Code: 9A14301

R09

II B.Tech I Semester (R09) Supplementary May 2012 Examinations
ELECTRICAL ENGINEERING
(Mechatronics)

Time: 3 hours **Max. Marks: 70**

Answer any FIVE questions
All questions carry equal marks

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1. (a) State and explain Kirchhoff's laws.
   (b) Define and explain circuit components.

2. (a) Explain the types of sources in detail.
   (b) State and explain maximum power transfer theorem.

3. (a) Derive the expression for rms value of a sinusoidal current wave.
   (b) Show that power dissipated by pure inductive circuit excited by a sinusoidal source is zero.

4. (a) Explain the principle of operation of transformers.
   (b) A single phase transformer working at unity power factor has an efficiency of 90 % at both half load and at full load of 600 W. Determine the efficiency at 80 % of full load.

5. (a) Derive the emf equation of DC generators.
   (b) A 4-pole DC shunt generator with lap connected armature supplies a load of 100 A at 200 V. The armature resistance is 0.1 ohm and the shunt field resistance is 800 ohm. Find the total armature current and emf generated.

6. (a) Explain the principle and operation of DC motors.
   (b) A 500 V DC shunt motor takes 4 A on no load the armature resistance including that of brushes is 0.2 ohm and the field current is 1.0 A. Estimates the output and efficiening when the input current is 20 A.

7. (a) Define and explain slip of 3-phase induction motor.
   (b) Calculate the synchronous speed, slip and rotor frequency of a 3-phase 50 Hz, 4-pole induction motor running at 1440 rpm.

8. Explain the principle and operation of moving iron instruments with neat diagrams.

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