Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) EXAMINATION – WINTER 2023

Subject Code:3151106 Date:07-12-2023

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

Q.1	**(a)**	Describe V-I characteristics of TRIAC briefly.	**03**
	(b)	Explain in brief about IGBT.	**04**
	(c)	Discuss firing or triggering of Thyristor in detail.	**07**
Q.2	**(a)**	Write the usage of snubber circuit in power electronics.	**03**
	(b)	What is the usage of freewheeling diode in controlled rectifiers?	**04**
	(c)	Draw and explain the circuit of ac phase control using DIAC and TRIAC.	**07**
		OR	
	(c)	Draw necessary waveforms and explain working of single phase full controlled bridge rectifier circuit with RLE load.	**07**
Q.3	**(a)**	Explain Step down Chopper briefly.	**03**
	(b)	Compare class B and class C Chopper	**04**
	(c)	Explain the principal of Dielectric Heating. Also gives application of Dielectric Heating.	**07**
		OR	
Q.3	**(a)**	What is commutation circuit for Thyristor?	**03**
	(b)	Explain displacement factor and harmonic factor of rectifiers.	**04**
	(c)	Explain in brief the different control strategies for chopper.	**07**
Q.4	**(a)**	Draw the block diagram of UPS.	**03**
	(b)	Enlist advantages and disadvantages of multiphase chopper?	**04**
	(c)	Draw and explain the V-I characteristics of UJT.	**07**
		OR	
Q.4	**(a)**	Design and explain the operation of current source inverter.	**03**
	(b)	List different driver circuits for MOSFET and IGBT and explain one IC based driver circuit.	**04**
	(c)	Explain bridge square wave inverter with necessary diagrams.	**07**
Q.5	**(a)**	Compare online and offline UPS.	**03**
	(b)	What are the applications of an inverter?	**04**
	(c)	Explain Speed control of Motor.	**07**
		OR	
Q.5	**(a)**	Enlist advantages of DC chopper drive.	**03**
	(b)	What is soft switching? Enlist the types of soft switching.	**04**
	(c)	Explain the construction and working of flyback converter type switched mode DC power supply.	**07**