 8 M

b) A solenoid 1 meter length and 10 cm in diameter has 5000 turns. Calculate 8 M

- i) approximate inductance and
- ii) the energy stored in the magnetic field when a current of 2 A flows in the solenoid.

4. a) Explain 8 M

- i) Power factor
- ii) Power triangle
- iii) Average value
- iv) Series resonance
- v) AC through inductor and a capacitor.

- b) A choke coil having inductance of 0.016 H with negligible resistance is connected to 200 Volts, 50 Hz supply. What will be the current if the frequency is 8 M
- i) decreased to 25 Hz.
 - ii) increased to 60 Hz.

5. a) Derive the expression for torque developed by a d.c motor. 8 M

b) Draw and explain the Torque-Slip characteristics of 3-phase Induction Motor. 8 M

6. a) A 10 KVA, 500/250V 1-phase transformer has its maximum efficiency of 94% when delivering 90% of its rated output at unity power factor. Estimate its efficiency when delivering its full-load output at 0.8 lagging power factor. 8 M

b) Explain the principle and working of a permanent magnet moving coil (PMMC) instrument. 8 M