Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) - EXAMINATION – SUMMER 2016

Subject Code:2162003 **Date:06/05/2016**

Subject Name: Control of Electric Drives

Time: 10:30 AM to 01:00 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 why Electrical Drives are widely used? State its Advantage and disadvantages.	**07**
	(b)	State essential parts of Electrical Drives. What are the function of power modulator.	**07**
Q.2	**(a)**	Derive the Equivalent values of drives parameter for Loads with Rotational Movement.	**07**
	(b)	A motor is used to drive a hoist. Motor characteristics are given by Quadrants I,II and IV: T=200 - 0.2N,N-m Quadrants II,III and IV: T= - 200 – 0.2N,N-m When hoist is loaded, the net load torque T_l=100 N-m and when it is unloaded, net load torque T_l=-80 N-m. Obtains the equilibrium speeds for operation in all the four quadrants.	**07**
		OR	
	(b)	A motor-load system has following details: Quadrant I and II,T = 400 - 0.4N.Motor is coupled to an active load torque T_l=±200 N-m. Calculate the speeds for motoring and braking operations in the forward direction. When operating in quadrants III and IV, T= - 400 – 0.4N,N-m.Calculate the equilibrium speed in quadrant III.	**07**
Q.3	**(a)**	Discuss the nature and classification of load torques.	**07**
	(b)	Explain what do you understand by the steady-state stability? What is main assumption?	**07**
		OR	
Q.3	**(a)**	A drive has following equations for motor and load torques: T = (1+2wm) and $T_l = 3\sqrt{wm}$ Obtain the equilibrium points and determine their steady state stability.	**07**
	(b)	Draw the waveform of 1-phase fully controlled converter with R-L-E load with conduction table & performance parameter.	**07**
Q.4	**(a)**	Explain the different control strategy for the varying the duty cycle in chopper.	**07**
	(b)	Derive the expression for the steady state time domain analysis of step down chopper.	**07**
		OR	
Q.4	**(a)**	Explain the armature control method and field control method for DC motor.	**07**
	(b)	Explain the speed control method of 3-phase induction motor.	**07**
Q.5	**(a)**	Explain the operation of single stack variable reluctance stepper motor.	**07**
	(b)	Derive the waveform of 3-phase fully controlled converter with R-L-E load with conduction table & performance parameter.	**07**
		OR	
Q.5	**(a)**	A dc motor is to be selected for driving a load having a large torque of short duration followed by long no-load period. A flywheel of suitable inertia is already mountain on the load shaft. Explain the role of flywheel to overcome	**07**

the load equalization in dc motor drive.

(b) A step up chopper has input voltage of 220 V and output voltage of 660V.If the conducting time of thyristor chopper is 100 μs, compute the pulse width of output voltage. **07**

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