Seat No.:	Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC SEM-II Examination May 2012

Subject code: X20903

Subject Name: Electrical Machines I & II	
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Date: 25/05/2012 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.
- (a) Draw and explain the vector diagrams when the single phase transformer $\mathbf{Q.1}$ 07 in on ON- Load condition. A 4-pole, 500 V shunt motor has 720 wave connected conductors in the 07 armature. The field resistance is 250 Ω and line current is 40 A. The flux per pole is 0.03 Wb. The armature resistance is 0.2 Ω and the contact drop is 1 V per brush. Calculate the full load speed of the motor. **Q.2** Why starters are use to start D.C. motors. Explain three point starter with **07** diagram. **(b)** Discuss the main parts of D.C. generator with their applications. 07 **(b)** Explain different speed control methods for dc series & dc shunt motor. 07
- Q.3 **07** (a) Derive the equation of torque under starting and running condition for induction motor.
 - **(b)** Explain working principle of single phase transformer. Also derive emf **07** equation.

- Q.3 Explain the difference between cylindrical and salient pole rotors used in 07 large alternator. Define (1) pitch factor (2) Distribution factor (3) Form factor.
 - **(b)** Explain equivalent circuit of single phase transformer. 07
- **Q.4** Explain the operating principle of synchronous motor. Draw the vector 07 diagrams when the synchronous motor runs at under excitation and over
 - (b) State different methods for finding voltage regulation of alternator. 07 Explain in brief any one of them.

OR

- **Q.4** Explain rotating magnetic field theory for three phase induction motor. 07 (a)
 - Explain why the induction motor is self starting. Also explain term 'slip'. **07 (b)**
- Q.5 Explains open circuit and short circuit tests of a 1-phase transformer. **07** (a) Discuss their importance.
 - **(b)** Explain the internal and external characteristics of D.C. shunt generator. 07
- What are different type of losses occur in transformer? Derive the **Q.5** 07 condition of maximum efficiency.
 - Explain the principle of D.C. generator. Also derive emf equation of D.C. **07** generator.
