Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–V • EXAMINATION – WINTER 2013

Subject Code: X20903 **Date: 26-12-2013**

Subject Name: Electrical Machines I and II

Time: 02.30 pm - 05.00 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)**	Compare field control and armature voltage control methods of speed control of D.C. motor.	**07**
	(b)	Explain Three point starter for D.C. shunt motor.	**07**
Q.2	**(a)**	Explain speed control methods for three phase induction motor.	**07**
	(b)	Derive the E.M.F. equation of single phase transformer and explain effect of turns ratio on output voltage.	**07**
		OR	
	(b)	Explain synchronization of alternators. Which conditions must be satisfied for proper synchronization of 3-phase alternators?	**07**
Q.3	**(a)**	Explain construction ,working principle of single phase transformer.	**07**
	(b)	An ideal 25 KVA transformer has 500 turns on the primary winding and 40 turns on the secondary winding. The primary is connected to 3000 V,50 Hz supply. Calculate (1) primary and secondary currents on full load (2) secondary e.m.f. (3) maximum core flux.	**07**
		OR	
Q.3	**(a)**	Explain construction ,working principle of 3 phase induction motor	**07**
	(b)	3-phase Induction motor has star connected stator winding & runs at 230V,50Hz supply, The rotor resistance & reactance 0.3Ω & 0.9Ω.The ratio of stator to rotor Turns is 1.75 ,full load slip is 5%,Calculate (i)The full load torque in Kg-m (ii) Speed at max. torque(iii)Rotor E.M.F./phase at maximum torque	**07**
Q.4	**(a)**	Differentiate between self-excited and separately excited d.c. machines. Draw the load characteristics of shunt, series and compound generators.	**07**
	(b)	Explain the difference between cylindrical and salient pole rotors used in large alternator .	**07**
		OR	
Q.4	**(a)**	Explain Power stages of 3 phase induction motor.	**07**
	(b)	Explain Torque speed characteristics of 3 phase induction motor.	**07**
Q.5	**(a)**	Explain (i)Back Pitch (ii)Front pitch (iii)Commutator Pitch (iv)Pitch of a winding	**07**
	(b)	A 50KVA,230Volts,50Hz single phase alternator has armature resistance 0.015Ω & leakage reactance 0.08Ω,Compute voltage induce, when alternator delivering full load at (i)Unity (ii) 0.7leading (iii) 0.7lagging	**07**
		OR	
Q.5	**(a)**	Explain various applications of Synchronous motor	**07**
	(b)	Explain synchronous impedance method for finding voltage regulation of an alternator.	**07**

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