

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER- VI EXAMINATION – SUMMER 2026****Subject Code:3164104****Date:01-06-2026****Subject Name:Power Electronics and 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) Explain the gate turn on/off method of GTO.	03
	(b) What is commutation? Explain self commutation method.	04
	(c) Explain forward blocking and forward conduction mode of operation for SCR using sketch of SCR forward V-I characteristics.	07
Q.2	(a) Compare step up and step down choppers.	03
	(b) Gate trigger pulse turning on SCR, but after removing gate voltage it remain in on condition. Justify this statement.	04
	(c) Explain the working of single phase half wave controlled rectifier with restive and inductive load.	07
	OR	
	(c) A single phase half wave rectifier is used to supply power to a load of impedance 10Ω from 230V, 50 Hz ac supply at the firing angle 30° . Calculate average load voltage, effective value and load current.	07
Q.3	(a) Write short note on cycloconverter.	03
	(b) Draw only basic structure of power MOSFET and IGBT and name each layer and part.	04
	(c) What are the applications of DC to DC converter? Explain the operation of Buck Converter.	07
	OR	
Q.3	(a) What is controlled rectification? Explain With help of circuit diagram and waveforms.	03
	(b) List the various turn on method of SCR. Explain resistance triggering method in brief.	04
	(c) With help of circuit diagram and wave form explain the working of single phase full bridge voltage source inverter.	07
Q.4	(a) Why 3-phase to 1-phase cycloconverter requires positive and negative group phase-controlled converters?	03
	(b) Describe unipolar and bipolar sinusoidal pulse width modulation for inverter.	04
	(c) Explain the working principal of buck-boost converter with circuit diagram of different modes of operation.	07

OR

Q.4	(a)	What is the function of an inverter? List the various applications of an inverter.	03
	(b)	Explain cause of presence of harmonics in output of inverter.	04
	(c)	What do you mean by Pulse Width Modulation? State advantages and disadvantages of PWM technique.	07
Q.5	(a)	List out the various schemes for DC motor speed control.	03
	(b)	Discuss Space Vector Pulse Width Modulation Technique in brief.	04
	(c)	Derive inverter output voltage.	07
OR			
Q.5	(a)	Write short note on DC Chopper drives.	03
	(b)	Explain the single quadrant closed loop control of AC Drive.	04
	(c)	Explain the variable frequency control operation of AC Drives.	07
