Reg. No.												

Question Paper Code	12864

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024

Fifth Semester

Electrical and Electronics Engineering

20EEPC502 - POWER ELECTRONICS

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	In TRIAC which of the modes the sensitivity of gate signal is high?	2	K2	CO1
2.	Define latching current.	2	K1	CO1
3.	Illustrate the function of freewheeling diodes in a controlled rectifier.	2	K2	CO2
4.	Define overlap period or commutation period.	2	K2	CO2
5.	Define by duty-cycle.	2	K1	CO3
6.	Distinguish between PWM and FM control.	2	K2	CO3
7.	Compare CSI and VSI.	2	K2	CO4
8.	Define modulation index.	2	K1	CO4
9.	What is a matrix converter?	2	K1	CO5
10.	Compare integral cycle control and phase control in AC voltage controllers.	2	K2	CO5

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

			Marks	K – Level	CO
11.	a)	Explain the steady state and switching characteristics of MOSFET.	13	K2	CO1
		OR			
	b)	Explain the structure and discuss the different modes of operation of TRIAC with the help of VI characteristics.	13	K2	CO1
12.	a)	Explain the operation of a single phase full converter with RLE load using relevant waveforms. Obtain the expressions for its average output voltage and RMS value of output voltage.	13	K2	CO2
		OR			
	b)	Discuss the working of three phase six pulse converters with R load using relevant waveforms. Derive the average output voltage.	13	K2	CO2

13.	a)	Explain the working of boost converter with a neat sketch with waveform and derive the expression.	*13*	*K2*	CO3
		OR			
	b)	Discuss the principle of operation of DC-DC class-E chopper with suitable waveforms.	*13*	*K2*	CO3
14.	a)	Describe the principle of operation of a 3 phase voltage source inverter with 180˚conduction mode with necessary waveforms and circuits. Also obtain the expression for line to line voltage.	*13*	*K2*	*CO4*
		OR			
	b)	Explain different types of PWM techniques to control the output voltage.	*13*	*K2*	*CO4*
15.	a)	Explain the operation of the step up and step down cyclo-converter with neat waveforms.	*13*	*K2*	*CO5*
		OR			
	b)	A single phase voltage controller has input voltage of 230V 50Hz and a load of R=15 Ohm. For 6 cycles ON and 4 cycles OFF. Calculate (i) RMS output voltage (ii) Input power factor (iii) Average and RMS thyristor currents.	*13*	*K2*	*CO5*

PART - C (1× 15 = 15 Marks)

16.	a) i)	Explain the different method of voltage control adopted in inverter.	*7*	*K2*	*CO4*
	ii)	Explain the operation of multistage control of AC voltage controllers with a neat diagram.	*8*	*K2*	*CO5*
		OR			
	b) i)	Explain the application of inverter in Induction heating.	*8*	*K2*	*CO4*
	ii)	Explain the operation of a 1-phase full wave AC voltage controller with R load using neat waveforms and derivation.	*7*	*K2*	*CO5*