Reg. No.												

Question Paper Code	21313

M.E. / M.Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022

First Semester

M.E. - Power Electronics and Drives

20PPEPC104 - ANALYSIS AND DESIGN OF INVERTERS

(Regulations 2020)

Duration: 3 Hours | Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks, K-Level,CO
1.	What is the need for voltage control and harmonic elimination in single phase inverter?	2,K1,CO1
2.	Define Total Harmonic distortion.	2,K1,CO1
3.	Define Space vector Modulation techniques.	2,K1,CO2
4.	Explain how the output voltage of three phase inverter is controlled.	2,K12CO2
5.	List the advantages and disadvantages of ACSI.	2,K1,CO3
6.	Compare VSI and CSI.	2,K1,CO3
7.	List the different types of Multilevel inverter.	2,K1,CO4
8.	What is back to back intertie system?	2,K1,CO4
9.	What is the dead zone of a resonant inverter?	2,K1,CO5
10.	What are the classifications of resonant Pulse inverter?	2,K1,CO5

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11.	a)	Explain the operation of a single phase full bridge inverter with the help of waveforms.	13,K4,CO1
		OR	
	b)	Explain various voltage control method in single phase inverter using PWM techniques with necessary diagram and waveform.	13,K4,CO1
12.	a)	Explain the working of 180 degree conduction mode operation of three phase inverter with star connected load with a neat circuit diagram and waveforms.	13,K4,CO2
		OR	
	b)	Describe the Space vector modulation used to control the output voltage of three phase inverter with a neat sketch.	13,K2,CO2

13. a) Describe elaborately about the auto sequential CSI with relevant diagrams and waveforms. *13,K4,CO3*

OR

b) With a neat sketch explain the six step thyristor inverter with neat waveforms. *13,K4,CO3*

14. a) Describe the operation of diode-clamped multilevel inverter with neat diagram. *13,K4,CO4*

OR

b) Describe the operation of cascaded multilevel inverter with neat diagram. *13,K4,CO4*

15. a) Describe the operation of Class E resonant inverter with neat wave forms. *13,K4,CO5*

OR

b) With neat diagram describe the operation of DC-link Resonant inverter. *13,K4,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) The series resonant inverter has $L_1=L_2=L=50\mu H$, $C=6\mu F$, $R=2\Omega$. The DC input voltage is $V_s= 220V$ and the frequency of the output voltage is $f_o= 7kHz$. The turn off time of thyristors is $t_q=10\mu s$. Determine *15,K5,CO5*
    a) The Circuit Turn-Off time t_{off}
    b) The Maximum Permissible frequency f_{max}
    c) The Peak-Peak capacitor voltage V_{pp}
    d) The Peak load current I_p
    e) Sketch the instantaneous load current $i_o(t)$,Capacitor Voltage $V_c(t)$ and DC supply current I_s
    f) The RMS load current I_o
    g) The output power P_o
    h) The average supply current I_s

OR

b) Describe the operation of Flying capacitor multilevel inverter with neat a sketch. *15,K4,CO4*