Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– IV(NEW) EXAMINATION – SUMMER 2023

Subject Code:3140915 Date:27-07-2023

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.**

			MARKS
Q.1	**(a)**	Draw the symbol of Transistor, MOSFET, IGBT, DIAC, TRIAC, GTO.	**03**
	(b)	Explain construction, VI characteristics of SCR.	**04**
	(c)	Draw and explain any three triggering methods for Thyristors.	**07**
Q.2	**(a)**	Give classification and types of DC-DC converter topologies.	**03**
	(b)	Define Holding current, latching current for SCR.	**04**
	(c)	A step up chopper has input voltage of 220 V and output voltage of 660V. if the turn off time is 100 microsecond. Compute turn on time.	**07**
		OR	
	(c)	A boost converter has an input voltage of 6 V. The average output voltage is 15 V. The switching frequency is 20 kHz. Find the duty cycle.	**07**
Q.3	**(a)**	Explain Buck converter with circuit diagram and waveform.	**03**
	(b)	Explain working of Flyback converter with circuit and waveform.	**04**
	(c)	Describe Full-bridge single-phase voltage source inverter with circuit diagram and waveform.	**07**
		OR	
Q.3	**(a)**	Write advantages of SVPWM technique over SPWM techniques.	**03**
	(b)	State the term Harmonic Factor, THD, LOH, DF with respect to converter.	**04**
	(c)	Explain three phase inverter with 120^0 mode of conduction with circuit and waveform.	**07**
Q.4	**(a)**	Write significance of freewheeling diode in control rectifier.	**03**
	(b)	Define the term Harmonics, its causes and effects.	**04**
	(c)	Explain single phase full wave controlled rectifier with RL load with circuit and waveform.	**07**
		OR	
Q.4	**(a)**	Explain UJT relaxation oscillator circuit.	**03**
	(b)	A single phase full wave AC-DC converter is supplied by 230 V 50 Hz supply. The load consists of R=10 ohm. A firing angle delay of 30^0. Determine the average output voltage, Average output current.	**04**
	(c)	Describe three phase full wave controlled AC –DC converter with R load with circuit and waveform.	**07**
Q.5	**(a)**	Write advantages disadvantages and application of single phase full wave AC voltage controller.	**03**
	(b)	Describe application of TRIAC as Single-phase Fan regulator with circuit diagram and waveform.	**04**
	(c)	Explain single phase Cycloconverter with circuit and waveform.	**07**

OR

Q.5	**(a)**	Explain two transistor model of Thyristor.	**03**
	(b)	Explain working of Dual converter with circuit diagram.	**04**
	(c)	Explain Matrix converter with circuit and waveform.	**07**

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