Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) - EXAMINATION – SUMMER 2016

Subject Code:2161708 **Date:09/05/2016**

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.**

Q.1	**(a)**	Explain dynamic characteristics of power MOSFET.	**07**
	(b)	Discuss the functional structure and static characteristics of IGBT.	**07**
Q.2	**(a)**	Explain the operation of any two transformer –based BJT drive circuits.	**07**
	(b)	Why snubber circuit is needed? Draw and explain turn-off snubber.	**07**
		OR	
	(b)	What are the requirements of transistor good base drive? Explain operation of base drive circuit which is useful when capability of base voltage V_b is low.	**07**
Q.3	**(a)**	With waveforms explain single -Phase full-wave uncontrolled bridge rectifier with resistive load.	**07**
	(b)	In a full-wave rectifier, load resistance is 5kΩ. The input voltage to each diode is 400sin2π50t. Calculate the maximum value of the current, average current, rms current, dc power output, form factor and ripple factor.	**07**
		OR	
Q.3	**(a)**	With waveforms explain single-phase half-wave controlled rectifier.	**07**
	(b)	Discuss the design considerations for the inductor of an LC- rectifier filter.	**07**
Q.4	**(a)**	Explain the operation of step-down converter with waveforms of the various signals of circuit.	**07**
	(b)	What is duty cycle? If Chopper is having a supply voltage of 200V DC and operating at a frequency of 1KHz with a pulse width of 5µs. Calculate the duty cycle, average load voltage and rms load voltage.	**07**
		OR	
Q.4	**(a)**	Explain operation of boost converter with waveforms of the various signals of circuit.	**07**
	(b)	Explain forward converter with demagnetizing winding.	**07**
Q.5	**(a)**	Explain two-level chopper and two-level inverter using single pole double throw switch.	**07**
	(b)	Explain saturable - core inverter.	**07**
		OR	
Q.5	**(a)**	Explain the circuit operation of half-bridge inverter configuration.	**07**
	(b)	Explain six-step inverter modes.	**07**

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