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

2024

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)	What is power electronics? What are the conditions under which a transistor operates as a switch?	3+3=6
	b)	Describe the structural features of power MOSFET. Draw and explain in brief the switching characteristics of power MOSFET	5+5=10
	c)	What do you understand by 'Latching Current' and 'Holding Current' in thyristor	4
2	a)	Write a short note on the Turn-on methods of SCR.	6
	b)	Draw and explain V-I characteristics of SCR and its working.	8
	e)	What is the Firing Angle? What benefits come with using freewheeling diodes?	3+3=6
3.	a)	What is extinction and conduction angle? Explain the operation of a single-phase half-controlled rectifier with RL load and also derive the average and RMS load voltage	3+7=10
	b)	For the circuit of a controlled half-wave rectifier with RL load, the source is 120Vrms at 60 Hz, R=20Ω, L=0.04H, and the delay angle is 45 degree . Determine (a) an expression for i(ωt), (b) the rms current, (c) the power absorbed by the load, and (d) the power factor.	10
4.	a)	What is snubber circuit? What is the function of freewheeling diode in controlled rectifier?	2+3=5
	b)	What are the main classification of inverters? What is the main drawback of a single phase half bridge inverter? Describe the working of a single-phase full bridge inverter with suitable waveform.	2+1+7=10
	c)	Describe the working of series voltage regulator.	5
5.	a)	What is switching regulator? Describe the Buck switching regulator with relevant equivalent circuits.	2+8=10

	b)	What is UPS? When to use Online and Offline UPS? Describe the working principle of Online UPS.	2+3+5=10
6.		Write a short notes (*any four*) on the following: (i) Three Phase DC-AC converter (ii) SMPS (iii) IC voltage regulator (iv) DC motor (v) Transistor shunt regulator	4×5=20

CENTRAL INSTITUTE OF TECHNOLOGY
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