Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME- SEMESTER II– EXAMINATION – SUMMER 2015

Subject Code: 2722911 **Date:28/05/ 2015**

Subject Name: INDUSTRIAL DRIVES

Time: 2:30 PM – 5:00 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 reference frame theory for electrical machine.	**07**
	(b)	Discuss the characteristics of induction motor with a view to stable operation.	**07**
Q.2	**(a)**	Discuss how the motor efficiency of an inverter fed induction motor varies with frequency.	**07**
	(b)	Explain following terms with respect to the controlled converter. i. Harmonic Factor. ii. Displacement Factor. iii. Input Supply Power Factor.	**07**
		OR	
	(b)	The speed of a 10 hp,230 V,1200 rpm seperately excited dc motor is controlled by a single-phase full converter. The rated motor armature current is 35 A and Ra=0.3 q , AC suppy voltage=250 V, motor voltage constant kaØ=0.182 V/rpm. Assume that suffient inductance is present in the armature circuit to make the motor current contious. Find (i) motor torque (ii) Speed of the motor (iii) supply power factor. For firing angle Ŭ=45°.	**07**
Q.3	**(a)**	Discuss steady state analysis of chopper controlled DC motor drive.	**07**
	(b)	Discuss closed loop operation of DC motor drive with chopper circuit.	**07**
		OR	
Q.3	**(a)**	Write a brief note on modelling of DC machines.	**07**
	(b)	Explain working of four quadrant chopper circuit for DC motor.	**07**
Q.4	**(a)**	Explain closed loop control scheme for controlling the speed of VSI fed induction motor.	**07**
	(b)	Explain v/f control of induction motor with neat diagram. State its area of applications.	**07**
		OR	
Q.4	**(a)**	Describe speed control of an induction motor using static rotor resistance method.	**07**
	(b)	If the speed control of induction motor is achieved by varying the stator voltage, what will be effect on 1.Motor efficiency and 2.Current drawn from the source. Also, enlist various AC voltage controller configurations that can be utilized for stator voltage control.	**07**
Q.5	**(a)**	Explain space vector modulation control.	**07**
	(b)	Explain derating of induction motor due to harmonics present in supply.	**07**
		OR	
Q.5	**(a)**	Discuss the self-control operation of synchronous motor.	**07**
	(b)	Explain indirect vector control scheme for induction motor.	**07**

****