Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC SEMESTER VI– EXAMINATION – SUMMER 2017

Subject Code: X60901 **Date: 29/04/2017**

Subject Name: Electrical Machine-III

Time: 10.30AM to 01.00PM **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 slip test for determining Xd and Xq of salient pole synchronous machine. Draw circuit diagram.	**07**
	(b)	Explain constructional features of alternator. Also explain its types and corresponding application fields for alternators.	**07**
Q.2	**(a)**	Explain hunting of synchronous machines and methods of its prevention.	**07**
	(b)	Explain coil span factor and distribution factor of an alternator.	**07**
		OR	
	(b)	Derive e.m.f. equation of alternator. Explain distribution factor with effect of harmonics.	**07**
Q.3	**(a)**	Explain Hopkinson's test for determination of efficiency of DC shunt machine.	**07**
	(b)	What are the advantages of connecting alternators in parallel? Draw circuit diagram for one dark and two bright lamp method.	**07**
		OR	
Q.3	**(a)**	Explain an experimental method of determining 'V' curve for a synchronous motor.	**07**
	(b)	Following data is obtained when two DC shunt machines were tested by Hopkinson's test: Supply voltage = 230 V, Supply current = 2.6 A, Current taken from generating machine = 4.5 A, Field current of generator = 0.5 A, Field current of motor = 0.4A, Ra = 2 Ω, Calculate efficiency for machine working as a motor.	**07**
Q.4	**(a)**	Explain working principle and construction of AC servomotor.	**07**
	(b)	A 2 MVA, 3-phase, 8 pole alternator is connected to 6000 V, 50 Hz bus bar and has synchronous reactance of 4 Ω/ph. Find synchronizing power and torque per mechanical degree of rotor displacement at no load. Consider normal excitation condition.	**07**
		OR	
Q.4	**(a)**	Explain the construction and working principle of a reluctance motor.	**07**
	(b)	What is voltage regulation of alternator? Explain MMF method to find voltage regulation of alternator.	**07**
Q.5	**(a)**	What synchronous motor is not self start? Explain the methods of starting of synchronous motor.	**07**
	(b)	Explain construction and working of PMBLDC motor.	**07**
		OR	
Q.5	**(a)**	What are the causes of harmonics in the voltage waveforms of an alternator? How they can be minimized?	**07**
	(b)	Explain the Brake test on DC machine.	**07**

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