

I B.Tech YEAR(R05) Supplementary Examinations, May/June 2010

BASIC ELECTRICAL ENGINEERING

(Common to Computer Science & Engineering, Information Technology and Computer Science & Systems Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) What is meant by electrical power? Give different forms of expressions for electrical power with units?
(b) Define electrical energy and its units?
(c) A current of 5 Amps. flows in a resistor of resistance 8 ohms. Determine the rate of heat dissipation and also the heat dissipated in 10 minutes? [6+4+6]
2. (a) What is meant by resistance? Give an expression for resistance in terms of its dimension and derive the same.
(b) An aluminum wire 400 Mts. long has a resistance of 0.30 ohms. Find its area of cross section. Find the area of cross section required if the wire is of copper. (Specific resistance of copper and aluminum are 1.75×10^{-8} and 2.8×10^{-8} ohm-met). [6+10]
3. (a) Derive an expression for the attraction force F of an electromagnet.
(b) A smooth core armature working in a two pole field magnet has an air gap (from iron to iron) of 1cm. The area of surface of each pole is 100cm^2 . The flux per pole is 0.1wb. find.
i. the mechanical force exerted by each pole on the armature
ii. The energy in joules stored in the two air gaps. [8+8]
4. (a) Define the following
i. Alternating Quantity
ii. R.M.S. Value
iii. Average value
iv. Form factor.
(b) A coil having a resistance of 10 ohms and an inductance of 0.2H is connected in series with a 100×10^{-6} F capacitor across a 230V, 50Hz supply, Calculate
i. The active and reactive components of the current
ii. the voltage across the coil, Draw the phasor diagram. [8+8]
5. (a) Derive an emf equation of a single phase transformer .
(b) The maximum flux density in the core of 250 /3000 Volts 50 HZ single phase transformer is 1.2 webers per square meter. If the emf per turn is 8 volts determine primary and secondary turns and area of the core. [8+8]
6. (a) Derive the torque equation of a dc motor.
(b) A 250 volts dc shunt motor takes 80 A at full load. Resistances of armature and field windings are 0.1 ohm and 125 ohms respectively. Determine
i. armature current
ii. field current
iii. back emf developed at full load. [8+8]
7. (a) Explain the working principle of three phase induction motor.
(b) A 6 pole induction motor is fed by three phase 50 HZ supply and running with a full load slip of 3%. Find the full load speed of induction motor and also the frequency of rotor emf. [8+8]
8. (a) Discuss the classification of electrical instruments.
(b) Explain the significance of controlling torque and damping torque relevant to the operation of indicating instruments. [8+8]
