Register Number:……..

KUMARAGURU
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B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2023

(Regulation 2018)

Fifth Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U18EET5001**:** Power Electronics

COURSE OUTCOMES

CO1: Distinguish the operation, capabilities, characteristics of various power semiconductor devices and driver circuits.
CO2: Analyse the performance of AC-DC converter for different loads.
CO3: Utilize the principle of DC-DC converters with various control techniques for renewable energy application.
CO4: Apply the Voltage and frequency control of inverters and AC-AC converters.
CO5: Design a simulation model for power electronic converter.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	Identify voltage-controlled power semiconductor devices.	CO1	[K_2]
2.	Draw the snubber circuit for SCR.	CO1	[K_2]
3.	Compare half controlled converter with fully controlled converter.	CO2	[K_3]
4.	List the performance parameters of AC-DC converters.	CO2	[K_2]
5.	A step- down DC-DC converter is operated at 2 kHZ. Calculate the ON time and OFF time of the chopper to obtain 60V from 100V supply.	CO3	[K_3]
6.	Choose the power converter for solar PV system.	CO3	[K_3]
7.	State the applications of inverters.	CO4	[K_2]
8.	Classify PWM techniques used for the inverters.	CO4	[K_2]
9.	List the control techniques used for alternating voltage controllers.	CO4	[K_2]
10.	Identify the simulation tools used for power electronic converters.	CO5	[K_3]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	Draw and explain the V-I characteristics of power BJT.	(8)	CO1	[K_2]
	b)	Derive the anode current expression for SCR using two transistor analogy.	(8)	CO1	[K_2]

12.	a)	Describe the circuit, modes of operation and waveforms of single phase fully controlled converter with RL load. Derive the expression for average output voltage on continuous current mode.	(16)	CO2	[K_2]
13.	a)	Draw the circuit of four quadrant chopper and explain the modes of operation.	(8)	CO3	[K_2]
	b)	Derive the expression for output voltage of buck-boost DC-DC converter.	(8)	CO3	[K_3]
14.	a)	Describe the circuit, switching table, waveforms of three phase bridge VSI operating on 180º conduction mode with star connected balanced resistive load.	(16)	CO4	[K_3]
15.	a)	Draw the circuit of (i) Three phase AC voltage controller. (ii) Single phase cyclo- converter.	(8)	CO4	[K_2]
	b)	Describe the circuit and operation of ON Load Transformer Tap Changer.	(8)	CO4	[K_2]
16.	a)	Compare voltage source inverter and current source inverter.	(8)	CO4	[K_2]
	b)	Draw the simulation model for the boost converter.	(8)	CO5	[K_2]

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