

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***M.E DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025***First Semester**Power Systems Engineering***PPST2414 - Analysis of Power Converters***Regulations - 2024**Duration : 3 Hrs**Maximum : 100 Marks***PART - A (ANSWER ALL QUESTIONS) (Marks 10*2=20)**

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
1.	Mention the two advantages of GTO over SCR.	L1	1	2
2.	Write the expression for the RMS output voltage in single phase fully controlled rectifier with RLE load.	L2	1	2
3.	What role does the freewheeling diode play in protecting a fully controlled converter under load conditions?	L2	2	2
4.	Write a short note on various applications of controlled converter.	L2	2	2
5.	List two key performance parameters of inverters.	L1	3	2
6.	How does voltage sag affect the operation of sensitive equipment in a UPS system?	L2	3	2
7.	What is the function of a variable frequency drive (VFD) in an AC drive system?	L2	4	2
8.	What are Current Source Inverters (CSI), and how do they differ from Voltage Source Inverters (VSI)?	L2	4	2
9.	What is the significance of PWM techniques in multilevel inverters?	L2	5	2
10.	How do multilevel inverters compare to traditional two-level inverters?	L2	5	2

PART - B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a Derive the expression for the RMS output voltage of a half-controlled converter with an R-L load.	L3	1	16
	Or			
	b Discuss with circuit and output waveform the working of single phase fully controlled converter with RL load in discontinuous mode of operation.	L3	1	16
12.	a Illustrate the role of freewheeling diodes in a 3-phase fully controlled converter with an RLE load. What functions do they serve, and how do they impact converter operation?	L4	2	16
	Or			
	b Explain the construction and working principle of a 12 pulse converter. How does it differ from a 6 pulse converter in terms of harmonic reduction?	L4	2	16

13.	a	Explain the principle of operation, circuit configuration, switching sequence, output voltage waveform and applications for single phase full bridge inverter.	L4	3	16
		Or			
	b	Discuss the voltage control of single-phase inverters using various PWM techniques.	L4	3	16
14.	a	Explain the operation of a 120-degree conduction mode inverter with a delta-connected load, including the impact on voltage and current waveforms.	L2	4	16
		Or			
	b	Describe the design and role of the input inductor in a Current Source Inverter (CSI). Why is it necessary, and what challenges does it introduce?	L2	4	16
15.	a	Explain the structure and working principle of a cascaded H-bridge multilevel inverter.	L3	5	16
		Or			
	b	Explain the concept of Selective Harmonic Elimination (SHE) in PWM for multilevel inverters. How does SHE improve power quality, and what are the challenges associated with its implementation?	L3	5	16