Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – WINTER • 2013

Subject code: 1724501 **Date: 24-12-2013**

Subject Name: Solid State AC Drives

Time: 10.30 am – 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)**	State the methods of speed control of three phase induction motor and explain cascaded Induction Machines	**07**
	(b)	Explain the field oriented control method for induction motor.	**07**
Q.2	**(a)**	Why stator voltage control is suitable for speed control of Induction Motors in Fan and Pump drives?	**07**
	(b)	Explain vector control of current-fed inverter of induction motor.	**07**
		OR	
	(b)	Explain direct vector control of induction motor with voltage model.	**07**
Q.3	**(a)**	Why current source inverter fed induction motor drive is operated at a constant rated flux?	**07**
	(b)	Explain indirect vector control of induction motor with slip and flux estimation from machine parameters.	**07**
		OR	
Q.3	**(a)**	Variable frequency control of Induction Motor is more efficient than stator voltage control, Why?	**07**
	(b)	Explain direct vector control of induction motor with current model. Give the limitation of the model	**07**
Q.4	**(a)**	What is Direct torque control of Induction motor? Explain control strategy of DTC.	**07**
	(b)	Explain open loop V/f control of voltage source inverter fed for induction motor. What is 'voltage boosting' in a voltage-source inverter, and why is it necessary?	**07**
		OR	
Q.4	**(a)**	Explain closed loop speed control with V/F control and slip regulation. Give the limitation of the model.	**07**
	(b)	Which harmonics are dominant in the output voltage of a six-step inverter? Discuss the effects of these harmonics on the performance of an induction machine fed from a six-step inverter.	**07**
Q.5	**(a)**	Write a brief note on Static Kramer Drive.	**07**
	(b)	Explain the brush and brushless Synchronous motor.	**07**
		OR	
Q.5	**(a)**	An induction motor is controlled using VVVF drive. Discuss how the following varies in the field weakening mode with respect to the variation in frequency (i) Terminal voltage (ii) Maximum Torque (iii) Maximum power (iv) Slip speed (iv) Stator current	**07**
	(b)	Explain self-controlled synchronous motor drive employing load commutated thyristor inverter.	**07**

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