Code :R5100506

R5

B.Tech I Year (R05) Supplementary Examinations, December 2010
BASIC ELECTRICAL ENGINEERING
(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
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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?

2. (a) Explain the division of current in the parallel branches

   (b) A circuit consists of three resistances of 12, 18 and 36 ohms respectively by joined in parallel and the combination is connected in series with a resistance of 12 ohms. The whole circuit is connected to 60V supply. Calculate current in each branch, total current drawn and power dissipated in each resistor.

3. (a) Explain the following terms :
   i. Permeability
   ii. Relative permeability
   iii. Reluctance
   iv. Magnetic field strength.

   (b) A steel magnetic circuits has a uniform cross- sectional area of $4cm^2$, and a length of 80 cm. A coil of 250 turns is wound uniformly over the magnetic circuit. When the current in the coil is 1.5 A the total flux established is 0.25×10^{-3} wbs. When the current is 5A, the total flux established is 0.6×10^{-3} wbs. For each value of the current, calculate
   i. magnetic field strength and
   ii. The relative permeability of the steel.

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.

5. What is an ideal transformer . Derive an expression for insuced emf in a transformer in terms of frequency the maximum value of flux, and the number of turns on the winding.

6. (a) Derive the expression generated emf in a dc generator.

   (b) Calculate the emf generated by a 4 pole wave wound armature having 45 slots with 18 conductors per slot when driven at 1000 rpm. The flux per pole is 0.02 webers.

7. Explain with the help of suitable diagrams how rotating magnetic field is produced in a three phase induction motor.

8. Explain the following with reference to the indicating instruments

   (a) Deflecting torque

   (b) Controlling torque

   (c) Damping torque

   (d) Scale and pointer

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