Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VI (OLD).EXAMINATION – WINTER 2016

Subject Code: 160901 **Date: 27/10/2016**

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)**	What is armature reaction? Explain the effect of armature reaction on the Terminal voltage of an alternator.	**07**
	(b)	Explain Hopkinson's test for determination of efficiency of DC shunt Machine.	**07**
Q.2	**(a)**	What are the advantages of connecting Alternators in parallel? Explain with diagram three dark lamp method of synchronizing two three phase Alternators.	**07**
	(b)	Explain brake test for DC machine.	**07**
		OR	
	(b)	Describe the construction and working principle of a reluctance motor.	**07**
Q.3	**(a)**	Explain V and inverted V curves of synchronous motor.	**07**
	(b)	Why synchronous motor is not self-starting? Explain the methods of starting of synchronous motor.	**07**
		OR	
Q.3	**(a)**	Derive emf equation of alternator. Explain distribution factor with effect of harmonics.	**07**
	(b)	Explain the effect of varying excitation at constant load on synchronous motor.	**07**
Q.4	**(a)**	List different methods for finding voltage regulation of an alternator and explain Potier method.	**07**
	(b)	Find the Synchronous impedance and reactance of an alternator in which a given field current produces an armature current of 200amp on short circuit and a generated e.m.f of 50v on open circuit. The armature resistance is 0.1 Ω. To what induced voltage must the alternator to be excited if it is to deliver a load of 100Amp at a p.f of 0.8 lagging. With a terminal voltage of 200V.	**07**
		OR	
Q.4	**(a)**	Explain the two reaction theory of salient pole machine in detail with phasor diagram.	**07**
	(b)	The Synchronous reactance per phase of a 3phase star connected 6600volt synchronous motor is 10Ω/ph. For a certain load, the input is 900Kw and the induced line e.m.f is 8900(Line Value) volt. Evaluate the line current. Neglect resistance.	**07**

Q.5	**(a)**	A 3ph, 16pole, alternator has a star connected winding with 144 slots and 10 conductors per slot. The Flux per pole is 0.03, sinusoidally distributed and the speed is 375r.p.m. Find the frequency, r.p.m and the phase and line e.m.f. assume full pitched Coil.	**07**
	(b)	What are the causes of harmonics in the voltage waveform of an alternator? How can these be minimized?	**07**

OR

Q.5	**(a)**	Explain construction and working principle of hysteresis motor.	**07**
	(b)	Write short note on AC servo motor.	**07**

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