

Code: EM2T4

I B.Tech-II Semester-Regular Examinations - July 2014

BASIC ELECTRICAL ENGINEERING
(Electronics & Computer Engineering)

Duration: 3 hours

Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1. a) State and explain Ohm's law. 7 M
b) Classify the types of circuit elements. 7 M
2. a) State and explain the laws of magnetic force. 7 M
b) Explain the two ways of inducing emf in a conductor linking the flux changes. 7 M
3. a) Explain and deduce expression for the self inductance of a coil and mutual inductance between two current carrying coils. 7 M
b) A flux density of 1.2 wb/m^2 is required in 2mm air gap of an electromagnet having an iron path 1m long. Calculate the mmf required, assuming a relative permeability of iron as 1500. Neglect leakage. 7 M
4. a) Derive the emf equation of transformer. 7 M
b) A single phase, 50 hz transformer has square core of 20cm side. The permissible maximum flux density in the core is

1 wb/m^2 . Calculate the number of turns per limb on the HV and LV sides of 3300/230V to allow the insulation of stampings, assume the net iron area to be 90% of gross iron area. 7 M

5. a) Explain the operation of commutator in DC machines. 7 M

b) Derive the emf equation of DC generators. 7 M

6. a) Define torque in induction motors. Obtain an expression for the torque developed by the rotor of induction motor. 7 M

b) A 6 – pole, three phase, 50Hz induction motor is running at full load with a slip of 4%. The rotor is star connected and its resistance and standstill reactance are 0.25Ω and 1.5Ω per phase. The emf between slip rings is 100V. Find the rotor current per phase and power factor assuming the slip rings are short circuited. 7 M

7. a) Explain the operation and characteristics of PMDC motor. 7 M

b) Explain the operation and characteristics of single phase capacitor motors. 7 M

8. a) What are the essential torque requirements to ensure proper operation of indicating instruments? Explain. 7 M

b) Discuss the working features of digital meters. 7 M