Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. IInd Semester–Remedial Examination – June/July- 2011

Subject code: 720701

Subject Name: Advanced Electrical Machines

Date:22/06/2011 **Time: 10:30 am – 01:00 pm**

Total Marks: 60

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Explain the working principle of PMBLDC machine. Why PMBLDC motor is called an electronically commutated motor?	**06**
	(b)	Derive the equivalent magnetic circuit of PMBLDC machine.	**06**
Q.2	**(a)**	Derive winding inductances and voltage equations for induction machine. Mention assumptions made for derivation.	**06**
	(b)	Determine the expression for fqs, fds and fos for fas=cos(t), fbs= (1/2)t, fcs= -sin(t), assume $\theta(0)= -\pi/12$ and $\omega=1$ rad/sec, for $t= \pi/3$.	**06**
		OR	
	(b)	Discuss block diagram of typical electromechanical system. Explain energy balance in such system.	**06**
Q.3	**(a)**	Explain electromechanical energy conversion in SRM.	**06**
	(b)	Explain (n+1) Switch Converter used for S.R.M.	**06**
		OR	
Q.3	**(a)**	Discuss essential elements in condition monitoring system. Explain the principle of hall effect devices and their benefits over other sensors.	**06**
	(b)	Discuss fault detection and diagnosis technique for transformer.	**06**
Q.4	**(a)**	Explain working principle of multiple stack variable reluctance stepper motor.	**06**
	(b)	Explain working principle of permanent magnet stepper motor. Find the step angle for a 3 phase, 4 pole stepper motor having two stator teeth in one tooth pitch of a stator tooth.	**06**
		OR	
Q.4	**(a)**	Explain the concept of energy efficient motor. Describe various efficiency evaluation techniques.	**06**
	(b)	Explain balanced steady state relationship.	**06**
Q.5	**(a)**	How linear induction machine is different than conventional induction machine? State the Advantage and Disadvantage.	**06**
	(b)	Discuss reactive power compensation of wind mill generator.	**06**
		OR	
Q.5	**(a)**	Compare wind mill generator with synchronous generator. How constant voltage and frequency is achieved in the wind mill generator.	**06**
	(b)	Classify the PMBLDC Machine. Explain difference between BLDC machine and Brushed DC machine.	**06**

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