GUJARAT TECHNOLOGICAL UNIVERSITY
B E Sem-VI Examination May 2011

Subject code: 160901
Subject Name: Electrical Machine - III

Date:16/05/2011   Time: 10.30 am – 01.00 pm
                                                   Total Marks: 70

Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Explain Hopkinson's test for determination of efficiency of DC shunt **07** machine.
(b) What are the advantages of connecting alternators in parallel? Explain with **07** diagram three dark lamp method of synchronizing two three phase alternators.

Q.2 **(a)** Describe the construction and working principle of a reluctance motor. **07**
(b) A 3-phase, 8-pole, 750 rpm star-connected alternator has 72 slots on the **07** armature. Each slot has 12 conductors and winding is short chorded by 2 slots. Find the induced emf between lines, given the flux per pole is 0.06 Wb.
OR
(b) Explain coil span factor and distribution factor of an alternator. **07**

Q.3 **(a)** Write short note on Field test for DC series machines. **07**
(b) Explain construction and working principle of hysteresis motor. **07**
OR
Q.3 **(a)** Two identical DC machines when tested by Hopkinson's test gave the **07** following test results:
    Field currents are 2.5 A and 2 A. Line voltage is 220 V. Line current including both the field currents is 10 A. Motor armature current is 73 A. The armature resistance of each machine is 0.05 ohm. Calculate the efficiency of both machines.

(b) Write short note on AC servo motor. **07**

Q.4 **(a)** Briefly explain the ZPF method of finding the voltage regulation of **07** Alternator.
(b) What is armature reaction? Explain the effect of armature reaction on the **07** terminal voltage of an alternator.
OR
Q.4 **(a)** What are the causes of harmonics in the voltage waveform of an alternator? **07** How can these be minimized?
(b) Explain the two reaction theory of salient pole synchronous machine. **07**

Q.5 **(a)** Explain an experimental method of determining 'V' curves for a **07** synchronous motor.
(b) Briefly explain the principles of operation of DC servo motor and PM **07** synchronous motor.

Q.5 **(a)** Explain circle diagram of auto synchronous motor. **07**

(b) (i) Discuss different torques in synchronous motor. **04**

(ii) Draw experimental setup diagram of Brake test for DC motor and write **03** down its efficiency equation.

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