Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER II (OLD) – • EXAMINATION – SUMMER 2016

Subject Code: 1720701 Date:17/05/2016

Subject Name: Advanced Electrical Machines

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)**	Explain working principle of BLDC machine. Explain unipolar and bipolar drive circuits used for BLDC machine.	**07**
	(b)	Compare conventional DC machine and Brushless DC Machine.	**07**
Q.2	**(a)**	State different types of stepper motor. Discuss various modes of variable reluctance stepper motor operation.	**07**
	(b)	Compare wind mill generator with synchronous generator. State the significance of capacitor bank in a Squirrel cage induction generator when connected to an isolated load.	**07**
		OR	
	(b)	Explain the working, construction of Linear Induction Motor. Compare LIM and 3-phase induction motor	**07**
Q.3	**(a)**	Justify that, The number of stator pole and rotor pole in a switched reluctance motor are not same. State the merits and demerits of SRM.	**07**
	(b)	Explain fault detection and diagnosis technique for 3 phase Induction motor.	**07**
		OR	
Q.3	**(a)**	Carry out transformation of a balanced set from (a,b,c) to (d,q,0) reference frame.	**07**
	(b)	Derive winding inductances and voltage equations for induction machine. Mention assumptions made for derivation.	**07**
Q.4	**(a)**	Explain direct saving and pay back analysis of energy efficient motor.	**07**
	(b)	Discuss fault detection and diagnosis techniques for transformer.	**07**
		OR	
Q.4	**(a)**	Explain the term vector rotator. Derive expression of vector rotator and explain its significance.	**07**
	(b)	Why reactive power compensation is required for the windmill generator? How it can be obtained?	**07**
Q.5	**(a)**	Derive the equation of total energy supplied to the coupling field for electromechanical system with magnetic and electric field.	**07**
	(b)	Explain segregation method of efficiency evaluation technique.	**07**
		OR	
Q.5	**(a)**	Define the terms (i) Pull-out torque, (ii) Pull-in torque, (iii) Pull-in rate, (iv) Pull-out rate, (v) Response range, (vi) Slewing range and (vii) Synchronism, in a stepper motor.	**07**
	(b)	Explain energy relationship in electromechanical system. Derive the expression for energy stored in a magnetic field. Also define energy and co-energy.	**07**

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