Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER- VII EXAMINATION-SUMMER 2023

Subject Code: 171002 Date: 28/06/2023

Subject Name: Power Electronics

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.**

Q.1	**(a)**	Describe two transistor model of Thyristor.	**07**
	(b)	Define the following: - (1) Spread Time (2) Latching Current (3) Holding Current (4) Softness Factor (5) String Efficiency (6) Reverse recovery Charge (7) Derating	**07**
Q.2	**(a)**	Draw and explain SCR V-I characteristics with required terms.	**07**
	(b)	List and describe Turn-on methods of Thyristor.	**07**
		OR	
	(b)	List and describe any two Turn-off methods of Thyristor.	**07**
Q.3	**(a)**	Write short note on single phase-controlled rectifier	**07**
	(b)	What is chopper? Describe the working of Type A chopper	**07**
		OR	
Q.3	**(a)**	What is commutation? Explain with relevant waveforms class B commutation.	**07**
	(b)	What is the principle of operation of step-up chopper? Explain with wave form.	**07**
Q.4	**(a)**	Discuss the pulse width modulated inverter.	**07**
	(b)	Describe the operation of three-phase inverter with 180-Degree conduction	**07**
		OR	
Q.4	**(a)**	Describe the working of single-phase half Bridge inverter. What is its main drawback? Explain how this drawback is overcome?	**07**
	(b)	What is inverter? List few industrial applications of inverters. Explain basic series inverter.	**07**
Q.5	**(a)**	Compare SCR, power MOSFET and IGBT	**07**
	(b)	Explain the operation of UPS system	**07**
		OR	
Q.5	**(a)**	Explain device structure and characteristics of IGBT.	**07**
	(b)	Write short note on buck-boost converter.	**07**

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