Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–VI. EXAMINATION – SUMMER 2016

Subject Code:X60901 **Date:11/05/2016**

Subject Name:Electrical Machine-III

Time:10:30 AM TO 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 working principle and construction of AC Servomotor.	**07**
	(b)	Two identical DC machines when tested by Hopkinson's test gave the 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.	**07**
Q.2	**(a)**	Explain Field test for determination of efficiency of DC series machine.	**07**
	(b)	A 3-phase, 8-pole, 750 rpm star-connected alternator has 72 slots on the 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.	**07**
		OR	
	(b)	Describe the construction and working principle of a reluctance motor.	**07**
Q.3	**(a)**	Explain swinburn test for determination of efficiency of DC shunt machine.	**07**
	(b)	Explain coil span factor and distribution factor of an alternator.	**07**
		OR	
Q.3	**(a)**	Explain construction and working principle of hysteresis motor.	**07**
	(b)	Explain MMF method of finding the voltage regulation of Alternator.	**07**
Q.4	**(a)**	Explain coil span factor and distribution factor of an alternator. Also derive E.M.F. equation for alternator.	**07**
	(b)	A 500 V,25 hp, dc shunt motor takes 2.4 A while running light. The field and armature resistances are 650 Ω and 0.57 Ω respectively. Calculate full load efficiency, assuming a brush drop of 2 V.	**07**
		OR	
Q.4	**(a)**	Explain the effect of armature reaction on the terminal voltage of an alternator	**07**
	(b)	Explain slip test for alternator.	**07**
Q.5	**(a)**	What are the causes of harmonics in the voltage waveform of an alternator? How can these be minimized?	**07**
	(b)	Explain an experimental method of determining 'V' curves for a synchronous motor	**07**
		OR	
Q.5	**(a)**	Briefly explain the principles of operation of DC servo motor and PM synchronous motor.	**07**
	(b)	Explain synchronization of alternators.	**07**

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