

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– VI (New) EXAMINATION – WINTER 2019****Subject Code: 2160913****Date: 12/12/2019****Subject Name: Control of Electrical Drives****Time: 02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
Q.1	(a) What is an Electric Drive? Give the classification of Electric Drive.	03
	(b) Draw the basic block diagram of Electric Drive and Explain the function of any three blocks.	04
	(c) Explain nature and classification of load torques.	07
Q.2	(a) Explain the method to determine the moment of Inertia (J).	03
	(b) Explain drive parameters for the load with rotational motion.	04
	(c) Discuss the four quadrant operation of electrical drive for hoist load.	07
	OR	
	(c) Explain how static rotor resistance control is achieved during starting of induction motor.	07
Q.3	(a) A 200V DC series motor has armature and field resistance of 0.2 Ω and 0.1 Ω respectively. It takes a current of 20 A from supply while running at 1300 rpm. If an external resistance of 2 Ω is added in series with the motor, calculate the new speed. Assume load torque remains constant.	03
	(b) Draw and explain the dynamic model of DC motor.	04
	(c) Discuss the Single phase fully controlled converter for continuous conduction mode with diagram and waveforms. Also derive the equation for speed in terms of firing angle.	07
	OR	
Q.3	(a) A 200 V, 875 rpm, 150 A separately excited DC motor has an armature resistance of 0.06 Ω . It is fed from a single phase fully controlled rectifier with an AC source of 220 V, 50 Hz. Calculate the firing angle for rated motor torque and 750 rpm. Assume continuous conduction mode.	03
	(b) Compare DC Drive with AC Drive.	04
	(c) Discuss chopper controlled Separately excited DC motor drive operation for motoring mode.	07
Q.4	(a) Compare CSI fed induction motor drive with VSI fed induction motor drive.	03
	(b) Discuss the effect of harmonics on induction motor.	04
	(c) Explain closed loop slip control scheme for induction motor.	07
	OR	
Q.4	(a) Explain operation of doubly fed induction machine in sub synchronous mode.	03
	(b) What are the advantages of V/f control over other scalar control techniques?	04

- (c) Explain constant air gap flux control scheme for induction motor drives. **07**
- Q.5** (a) Write advantages of BLDC motor over conventional DC motor. **03**
- (b) Compare Direct torque control method and field oriented control method. **04**
- (c) Explain the d-q model of induction motor. **07**
- OR**
- Q.5** (a) State application of synchronous motor drive. **03**
- (b) State the advantages and disadvantages of electric traction drives. **04**
- (c) Explain basic structure of solar and battery operated drives. **07**

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