Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER – II • EXAMINATION – WINTER 2012

Subject code: X 20903 Date: 22/01/2013

Subject Name: Electrical Machines I and II

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 construction of dc machine	**07**
	(b)	Explain open circuit and short circuit test on single phase transformer	**07**
Q.2	**(a)**	Explain speed control of dc series and shunt motor by armature control and flux control method	**07**
	(b)	Consider a 4-KVA , 200/400 V single-phase transformer supplying full-load current at 0.8 lagging power factor . The O.C /S.C test results are as follows O.C.Test:- 200 V 0.8 A 70 W (L.V Side) S.C. Test:- 20 V 10 A 60 W (H.V Side) Calculate efficiency ,secondary voltage and current into primary at the above load	**07**
		OR	
	(b)	A 4-pole ,220 V shunt motor has 540 lap-connected conductors. It takes 32 A from the supply mains and develops output power of 5.595 KW. The field winding takes 1 A. the armature resistance is 0.9 Ω and the flux per pole is 30 mwb. Calculate (1) speed and (2) torque developed in N.m	**07**
Q.3	**(a)**	Explain torque-slip characteristic of induction motor	**07**
	(b)	Explain the synchronous impedance method to predetermine voltage regulation of alternator	**07**
		OR	
Q.3	**(a)**	Explain working principle of Induction motor	**07**
	(b)	Explain the MMF method to predetermine voltage regulation of alternator	**07**
Q.4	**(a)**	Explain working principle of synchronous motor also explain different methods of starting of synchronous motor	**07**
	(b)	Explain three point starter	**07**
		OR	
Q.4	**(a)**	Explain various methods of measurement of slip of induction motor	**07**
Q.4	**(b)**	From the following test results , determine the voltage regulation of a 2000-V , 1 –phase alternator delivering a current of 100 A at (i) unity power factor(ii) 0.71 lagging power factor Test results:-Full-load current of 100 A is produced on short-circuit by a field excitation of 2.5 A. An e.m.f of 500 V is produced on open-circuit by the same excitation . the armature resistance is 0.8Ω	**07**

Q.5	**(a)**	Explain working principle of transformer at loaded condition with vector diagram	**07**
	(b)	Derive EMF equation in dc machine also explain types of dc generators	**07**

OR

Q.5	**(a)**	Explain voltage build-up process in dc shunt generator	**07**
	(b)	A 12 –pole , 3-phase , 600 V , 50 Hz star connected induction motor has rotor-resistance & standstill reactance of 0.03 Ω and 0.5 Ω per phase respectively. Calculate (a) Speed of maximum torque (b) Ratio of full-load to maximum torque . if the full- load speed is 495 rpm	**07**

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