Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER • 2015

Subject Code: 150802 **Date:07/05/2015**

Subject Name: Electrical Machines

Time: 02.30pm-05.00pm **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)**	Describe Hopkinson's test for computing the efficiency and its advantages and disadvantages.	**07**
	(b)	What is armature reaction? Describe the phenomena of armature reaction.	**07**
Q.2	**(a)**	Draw the developed diagram of progressive lap winding for 4 poles and 12 slots armature with two coil sides per slot.	**07**
	(b)	What is mean by tertiary winding? Write applications of tertiary winding.	**07**
		OR	
	(b)	What are the conditions of parallel operation of three phase transformers?	**07**
Q.3	**(a)**	Explain the Scott connection of transformers with diagram and mark the terminals and turn-ratio.	**07**
	(b)	Explain crawling and cogging phenomena for three phase induction motor.	**07**
		OR	
Q.3	**(a)**	Describe in detail any two methods of controlling speed of an Induction motor.	**07**
	(b)	Draw the circle diagram of a 20 hp, 400 V, 50 Hz, 3-Ø star-connected induction motor from the following test data(line values) No Load test =400 V 9 A p.f.=0.2 SC test =200 V 50 A p.f.=0.4 The stator and rotor copper losses are divided equally in the SC test. From the circle diagram find (1) line current and power factor at full load (2) maximum power output.	**07**
Q.4	**(a)**	Explain power developed by a synchronous motor with neat diagram.	**07**
	(b)	Compare Synchronous motors and Induction motors.	**07**
		OR	
Q.4	**(a)**	Obtain V-curves with diagram for synchronous motors. What is its significance?	**07**
	(b)	Explain in detail capacitor start and capacitor run single phase induction motor.	**07**
Q.5	**(a)**	Explain double field revolving theory for single phase induction motor.	**07**
	(b)	Discuss the construction, operation and speed control for the Universal motor.	**07**
		OR	
Q.5	**(a)**	Discuss the construction and working of Permanent Magnet DC (PMDC) motor. Also state its advantages and disadvantages.	**07**
	(b)	Explain the operation of single stack variable reluctance stepper motor. Also discuss about the micro stepping.	**07**

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