Register Number:……..

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

(Regulation 2018)

Seventh Semester

ELECTRONICS AND INSTRUMENTATION ENGINEERING

U18EIE0017**:** Industrial Electronic Drives

COURSE OUTCOMES

CO1: Choose the power devices based on the application.

CO2: Evaluate the performance of AC-DC converters with R, RL and RLE load.

CO3: Describe the functioning of various DC-DC converters.

CO4: Describe the functioning of various DC-AC converters.

CO5: Identify the drives for various control applications.

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

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

1.	Mention the various triggering methods of turning on a thyristor and which is the most reliable method?	CO1	[K_1]
2.	What is meant by secondary breakdown in BJTs?	CO1	[K_2]
3.	Sketch the variation in output voltage with firing angle for a semi converter and a fully controlled converter in the same graph.	CO2	[K_2]
4.	With the help of output equation, justify the two quadrant operation of a single phase controlled AC to DC converter.	CO2	[K_2]
5.	A chopping circuit is operated at a frequency of 4kHz on a 440V DC supply. If the output voltage is 200V compute the conduction and non-conduction period of the switch.	CO3	[K_2]
6.	Pulse width modulation is preferred to frequency modulation. Give reasons.	CO3	[K_2]
7.	Name the various PWM techniques applied for inverters and brief how they differ from each other.	CO4	[K_1]
8.	What is meant by shoot through faults in inverters and how can it be overcome?	CO4	[K_2]
9.	State the major elements of an electric drive.	CO5	[K_2]
10.	Define SMPS.	CO5	[K_2]

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

11.	a)	Illustrate the switching characteristics of IGBT.	8	CO1	[K_2]
	b)	Explain the VI characteristics of a thyristor.	8	CO1	[K_2]
12.		A single phase half-controlled thyristor bridge converter supplies an RL load. Draw the power circuit diagram and explain its working with waveforms. Derive the average output voltage of the converter and determine the average output voltage of the converter, if the supply voltage is Vs=400V, 50 Hz and the firing angle is 60°.	16	CO2	[K_3]
13.	a)	Suggest and describe a power electronic circuit to control the DC motor in motoring and regenerative braking modes under forward and reverse directions.	8	CO3	[K_3]
	b)	With the help of suitable waveform explain the buck regulator circuit.	8	CO3	[K_2]
14.	a)	Explain how gate pulses are generated for a single phase sinusoidal PWM inverter.	8	CO4	[K_2]
	b)	Brief the role of power electronics in HVDC transmission system.	8	CO5	[K_2]
15.		Draw and explain the operation of the IGBT based three phase bridge inverter circuit with star connected resistive load under 120^0 mode of operation.	16	CO4	[K_2]
16.	a)	With a block diagram explain the working of an online UPS.	8	CO5	[K_3]
	b)	Explain the Closed loop control of DC drives with the help of a block diagram.	8	CO5	[K_2]

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