Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC SEM-II Examination May 2012

Subject code: X20903

Subject Name: Electrical Machines I & II

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.**

Q.1	**(a)**	Draw and explain the vector diagrams when the single phase transformer in on ON- Load condition.	**07**
	(b)	A 4-pole , 500 V shunt motor has 720 wave connected conductors in the 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.	**07**
Q.2	**(a)**	Why starters are use to start D.C. motors. Explain three point starter with diagram.	**07**
	(b)	Discuss the main parts of D.C. generator with their applications.	**07**
		OR	
	(b)	Explain different speed control methods for dc series & dc shunt motor.	**07**
Q.3	**(a)**	Derive the equation of torque under starting and running condition for induction motor.	**07**
	(b)	Explain working principle of single phase transformer. Also derive emf equation.	**07**
		OR	
Q.3	**(a)**	Explain the difference between cylindrical and salient pole rotors used in large alternator. Define (1) pitch factor (2) Distribution factor (3) Form factor.	**07**
	(b)	Explain equivalent circuit of single phase transformer.	**07**
Q.4	**(a)**	Explain the operating principle of synchronous motor. Draw the vector diagrams when the synchronous motor runs at under excitation and over excitation.	**07**
	(b)	State different methods for finding voltage regulation of alternator. Explain in brief any one of them.	**07**
		OR	
Q.4	**(a)**	Explain rotating magnetic field theory for three phase induction motor.	**07**
	(b)	Explain why the induction motor is self starting. Also explain term 'slip'.	**07**
Q.5	**(a)**	Explains open circuit and short circuit tests of a 1-phase transformer. Discuss their importance.	**07**
	(b)	Explain the internal and external characteristics of D.C. shunt generator.	**07**
		OR	
Q.5	**(a)**	What are different type of losses occur in transformer? Derive the condition of maximum efficiency.	**07**
	(b)	Explain the principle of D.C. generator. Also derive emf equation of D.C. generator.	**07**

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