Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII (OLD) - EXAMINATION – SUMMER 2018

Subject Code: 180904 **Date: 09/05/2018**

Subject Name: Electrical Machine Design -II

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)**	Derive output equation for 3-Phase Induction motor. Explain factors affecting size of Induction motor.	**07**
	(b)	Discuss the factors for estimating the length of the air-gap of 3-Phase Induction motor.	**07**
Q.2	**(a)**	Define SCR of a synchronous machine. Discuss the importance of SCR in the design of synchronous machine.	**07**
	(b)	Describe about shape and sizes of rotor bars in 3-phase induction motor.	**07**
		OR	
	(b)	What is dispersion coefficient ? Explain the effect of it on power factor?	**07**
Q.3	**(a)**	Explain design procedure for stator of single phase Induction Motor.	**07**
	(b)	Prove that the output of single phase machine is two third of that of a three phase machine.	**07**
		OR	
Q.3	**(a)**	Explain design of capacitance for maximum torque in single phase Induction Motor.	**07**
	(b)	Calculate main dimensions and size of conductor of 5 HP, 400 V, 3-phase, 50 Hz, 1500 rpm squirrel cage induction motor. Star-delta starter is used for starting. Average flux density in gap is 0.46 wb/m^2, ampere-conductor/meter is 22000, current density is 4, full load efficiency is 83% and full load power factor is 0.84 lagging.	**07**
Q.4	**(a)**	Discuss the factors affecting the choice of specific magnetic loading for synchronous machine.	**07**
	(b)	Discuss factors affecting selection of no. of armature slots in synchronous machine.	**07**
		OR	
Q.4	**(a)**	What is the role of damper winding in (i) synchronous generator and (ii) synchronous motor?	**07**
	(b)	Write the steps with equations for rotor design of an synchronous machine.	**07**
Q.5	**(a)**	Describe no load current and short circuit current calculation in 3-Phase Induction motor.	**07**
	(b)	How you will estimate MMF required for various parts of magnetic circuit of Synchronous Machines ?	**07**
		OR	
Q.5	**(a)**	Explain determination of Direct and Quadrature axis reactance of Alternator.	**07**
	(b)	Discuss the factors for choice of specific electric loading for 3-Phase Induction motor.	**07**

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