

GUJARAT TECHNOLOGICAL UNIVERSITY**BE – SEMESTER- V EXAMINATION-SUMMER 2023****Subject Code: 3152407****Date: 26/06/2023****Subject Name: Power Electronics Circuits - I****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.
5. Assume suitable data if required.

		MARKS
Q.1	(a) What is difference between un-controlled rectifier and controlled rectifier?	03
	(b) Explain effect of source inductance on operation of uncontrolled rectifier circuit.	04
	(c) Explain working operation of single phase full wave uncontrolled rectifier circuit with appropriate waveforms.	07
Q.2	(a) Compare single phase Half wave rectifier and single phase Full wave rectifier in all respect.	03
	(b) What is significance of freewheeling diode in AC-DC converter? Explain.	04
	(c) Explain working operation of single-phase semi-converter with necessary waveforms.	07
	OR	
	(c) Explain working operation of three phase half wave controlled rectifier circuit. Draw necessary waveforms.	07
Q.3	(a) What is time ratio control? Explain.	03
	(b) Explain difference between isolated and non-isolated DC-DC converter with suitable example.	04
	(c) Explain working principle of class B type second quadrant chopper.	07
	OR	
Q.3	(a) Explain the requirements of dc power supply.	03
	(b) What is variable frequency control for DC-DC converter? Explain.	04
	(c) Explain the Cuk converter with necessary circuit diagram and waveforms.	07
Q.4	(a) What is function of Buck converter? Explain.	03
	(b) Explain term “Ripple voltage” with reference to DC-DC converter.	04
	(c) Write a short note on Jones chopper circuit.	07
	OR	
Q.4	(a) Explain importance of isolation in DC-DC converter circuit.	03
	(b) What is continuous conduction mode operation of DC-DC converter?	04
	(c) Discuss about working principle of multiphase chopper circuit.	07
Q.5	(a) Explain basic concept of Zero Current Switch(ZCS).	03
	(b) Define and explain extinction angle for controlled rectifier.	04
	(c) Explain the SEPIC converter with necessary circuit diagram and waveforms.	07
	OR	
Q.5	(a) Explain basic concept of Zero Voltage Switch.	03
	(b) What is inversion mode operation of AC-DC controlled converter? Explain.	04
	(c) Explain the Push-Pull converter with necessary circuit diagram and waveforms.	07
