Reg. No.															

Question Paper Code	14022

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

Fifth Semester

ELECTRICAL AND ELECTRONICS ENGNEERING

20EEPC502 – POWER ELECTRONICS

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	The device that can conduct in both directions is a) SCR b) TRIAC c) DIAC d) GTO	1	K1	CO1
2.	The function of a snubber circuit is a) To amplify current b) To protect SCR from dv/dt c) To increase switching speed d) To improve conduction angle	1	K1	CO1
3.	Increasing source inductance in a converter: a) Increases overlap angle b) Decreases overlap angle c) Has no effect d) Improves output voltage	1	K1	CO2
4.	The power factor of a converter improves when: a) α increases b) α decreases c) Load inductance increases d) Load capacitance increases	1	K1	CO2
5.	Class A chopper operates in a) All four quadrants b) Any two quadrants c) Only one quadrant d) None of these	1	K1	CO3
6.	SMPS has a) Low frequency b) Large size c) High efficiency d) Constant output	1	K1	CO3
7.	SVM is used in a) Cycloconverter b) Matrix converter c) Rectifier d) Three phase inverter	1	K1	CO4
8.	Harmonic reduction is achieved by a) Commutation b) Snubber c) Chopper d) PWM	1	K1	CO4
9.	Cycloconverter produces a) AC of lower frequency b) AC of higher frequency c) DC output d) Pure sinusoidal DC	1	K1	CO5
10.	Power factor in AC controllers is controlled by a) Firing angle b) Duty cycle c) Carrier frequency d) Voltage gain	1	K1	CO5

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

		Marks	K – Level	CO
11.	Outline the VI characteristics of a TRIAC.	2	K2	CO1
12.	What is the purpose of a snubber circuit?	2	K1	CO1
13.	List any four applications of single-phase controlled rectifiers?	2	K1	CO2
14.	Define power factor in converter operation.	2	K1	CO2
15.	Compare between Buck and Boost converter.	2	K2	CO3
16.	What is the function of freewheeling diode?	2	K1	CO3
17.	Classify the different PWM techniques?	2	K2	CO4
18.	How voltage control is obtained in inverters?	2	K1	CO4
19.	Define control angle in AC controllers.	2	K1	CO5
20.	What is the principle of welding?	2	K1	CO5
21.	What are the different commutations for SCR?	2	K1	CO1

22.		Compare voltage ripple and harmonics.	2	K2	CO2

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Classify and explain various triggering methods of SCR.	11	K2	CO1
		OR			
	b)	Illustrate the operation of GTO and its characteristics with waveforms.	11	K2	CO1
24.	a)	A single-phase full converter operates from 230 V, 50 Hz supply with a load of 10 Ω and firing angle 45°. Solve the average output voltage, RMS output voltage and load current.	11	K3	CO2
		OR			
	b)	Identify with waveforms the operation of a three-phase fully controlled converter.	11	K2	CO2
25.	a) i)	Develop the voltage and current expressions for a Buck-Boost converter.	5	K3	CO3
	ii)	A step-down chopper operates from 230 V DC supply with a duty cycle of 0.4, load resistance 20 Ω, and negligible ripple. Solve output voltage and current.	6	K3	CO3
		OR			
	b) i)	Develop a Boost converter to step up 100 V DC to 200 V DC for 1 A load. Solve duty ratio.	5	K3	CO3
	ii)	Organize the operation of switched-mode regulators with advantages.	6	K3	CO3
26.	a)	Explain the working of three-phase VSI in 120° conduction mode.	11	K2	CO4
		OR			
	b)	Interpret space vector modulation (SVM) with vector diagrams.	11	K2	CO4
27.	a) i)	A single-phase AC controller feeds a 20 Ω load from 230 V, 50 Hz supply with firing angle of 60°. Solve RMS output voltage.	6	K3	CO5
	ii)	Identify the power factor control in AC voltage controllers.	5	K3	CO5
		OR			
	b) i)	Construct the working of three-phase AC voltage controller with RL load.	6	K3	CO5
	ii)	Select how cycloconverter can be used for industrial welding. Explain in detail.	5	K3	CO5
28.	a)	Illustrate the operation of four quadrant chopper with neat diagrams for various modes of operation.	11	K2	CO3
		OR			
	b)	Explain the functional block diagram and operation of battery operated vehicles.	11	K2	CO3