C

Reg. No. :

Question Paper Code: U5301

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2024

Fifth Semester

Electrical and Electronics Engineering

21UEE501 - POWER ELECTRONICS

(Regulations 2021)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5Marks)

1. The average output voltage is maximum when SCR is triggered at ωt= CO1– U

   (a) π (b) 0 (c) π/2 (d) π/4

2. Firing angle is used ---------- CO1-U

   (a) to burn device any time of SCR (b) to control on-off timing of SCR

   (c) to control off timing of general transistor (d) None of these

3. A chopper may be thought as a CO1-U

   (a) Inverter with DC input (b) DC equivalent of an AC transformer

   (c) Diode Rectifier (d) None of these

4. Single phase half bridge inverters requires CO1-U

   (a) two wire ac supply (b) two wire dc supply

   (c) three wire ac supply (d) three wire dc supply

5. In AC voltage controllers the CO1– U

   (a) variable ac with fixed frequency is obtained

   (b) variable ac with variable frequency is obtained

   (c) variable dc with fixed frequency is obtained

   (d) variable dc with variable frequency is obtained

PART – B (5 x 3= 15Marks)

6.	Write the purpose of snubber circuit	CO1- U
7.	Why the power factor of semiconverter is better than full converter	CO1-U
8.	Differentiate between constant frequency and variable frequency control	CO1-U
9.	Define Parallel inverter	CO1-U
10.	Define Matrix converter	CO1-U

PART – C (5 x 16= 80 Marks)

11.	(a)	Write short note on gate drive circuit and protection circuit of MOSFET	CO1-U	(16)
		Or		
	(b)	Explain the switching characteristics of SCR with neat circuit diagram and waveform	CO1-U	(16)
12.	(a)	Describe the operation of a single phase two pulse bridge converter using 4 SCRs with relevant waveform	CO4-Ana	(16)
		Or		
	(b)	Explain the principle of operation of single phase dual converter with neat power circuit diagram	CO4-Ana	(16)
13.	(a)	Draw the circuit of buck regulator and explain its working principle with necessary waveforms. Derive the expression for peak to peak ripple voltage of the capacitor that is present across the load	CO5-Ana	(16)
		Or		
	(b)	With neat power circuit diagram ,explain the operation of boost converter Draw the load voltage and load current waveforms and derive the expression for the output voltage .	CO5-Ana	(16)
14.	(a)	Describe the principle of operation of 3 phase voltage source inverter with 120^{o} conduction mode with necessary waveform. Derive the expression for line to line voltage.	CO1-U	(16)
		Or		
	(b)	Demonstrate the working of a single phase full bridge inverter with relevant circuit and waveform.	CO1-U	(16)

15. (a) Describe the working of single phase AC voltage controller with power circuit and output waveform. Also derive the expression for average value of the output voltage CO1-U (16)

Or

(b) Explain the operation of single phase to single phase cycloconverter with neat circuit diagram and waveform. CO1-U (16)