Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– II(New course) • EXAMINATION (Remedial) – WINTER- 2015

Subject Code: 2722911 **Date: 09/12/2015**

Subject Name: INDUSTRIAL DRIVES

Time:2:30 pm to 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)**	Discuss mathematical modeling of an AC machine.	**07**
	(b)	Explain two quadrant DC motor drive operations in detail.	**07**
Q.2	**(a)**	Explain following terms with respect to the controlled converter. (i) Harmonic Factor (ii) Displacement Factor (iii) Input Supply Power Factor	**07**
	(b)	The speed of a 10 kW, 230 V, 1200 rpm separately excited dc motor is controlled by a single phase full wave converter. The rated armature current is 38 A & the armature resistance of the motor is 0.3 ohm, as supply voltage is 260 V, motor voltage constant Kū is 0.182 V/rpm. Find (i) The motor torque. (ii) The speed of the motor. (iii) The supply power factor.For firing angle Ŭ=30°	**07**
		OR	
	(b)	Discuss how the motor efficiency of an inverter fed induction motor varies with frequency.	**07**
Q.3	**(a)**	Explain stator voltage control method for speed control of induction motor. Also discuss why it is suitable for fan type load.	**07**
	(b)	Discuss rotor resistance control of induction motor. Also draw its speed Torque characteristics.	**07**
		OR	
Q.3	**(a)**	In Time Ratio Control of buck chopper circuit supplying to the motor load, prove that the ripple in output current will be maximum for 50% duty cycle. Assume motor draws continuous current.	**07**
	(b)	Explain reference frame theory in brief.	**07**
Q.4	**(a)**	Discuss four quadrant chopper circuit for DC motor.	**07**
	(b)	Compare operation of induction motor operated through current source inverter and voltage source inverter.	**07**
		OR	
Q.4	**(a)**	Explain closed loop control of DC motor operated through chopper circuit.	**07**
	(b)	Explain indirect vector control scheme for induction motor.	**07**
Q.5	**(a)**	Explain Derating of induction motor due to Harmonics present in supply.	**07**
	(b)	Compare speed control of DC motor based on chopper and phase control circuit.	**07**
		OR	
Q.5	**(a)**	Explain Direct torque control method for induction motor	**07**
	(b)	Explain self synchronous operation of synchronous motor drive	**07**