Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII • EXAMINATION – SUMMER • 2015

Subject code: 172402 **Date: 08/05/2015**

Subject Name: IDC-II

Time: 02.30pm-05.00pm **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)**	Describe the analysis of Induction Motor with 1) Unbalanced rotor impedances 2) Non-sinusoidal voltage supply.	**07**
	(b)	Explain CSI control for IM and compare CSI with VSI giving three points.	**07**
Q.2	**(a)**	Explain stator voltage control of IM along with the torque speed characteristics. Also draw the block diagram indicating the closed loop control of stator voltage using a proper power electronics modulator.	**07**
	(b)	Explain the concept of variable frequency control of IM drive. Why is V/F control preferred over variable frequency control? Give proper reasons.	**07**
		OR	
	(b)	Explain Static Scherbius Drive with a neat diagram and derive the speed-torque relation for the same.	**07**
Q.3	**(a)**	Draw and explain the block diagram of Open loop Volts/Hertz control of Synchronous Machine drives.	**07**
	(b)	A 400 V, 50 Hz, 6 pole, Y-connected IM has the following parameters per phase referred to the stator: $R_s = 0.4\ \Omega$, $R'_r = 0.2\ \Omega$, $X_s = X'_r = 1.5\ \Omega$, $Xm = 30\Omega$. If the motor running at 960 rpm is controlled by variable frequency control at a constant flux of rated value, calculate 1) The rated torque. 2) Motor speed at half the rated torque and 25 Hz.	**07**
		OR	
Q.3	**(a)**	Explain Self-controlled synchronous motor drive using load commutated thyristor inverter.	**07**
	(b)	Derive the expression for flux vector estimation by Current Model.	**07**
Q.4	**(a)**	Describe the Bridge Converter and Split Rail Converter for SRM.	**07**
	(b)	Explain the basic principle of sensor less control of Induction Motor Drives.	**07**
		OR	
Q.4	**(a)**	Write a short note on: 1) Sinusoidal PMAC motor drives 2) Trapezoidal PMAC motor drives	**07**
Q.4	**(b)**	Explain the basic principle of DTFC for Voltage fed PWM inverter drives.	**07**
Q.5	**(a)**	Derive the stator reference model of Induction Motor in Arbitrary Reference Frames.	**07**
	(b)	Explain block diagram of feed-forward vector control for IM.	**07**
		OR	
Q.5	**(a)**	Explain the need of dynamic modeling of Induction Machines giving necessary equations and figures. Also state the assumptions made to derive the dynamic model.	**07**
	(b)	Explain block diagram of feedback vector control for IM.	**07**

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