

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER- VI EXAMINATION – SUMMER 2020

Subject Code: 2161708

Date: 28/10/2020

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.

		MARKS
Q.1	(a) What are the requirements for good base drive of transistor?	03
	(b) Explain operation of base drive circuit which is useful when capability of base voltage V_b is low.	04
	(c) In a full-wave rectifier, load resistance is $3k\Omega$. The input voltage is $240\sin 2\pi 50t$. Calculate the maximum value of the current, average current, dc power output and ripple factor.	07

Q.2	(a) Define reverse recovery time of diode.	03
	(b) Explain dynamic characteristics of power MOSFET.	04
	(c) With waveforms explain single-phase half-wave controlled rectifier.	07

OR

	(c) Explain 3- ϕ half-wave rectifier (Resistive Load) with relevant waveforms.	07
Q.3	(a) What do you mean by Duty Cycle of Chopper?	03
	(b) Explain dynamic characteristics of power BJT.	04
	(c) Draw symbols and static characteristics of SCR. In which ways it can be fired?	07

OR

Q.3	(a) What is meaning of hold time of filter- rectifier?	03
	(b) What is freewheeling diode? Explain with an example.	04
	(c) Explain operation of step-down converter with waveforms of the various signals of circuit.	07
Q.4	(a) What are the benefits of isolation between the input and output circuit?	03
	(b) What are the gate drive requirements for a MOSFET?	04
	(c) Explain Type E Chopper	07

OR

Q.4	(a) Define Holding current of SCR.	03
	(b) How to calculate power dissipation in BJT?	04
	(c) If Chopper is having a supply voltage of 100V DC and operating at a frequency of 5KHz with a pulse width of $65\mu s$. Calculate the duty cycle, average load voltage and RMS load voltage.	07

- Q.5 (a) Define Latching current of TRIAC. **03**
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(b) Explain two-level chopper using single pole double throw switch. **04**
(c) Explain the operation of the forward converter with waveforms. **07**

OR

- Q.5 (a) Draw and explain Anti saturation circuit for transistor. **03**
(b) Write a short note on Boost Converter. **04**
(c) Differentiate between self-driven and driven inverter. **07**

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