Total number of printed pages: **2** **D/6th Semester/DECE612A**

2025

POWER ELECTRONICS

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1.	a)	Define reverse recovery time and its importance in power diodes.	2+3=5
	b)	Explain and plot the static and switching characteristics of SCR.	7
	c)	What is a Power MOSFET and how does it work? Explain the difference between enhancement mode and depletion mode MOSFETs.	4+4=8
2.	a)	What is the need for protecting power semiconductor devices? Discuss the need for protection in power semiconductor devices with suitable examples.	3+10=13
	b)	For the single-phase full bridge rectifier, what is output voltage if supply voltage is 23 Vrms. A single phase full bridge converter is connected to 'R' load. The source voltage is of 230 V, 50 Hz. The average load current is of 10 A. For R=20Ω, Find the firing angle.	3+4=7
3.	a)	Explain the operation of single phase fully controlled rectifier with RL load and also derive the average and RMS load voltage.	10
	b)	What is a freewheeling diode? A 230V, 50Hz supply is connected to load resistance of 12 Ω through half controlled rectifier. if the firing angle is 60 degree & determine (i)Average output voltage (ii) RMS output voltage.	3+7=10
4.	a)	With the help of circuit diagram and waveform explain the operation of three phase bridge rectifier for R load also draw its input and output voltage waveform.	10

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	b)	What is meant by inverter? What are the applications of an inverter? State the main function of an inverter in a power system.	2+3+5 =10
5.	a)	Describe the working of a 1-Φ full bridge inverter with relevant circuit and waveforms.	7
	b)	What is UPS (Uninterruptible Power Supply)? Draw a block diagram for UPS and explain its operation.	2+7=9
	c)	What is SMPS? How does it differ from a linear power supply?	2+2=4
6.	a)	Describe the working principle of boost converter with circuit and waveform	10
	b)	Write the principle of operation of a variable reluctance motor. What are the advantages and disadvantages of stepper motor?	10

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