Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3151106 Date:04/06/2022

Subject Name:Power Electronics

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

			MARKS
Q.1	**(a)**	Give classification of thyristors family.	**03**
	(b)	Explain advantages of IGBT.	**04**
	(c)	Explain the construction, operation and characteristics of SCR	**07**
Q.2	**(a)**	Give the classification of inverters.	**03**
	(b)	Explain single phase AC chopper with necessary diagram.	**04**
	(c)	Draw and explain Three Phase Half wave controlled rectifier with required waveforms and equations.	**07**
		OR	
	(c)	Draw and explain the circuit of ac phase control using DIAC and TRIAC.	**07**
Q.3	**(a)**	Draw and explain Phase Locked Loop Control of DC Drives.	**03**
	(b)	Differentiate between online and offline UPS systems.	**04**
	(c)	What is SMPS? Give the classification of SMPS. Also List out advantages and disadvantages of SMPS.	**07**
		OR	
Q.3	**(a)**	What is Commutation? Explain briefly the classification of commutation techniques.	**03**
	(b)	Gives comparison between DC and AC Drives.	**04**
	(c)	Explain the principal of Dielectric Heating. Also gives application of Dielectric Heating.	**07**
Q.4	**(a)**	What is SMPS? Give the classification of SMPS.	**03**
	(b)	A 200 A SCR is to be connected in parallel with 300 A SCR. The on state voltage drops of the SCRs are 2.1 V and 1.75 V respectively. Calculate the series resistance that should be connected with each SCR if the two SCRs have to share the total current 500 A in proportion to their ratings.	**04**
	(c)	Draw and explain the V-I characteristics of UJT.	**07**
		OR	
Q.4	**(a)**	Why a freewheeling diode is connected in inductive loaded circuit?	**03**
	(b)	What is Pulse Width Modulation? How can it be used to control the output of chopper?	**04**
	(c)	Explain single phase half wave controlled rectifier with RL load with proper waveforms.	**07**
Q.5	**(a)**	Explain Step down Chopper.	**03**
	(b)	Explain regenerative and dynamic braking of dc motor.	**04**
	(c)	Explain Speed control of Motor	**07**

OR

Q.5	**(a)**	Write down the basic principle of induction heating.	**03**
	(b)	Explain UJT as relaxation oscillator.	**04**
	(c)	Write a short note on online UPS system.	**07**

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