

Code: **EM2T4**

**I B.Tech-II Semester-Regular Examinations - July 2013**

**BASIC ELECTRICAL ENGINEERING**  
**(For Electronics Computer Engineering)**

Duration: 3 hours

Marks:  $5 \times 14 = 70$

Answer any FIVE questions. All questions carry equal marks

1. a) Explain specific resistance and conductance of a given material. 7 M
- b) Classify the material substances based on energy band theory. 7 M
2. a) Explain the magnetic effects of electric current. 7 M
- b) A conductor of 100cm length carrying a current of 100A is placed in and at right angles to a uniform magnetic field produced by the pole core of an electrical machine. If the pole has a circular cross section of 120mm diameter and the total flux in the core is 16mwb, find the
  - (i) mechanical force on the conductor and
  - (ii) power required to move the conductor at right angles to the magnetic field. 7 M
3. a) Compare the electric and magnetic circuits in terms of their similarities and dissimilarities. 7 M

- b) An iron ring has a mean diameter of 15cm, a cross section of  $20\text{cm}^2$  and a radial gap of 0.5mm cut in it. It is uniformly wound with 1500 turns of insulated wire and a magnetizing current of 1A produces a flux of 1Wb. Neglecting the effect of magnetic leakage and fringing, calculate the
- (i) reluctance of magnetic circuit and
  - (ii) relative permeability of iron. 7 M
4. a) What is voltage transformation ratio and classify the transformers based on their voltage transformation ratio. 7 M
- b) State and explain various losses in transformers. 7 M
5. a) Explain the constructional details of DC machines. 7 M
- b) Derive an expression for torque produced in the shaft of DC motor. 7 M
6. a) Explain the constructional details of three phase induction motors. 7 M
- b) Derive an expression for the slip and rotor current frequency of induction motors. 7 M
7. a) Explain the construction and operation of shaded pole motor. 7 M

b) Explain the operation and characteristics of universal motor. 7 M

8. a) Explain the construction and working of PMMC type instruments. 7 M

b) Explain the construction of dynamo meter type instruments. 7 M