Reg. No.												

Question Paper Code	14213

M.E. / M.Tech - DEGREE EXAMINATIONS, NOV / DEC 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 (MCQ) (10 × 1 = 10 Marks)
Answer ALL Questions

		Marks	K–Level	CO
1.	The output of a single-phase half-bridge inverter on an R load is ideally: (a) a sine wave (b) a square wave (c) a triangular wave (d) a constant dc	1	K1	CO1
2.	In a single-phase full bridge inverter, how many SCR(s) are gated at a time? (a) One (b) Two (c) Three (d) None of the mentioned	1	K1	CO1
3.	In case of the 120° mode of operation, _____ devices conduct at a time. (a) 2 (b) 3 (c) 4 (d) none of the mentioned	1	K1	CO2
4.	If T1 is gated at 0 °, T3 and T5 will start conducting at _____ and _____ respectively. (a) 180°, 270° (b) 120°, 240° (c) 180°, 300° (d) 240°, 360°	1	K1	CO2
5.	Force-commutated CSIs need (a) capacitors for their commutation (b) inductors for their commutation (c) diodes for their commutation (d) none of the mentioned	1	K1	CO3
6.	In current source inverters (CSIs), the output voltage's (a) amplitude depends upon the load impedance (b) waveform depends upon the load impedance (c) amplitude as well as the nature of the waveform depends on the load (d) both amplitude and waveform are independent of the load impedance	1	K1	CO3
7.	Which of the following is NOT a type of multilevel inverter? (a) Diode Clamped Multilevel Inverter (b) Balancing Capacitor Multilevel Inverter (c) Cascaded H-Bridge Multilevel Inverter (d) Cycloconverter	1	K1	CO4
8.	What is a key characteristic of the output voltage waveform of a multilevel inverter? (a) It is similar to a square wave (b) It has a lower total harmonic distortion (THD) (c) It consists of a single high-amplitude pulse (d) It is used only for high-frequency applications	1	K1	CO4
9.	Which of the following is an advantage of using a resonant inverter? (a) Higher switching losses compared to conventional inverters (b) Increased harmonic distortion in the output waveform (c) Controlled commutations that make semiconductor device control easier (d) A smaller physical size for a given power rating	1	K1	CO5
10.	What is a key characteristic of the load in a resonant inverter? (a) The load must be a purely resistive element (b) The load must be a slightly damped oscillating circuit (c) The load must be a constant current source (d) The load must be able to handle extremely high switching frequencies	1	K1	CO5

PART - B (12 × 2 = 24 Marks)
Answer ALL Questions

11.	Discuss the purpose of connecting diodes in antiparallel with thyristor in inverter Circuit.	2	K1	CO1
12.	State the need of commutation circuit in forced commutated inverters.	2	K1	CO1
13.	Mention the advantages of voltage control by PWM methods.	2	K1	CO2

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **14213**

14. Distinguish180 and 120 degree modes of operation.	2	K2	CO2
15. Define load commutated inverter.	2	K1	CO3
16. Draw the circuit of ASCI with series R-L load.	2	K1	CO3
17. What are the features of cascaded inverter?	2	K1	CO4
18. What is meant by two level inverter?	2	K1	CO4
19. Define dead zone of a resonant converter.	2	K1	CO5
20. How the output voltage is controlled in series resonant inverters?	2	K1	CO5
21. List the advantages and disadvantages of a flying capacitor.	2	K1	CO4
22. What is the purpose of coupled inductor in half-bridge resonant inverters?	2	K1	CO5

PART - C (6 × 11 = 66 Marks)
Answer ALL Questions

23.	a)	Outline the operation of half bridge VSI and obtain the steady state analysis for RL load.	11	K2	CO1
		OR			
	b)	Explain different voltage control techniques.	11	K2	CO1
24.	a)	Discuss in detail about Space Vector Modulation.	11	K2	CO2
		OR			
	b)	Explain the operation of 3 phase VSI feeding star load in 120 degree mode.	11	K2	CO2
25.	a)	Interpret the operation of three phase auto sequentially commutated current source inverter in detail.	11	K2	CO3
		OR			
	b)	Explain the operation of any one load commutated inverter in detail.	11	K2	CO3
26.	a)	Illustrate the different PWM techniques used in MLI.	11	K2	CO4
		OR			
	b)	Summarize the operation of diode clamped multilevel inverter with necessary diagrams and waveforms.	11	K2	CO4
27.	a)	Describe the operation of Class E resonant inverter with neat wave forms.	11	K2	CO5
		OR			
	b)	Summarize the procedure for the construction of series resonant converters.	11	K2	CO5
28.	a) (i)	Draw the circuit and output voltage of 5-level CHB inverter and name the different elements.	5	K2	CO4
	(ii)	Explain briefly the zero-current switching.	6	K2	CO5
		OR			
	(b) (i)	Illustrate the APOD PWM technique of MLI.	6	K2	CO4
	(ii)	Explain about the power line disturbances.	5	K2	CO5