Course Code: 23EE5T07

BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE

(AUTONOMOUS)

III - B.Tech I-Semester Regular Examinations (BR23), Nov/Dec - 2025

POWER ELECTRONICS (EEE)

Time: 3 hours Max. Marks: 70

Question Paper consists of Part-A and Part-B

*Answer **ALL** the question in **Part-A and Part-B***

PART–A (10X2 = 20M)

		Marks	CO	BL
1. a)	Define Latching and Holding currents	(2M)	CO1	BL1
b)	Draw the Snubber circuit and explain.	(2M)	CO1	BL2
c)	Define: Firing Angle and Extinction Angle	(2M)	CO2	BL1
d)	What is the purpose of freewheeling diode?	(2M)	CO2	BL1
e)	Compare 3 phase-controlled rectifiers with 1 phase-controlled rectifiers	(2M)	CO3	BL2
f)	Explain the concept of Cycloconverter	(2M)	CO3	BL2
g)	Define Duty cycle	(2M)	CO4	BL1
h)	List the applications of chopper	(2M)	CO4	BL1
i)	What are the classifications of inverter?	(2M)	CO5	BL2
j)	Compare 180^{o} and 120^{o} mode of conduction in 3 phase inverters	(2M)	CO5	BL2

PART–B (5X10 = 50M)

2a.	Explain the Principle of Operation of Thyristor with static and dynamic characteristics	10(M)	CO1	BL2
	(OR)			
3a.	Explain the Principle of Operation of power MOSFET with static and dynamic characteristics	10(M)	CO1	BL2

4a.	Explain operation of single phase Full-wave controlled converter with RL load.	5(M)	CO2	BL3
b.	Explain the operation of Dual converter.	5(M)	CO2	BL3
	(OR)			
5a.	Analyze the effect of source inductance on the performance of single phase fully controlled bridge rectifier	10(M)	CO2	BL4

6a.	Explain the operation 3 phase Full wave rectifier with RL load.	10(M)	CO3	BL3
b.	Describe the principle of operation of 1ϕ Step up cyclo converter with RL load		CO3	BL3
	(OR)			
7a.	Explain the operation of AC voltage controller with RL load.	10(M)	CO3	BL3
b.	Describe the principle of operation of 1ϕ Step down cyclo converter.		CO3	BL3

8a.	Explain the Control strategies of Chopper.	5(M)	CO4	BL2
b.	A Chopper circuit is operating on TRC at a frequency of 2 kHz on a 460 V supply. If the load voltage is 350 volts, calculate the conduction period of the thyristor in each cycle.	5(M)	CO4	BL4
	(OR)			
9a.	Explain the operation of a boost converter. Derive the expressions for peak-to-peak ripple current and ripple voltage in terms of circuit components, frequency, supply voltage and duty ratio.	10(M)	CO4	BL4

10a.	Explain the operating principle of Half Bridge Inverter.	10(M)	CO5	BL3
b.	Explain with neat circuit layout, discuss the operation of current source inverter.		CO5	BL3
	(OR)			
11a.	Explain the operation of three phase inverter operating with 180° mode conduction. Plot the necessary phase and line voltages.	10(M)	CO5	BL4

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