

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER- VI (New) EXAMINATION – WINTER 2019****Subject Code: 2161708****Date: 06/12/2019****Subject Name: Power Electronics****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.

		MARKS
Q.1	(a) Explain Characteristics of an Ideal Switch.	03
	(b) Explain reverse recovery characteristics of Power Diode.	04
	(c) Discuss the functional structure and static characteristics of IGBT.	07
Q.2	(a) What are the gate drive requirements for a MOSFET?	03
	(b) What is commutation? Explain types of commutation.	04
	(c) Draw and Explain Bidirectional Triode Thyristor with V-I characteristics.	07
	OR	
	(c) Explain operation of opto-isolated MOSFET drive circuit	07
Q.3	(a) Classify the diode based on the turn-off times.	03
	(b) Explain Two transistor model of Thyristor in detail.	04
	(c) Draw and explain turn-off snubber circuit.	07
	OR	
Q.3	(a) Explain Advantages of Full wave rectifier over half wave rectifier.	03
	(b) Discuss the design considerations for the inductor of an LC- rectifier filter.	04
	(c) Explain Three- phase full-wave controlled rectifier with resistive load.	07
	Draw necessary waveforms with $\alpha = 60^\circ$.	
Q.4	(a) What is the role of freewheel diode in rectifier?	03
	(b) Explain SAFE Operating Area (SOA) of a power MOSFET.	04
	(c) Explain single - phase full-wave controlled rectifier with resistive load.	07
	Draw necessary waveforms.	
	OR	
Q.4	(a) What is Chopper? Classify the chopper. List all type of Chopper.	03
	(b) Explain Type C Chopper along with neat sketch.	04
	(c) Explain Flyback converter with necessary waveforms.	07
Q.5	(a) What is the isolated converter? What are the benefits of isolation in Isolated converters?	03
	(b) Classify the Inverter based on the configuration and based on the nature of the output waveform.	04
	(c) Explain the working of Step-Down Chopper with circuit diagram and Relevant waveforms.	07
	OR	
Q.5	(a) Differentiate between self-driven and driven inverter.	03
	(b) Explain the circuit operation of half-bridge inverter configuration.	04
	(c) Explain operation of six step inverter.	07
