Question Paper Code: R18A22EE02

R18

ANURAG Engineering College

(An Autonomous Institution)

II B.Tech II Semester Supplementary Examinations, Jan/Feb-2024

POWER ELECTRONICS

(ELECTRICAL AND ELECTRONICS ENGINEERING)

Time: 3 Hours **Max. Marks: 75**

Section – A (Short Answer type questions) (25 Marks)

Answer All Questions		Course Outcome	B.T Level	Marks
1.	Define the term holding current and latching current.	CO1	L1	2M
2.	Tabulate the various forced commutation techniques used to turn off SCR.	CO1	L1	3M
3.	Classify the various modes of operation of single phase fully controlled bridge converter.	CO2	L2	2M
4.	Explain the effect of source impedance on the performance of converter.	CO2	L2	3M
5.	Explain the term voltage ripple factor.	CO3	L2	2M
6.	What is meant by phase control?	CO3	L1	3M
7.	List the applications of AC voltage controller.	CO4	L1	2M
8.	Compare phase control and sequence control of AC voltage controller.	CO4	L2	3M
9.	What is constant frequency control of choppers?	CO5	L1	2M
10.	State the control strategies of chopper circuits.	CO5	L1	3M

Section B (Essay Questions)

Answer all questions, each question carries equal marks. **(5 X 10M = 50M)**

11. A)	Examine the circuit IGBT with static V-I, transfer and turn off and turn on characteristics.	CO1	L3	10M
	OR			
B)	Analyze the suitable snubber circuit for SCR which is used as a switching device in a AC to DC conversion circuit.	CO1	L3	10M
12. A)	Discuss the working of Full wave controlled converter with its input and output waveforms for RL load.	CO2	L3	10M
	OR			
B)	Explain the working of Half wave controlled converter with R load and derive the value of average load voltage and load current.	CO2	L3	10M
13. A)	Discuss the operation of dual converter with its circuit diagram and waveforms.	CO3	L3	10M
	OR			
B)	The full wave three phase controlled rectifier has a three phase 415V, 50Hz source and provides a 100A constant load current. Determine the average and rms thyristor current along with apparent power.	CO3	L3	10M
14. A)	A single phase half wave ac voltage controller feeds a load of R=20Ω with an input voltage of 230V,50Hz. Firing angle of thyristor is 45 degrees. Determine the rms value of output voltage.	CO4	L3	10M
	OR			

B)	Describe the operation and principle of single phase cyclo converter with continuous and discontinuous load current with circuit diagram and waveform.	CO4	L3	10M
15. A)	A step up chopper has input voltage of 220V and output voltage of 660V. If the conducting time of thyristor-chopper is 100μsec, compute the pulse width of output voltage. In case output voltage pulse width is halved for constant frequency operation, find the average value of new output voltage.	CO5	L3	10M
	OR			
B)	A single phase half bridge inverter has load R=2Ω.DC source voltage Vs/2=115V. Sketch the wave forms for v_0, load current i_{01}, currents through thyristor1 and diode1 and voltage across thyristor T_1. Harmonics other than fundamental component are neglected. Indicate the devices that conduct during different intervals of one cycle.	CO5	L3	10M