Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – WINTER 2015

Subject Code: 172402 **Date:07/12/2015**

Subject Name: Industrial Drives & Control - II

Time: 10:30am to 1:00pm **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)**	Discuss on modelling of Induction Machine.	**07**
	(b)	Discuss on vector control of Induction Motor drive.	**07**
Q.2	**(a)**	Discuss on Induction Motor speed control by variation of stator voltage.	**07**
	(b)	Draw and explain various connections for stator voltage control of 3-phase Induction Motor.	**07**
		OR	
	(b)	Draw and explain closed loop system for Induction Motor speed control by stator voltage control method.	**07**
Q.3	**(a)**	Draw and explain the thyristor configuration for a stator voltage controlled reversible-speed Induction Motor Drive. Also draw the speed-torque characteristics for a reversible induction motor drive.	**07**
	(b)	The most versatile and reliable variable-speed drive consists of a cage-rotor Induction Motor which is speed controlled by variation of the stator frequency. Explain variable-frequency operation of Induction Motor. Also draw torque characteristics for this motor at constant volts / Hz.	**07**
		OR	
Q.3	**(a)**	Explain the concept of sensor less control of Induction Motor Drive.	**07**
	(b)	Discuss on parameter sensitivity and compensation of vector controlled Induction Motor.	**07**
Q.4	**(a)**	Discuss on constant current operation of stator frequency controlled IM.	**07**
	(b)	Discuss on closed-loop operation of stator frequency controlled Induction Motor. Also explain its control techniques.	**07**
		OR	
Q.4	**(a)**	Discuss on Permanent Magnet AC Motor Drive.	**07**
	(b)	Discuss on speed control of synchronous motor by vector control method.	**07**
Q.5	**(a)**	Draw the block diagram of controlled-slip Induction Motor Drive and explain its operation.	**07**
	(b)	Discuss on constant-torque constant-horsepower operation of variable frequency operated IM. Also draw the typical torque-speed characteristics for such an operation.	**07**
		OR	
Q.5	**(a)**	Draw & explain the schematic diagram of IM speed control by static variation of external rotor resistance. Also discuss on specific field of applications of such a drive.	**07**
	(b)	Explain the sub-synchronous static converter operation of IM under slip-power recovery scheme. Also draw open-loop torque-speed characteristics for the IM of such type of operation.	**07**

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