Q.P.Code: 20EE0209	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Regular & Supplementary Examinations August-2023

POWER ELECTRONICS
(Electrical & Electronics Engineering)

Time: 3 Hours **Max. Marks: 60**

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	Describe about Insulated Gate Bipolar Transistor (IGBT) and it's switching characteristics.	CO1	L2	12M
	OR			
2	Illustrate the voltage commutation and draw the output wave forms.	CO1	L4	12M

UNIT-II

3	A single Phase fully controlled converter supplies an inductive load. Assuming load current is constant=10A.Determine the following quantities if supply voltage is 230V,50 Hz and α=40. Calculate the i) Average Output Voltage of converter, ii) Supply RMS Current, iii) Supply Fundamental RMS Current, iv)Fundamental Power factor, v) Supply Power Factor, vi) Supply harmonicfactor	CO2	L3	12M
	OR			
4	Describe the operation of single-phase half wave converter with R-Load at α=60 with necessary wave forms. Also derive the output voltage, output current and RMS output voltages.	CO2	L2	12M

UNIT-III

5	a	For step down chopper dc source voltage is 230v, load resistance is 10 ohm. The chopper when it is in ON is 2V. For a duty cycle of 0.4. Calculate i) average and rms values of output voltage ii) chopper efficiency.	CO3	L3	8M
	b	List some applications of dc chopper.	CO3	L2	4M
		OR			
6		A DC Chopper (Step-Down) has a resistive load R=10Ω and the input voltage=200v.When the chopper remains on, its voltage drop is 2V. The chopper frequency is 1Khz. If the duty cycle is 50% Determine i) Average Output Voltage, ii) RMS Output Voltage, iii) Chopper Efficiency & iv)Effective input resistance of chopper	CO3	L3	12M

UNIT-IV

7	Illustrate the principle of operation of single phase to single phase step-down Bridge type cycloconverter with Resistive Inductive Load for Discontinuous Load Current.	CO4	L4	12M
	OR			
8	The Input Voltage to the Bridge type Cycloconverter is 230v, 50 Hz Single-Phase. The Load resistance is 10Ω and the load inductance is 60mH. Thefrequency of the output is 25Hz. If the Converters are operated as semi converterssuch that $0<\alpha\ \pi$ and the delay angle $\alpha=2\pi/3$, Determine i) The RMS Value of Output voltage, ii) The RMS Current of each thyristor and iii) The input Power Factor (PF).	CO4	L4	12M

UNIT-V

9	a	Expalin the operation of single phase full wave ac voltage controller with R-L load.	CO5	L2	6M
	b	Describe the operation of TRIAC in different modes.	CO5	L2	6M
		OR			
10	a	The single phase full wave AC voltage controller has a resistive load of R=5Ω & the input voltage VS=120V(RMS),50HZ. The delay angles of thyristors T1 &T2 are equal i.e., $\alpha1=\alpha2=2\pi/3$. Determine (i) The RMS output voltage (ii) Input power factor (iii) Average current of thyristor (iv) The RMS current of thyristor.	CO5	L3	8M
	b	Outline the applications of AC voltage controller.	CO5	L2	4M

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