Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VII(NEW) EXAMINATION – SUMMER 2019

Subject Code:2171707   **Date:10/05/2019**
Subject Name:Industrial Drives and Control
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)	Define the base speed in DC shunt motor		03
	(b)	Discuss various methods for scalar control of induction motor.		04
	(c)	Write characteristic equation for DC series and DC shunt motors. Give state space model for both these motors.		07
Q.2	(a)	Enumerate important components of electric motor drives.		03
	(b)	Which are the torque producing and flux producing components of DC shunt motor. Draw vector relationship of these components.		04
	(c)	Explain four quadrant operation of DC motor drive.		07
		OR		
	(c)	Give block diagram representation of working of DC series motor and derive its transfer function.		07
Q.3	(a)	List out various chopper topologies known to you.		03
	(b)	Explain inversion mode of chopper operation.		04
	(c)	Give output voltage waveform of full wave controlled rectifier, driving DC shunt motor, for both continuous and discontinuous conduction mode.		07
		OR		
Q.3	(a)	.Draw any appropriate circuit to convert line voltage into chopper input voltage of 200 VDC.		03
	(b)	Explain the closed loop operation of chopper with necessary block diagram.		04
	(c)	With circuit and necessary waveforms explain the first quadrant operation of chopper controlled DC motor.		07
Q.4	(a)	Give the torque equation for 3 phase induction motor.		03
	(b)	Enumerate various static frequency changers		04
	(c)	Explain with necessary circuit diagram, the working of modified full bridge Macmurray voltage source inverter		07
		OR		
Q.4	(a)	What is the meaning of real power and reactive power in induction motor drive?		03
	(b)	Give the equations for real power and reactive power for induction motor.		04
	(c)	Discuss any method of implementation of Volts/Hz strategy in induction motor.		07

Q.5	(a)	Draw torque v/s angular displacement characteristic curve for 4 phase VR step motor	03
	(b)	What are the necessities of operationg step motor in closed loop? Explain.	04
	(c)	With necessary circuit diagram and waveforms, explain active suppression drive for step motor.	07
		OR	
Q.5	(a)	Draw torque v/s angular displacement characteristic curve for 3 phase PM step motor	03
	(b)	With block diagram explain DC servo control	04
	(c)	With necessary circuit and waveforms, explain diode + resistance type and capacitor suppression drive for step motor.	07

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