Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – WINTER • 2014

Subject code: 1724504 **Date: 04-12-2014**

Subject Name: Advanced Electrical Machines

Time: 02:30 pm - 05:00 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 the construction and working principle of Permanent Magnet (PM) Stepper Motor with suitable diagram. State their applications.	**07**
	(b)	Compare Brushless DC with conventional DC Motors.	**07**
Q.2	**(a)**	Derive voltage equation to represent two magnetically coupled circuits with leakage. Assume magnetic system to be linear.	**07**
	(b)	Explain in brief the working principle of multi stack VR stepper motor with diagram.	**07**
		OR	
	(b)	Derive winding inductances and voltage equations for induction machines.	**07**
Q.3	**(a)**	How energy efficient motors are distinguished from standard motors? Explain the energy evaluation techniques for energy efficient motors.	**07**
	(b)	Explain how the constant voltage and frequency generation is possible with Wind Mill Generator?	**07**
		OR	
Q.3	**(a)**	The phases of 3-phase circuit consist of equal resistances, equal inductances and equal capacitances connected in series. The phases are not coupled. Write the voltage equations in the arbitrary reference frame and draw an equivalent circuit.	**07**
	(b)	Illustrate direct saving and pay back analysis of energy efficient motor.	**07**
Q.4	**(a)**	State the various types of converter used for Switched Reluctance Motor (SRM). Explain any one in brief with suitable diagram.	**07**
	(b)	Discuss in brief the energy efficient motor Standards.	**07**
		OR	
Q.4	**(a)**	List out the reference frames commonly used in the analysis of electric machines and illustrate the significance of each reference frame.	**07**
	(b)	Discuss the recent trends in condition monitoring of electrical machines.	**07**
Q.5	**(a)**	Discuss fault detection and diagnosis technique for Induction Motor.	**07**
	(b)	Compare Linear Induction Machine with Conventional Induction Machine. List the advantages of the linear induction Machine.	**07**
		OR	
Q.5	**(a)**	Illustrate the principle of operation of a linear induction motor and its applications.	**07**
	(b)	Explain the Torque/Speed characteristics of Switched Reluctance Motor (SRM).	**07**

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