Reg. No.															

Question Paper Code	13371

M.E. / M.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2024 (JAN - 2025)

First Semester

M.E. - Power Electronics and Drives

24PPEPC104 - ANALYSIS AND DESIGN OF INVERTERS

Regulations - 2024

Duration: 3 Hours | Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	What should be the pulse width for the elimination of 3rd harmonic in the output voltage waveform of single phase inverter?	2	K1	CO1
2.	Draw the waveform of single pulse-width modulation.	2	K1	CO1
3.	Compare 120 degree mode with 180 degree mode operation of a three phase inverter.	2	K2	CO2
4.	Define the space vector modulation for three phase inverter.	2	K1	CO2
5.	State the reason why low power devices cannot be used in a CSI.	2	K1	CO3
6.	Draw the ASCI voltage and current waveform.	2	K1	CO3
7.	In an m-level diode clamped inverter how many main switching devices and clamping diodes are present?	2	K1	CO4
8.	Plot the output waveform of five-level flying capacitor of single phase inverter.	2	K1	CO4
9.	Write the necessary condition for series resonant oscillation.	2	K1	CO5
10.	List the advantages of ZVS resonant converter.	2	K1	CO5

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

			Marks	K – Level	CO
11.	a)	A single phase bridge inverter has a resistive load R=2.4 ohm and the DC input voltage of 48 V. determine a) RMS output voltage at fundamental frequency. b) Output power c) Iav and Im of each transistor d) Peak reverse blocking voltage of each transistor e) HFand DF at the LOH.	13	K2	CO1
		OR			
	b)	Enumerate the operation of half bridge VSI and obtain the steady state analysis for RL load.	13	K2	CO1
12.	a)	Suggest a suitable harmonic elimination technique to reduce the Total Harmonic Distortion factor of three phase inverter.	13	K2	CO2
		OR			

	b)	Derive the fundamental voltage and current equations of three phase voltage source inverter fed star connected load for 120 degree mode of conduction.	*13*	*K2*	*CO2*
13.	a)	A star connected load of 25 ohm/phase is fed from 600V dc through a three phase bridge inverter per both 1800 and 1200 mode. Determine a. RMS value of load current b. RMS value of thyristor Current c. Load power.	*13*	*K2*	*CO3*
		OR			
	b)	Explain the operation of a six step current source inverter with inductive load.	*13*	*K2*	*CO3*
14.	a)	Explain the operation of flying capacitor multilevel inverter with necessary details. Also discuss its features advantages and disadvantages.	*13*	*K2*	*CO4*
		OR			
	b)	Enumerate application of multilevel converter connected to a power system for reactive power compensation.	*13*	*K2*	*CO4*
15.	a)	Analyze the step by step procedure for the design of zero-current switching resonant converter.	*13*	*K3*	*CO5*
		OR			
	b)	Develop the operation of Class E resonant inverter.	*13*	*K3*	*CO5*

PART - C (1 × 15 = 15 Marks)

16.	a)	A single phase bridge inverter fed from 230V dc is connected to load R=20 ohm & L=0.06H. Determine power delivered to load in case inverter is operating at 50 Hz with (a) square wave output. (b) Quasi square wave output with on period of 0.5 (c) Two symmetrically spaced pulses per half cycle on period of 0.5 of cycle.	*15*	*K2*	*CO3*
		OR			
	b)	Outline the operation of online and offline UPS.	*15*	*K2*	*CO5*