

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

## GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2022

Subject Code:3162003

Date:08/06/2022

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.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) Draw the basic block diagram of Electric Drive. Give difference between AC and DC drive.	03
	(b) Describe the advantages and disadvantages of Power Electronics system.	04
	(c) Describe the component of load torque and classification of load torque.	07
Q.2	(a) Explain the difference between MOSFER, SCR and IGBT.	03
	(b) Explain the Static V- I Characteristics of SCR.	04
	(c) Derive the Equivalent values of drive parameter.	07
	<b>OR</b>	
	(c) Explain the starting circuit of DC shunt motor in detail	07
Q.3	(a) Explain the principle of control of single phase inverter.	03
	(b) Explain the Power control of DC series motor in short with necessary diagram.	04
	(c) A drive has following parameters: $J=10 \text{ kg-m}^2$ , $T=100-0.1N$ , N-m, Passive load torque $T_l=0.05N$ , N-m. Initially the drive is operating in steady state. Now it is to be reversed. For this motor chara. T is changed to $T= - 100-0.1N$ , N-m. Calculate the time of reversal	07
	<b>OR</b>	
Q.3	(a) Give the difference between natural and forced commutation of SCR.	03
	(b) Explain the Any one commutation method for SCR.	04
	(c) Explain the control strategy of Chopper circuit. Explain with necessary diagram.	07
Q.4	(a) What is the use of Free-wheeling Diode in rectifier circuits? Explain with example.	03
	(b) Explain the Single phase semi-converter for DCM mode with diagram and Waveforms.	04
	(c) Explain the single phase controlled rectifier with RL load in detail. Support your answers with necessary waveforms and equations.	07
	<b>OR</b>	
Q.4	(a) Explain the Difference between VSI and CSI inverter.	03
	(b) Explain the construction and working of universal motor in detail.	04
	(c) Explain the regenerative braking of separately excited DC motor with chopper drive.	07
Q.5	(a) Explain the control of servo motor in short.	03
	(b) Explain the TRIAC based power control of inductive load with necessary	04

waveforms.

- (c) Explain the variable voltage variable frequency control of Induction motor. Suggest suitable converter to control the motor. 07

**OR**

- Q.5** (a) Give the construction details of Linear Induction motor. 03  
(b) Explain the construction and working of universal motor in detail 04  
(c) Explain the variable reluctance stepper motor? What is micro stepping? 07

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