

Code No: P18EET09

HALL TICKET NUMBER

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PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)

III B.TECH I SEMESTER END REGULAR EXAMINATIONS, DEC/JAN – 2022/23
POWER ELECTRONICS
(EEE Branch)

Time: 3 hours

Max. Marks: 60

Note: Question Paper consists of Two parts (Part-A and Part-B)

PART-A

Answer all the questions in Part-A (5X2=10M).

Q.No.	Questions	Marks	CO	KL
1.	a) Why the snubber circuit is used in thyristor circuit	[2M]	1	2
	b) Give the output voltage and current equation of Three -phase half wave-controlled rectifier with RL load	[2M]	2	1
	c) Draw block diagram of buck- boost converter	[2M]	3	5
	d) Why PWM technique is required in convertor circuit	[2M]	4	4
	e) Discuss V-I characteristics of Triac	[2M]	5	2

PART-B

Answer One Question from each UNIT (5X10=50M)

Q.No.	Questions	Marks	CO	KL
UNIT-I				
2.	a) Describe the variation of current and voltage during turn- on time of an SCR with the help of characteristics.	[5M]	1	2
	b) Explain R firing circuit of SCR with circuit diagram and waveforms.	[5M]	1	3
OR				
3.	a) With help of detailed structure explain the operation of MOSFET.	[5M]	1	2
	b) With neat sketches, explain the static V-I characteristics of an SCR. Define latching and holding current.	[5M]	1	2
UNIT-II				
4.	a) Explain a half-wave controlled rectifier feeding RL load, with waveforms of output voltage and output current. Derive the expression for average output voltage.	[5M]	2	5
	b) A three-phase half-wave controlled converter is connected to 380 V (line) supply. If the load current is constant at 32 A independent of the firing angle and on state forward drop of SCRs is 1.2 V, Find: i) Peak reverse voltage rating of SCRs ii) Average power dissipation in each SCR	[5M]	2	2
OR				
5.	With the help of circuit diagram explain the working of single phase fully controlled converter with RL load. Draw the waveform of output voltage with and without freewheeling diode and output current.	[10M]	2	5
UNIT-III				
6.	a) With the help of a neat circuit diagram and associated waveforms, discuss the operation of Buck-Boost converter.	[5M]	3	5
	b) Explain the application of DC to DC Converter	[5M]	3	2
OR				



7.	a)	With help of neat circuit diagram and associated waveforms discuss the operation of a Buck converter in continuous conduction mode and discontinuous conduction mode.	[5M]	3	5
	b)	Obtain output voltage ripple & inductor current of DC-DC converter operating with Discontinuous mode	[5M]	3	2
UNIT-IV					
8.	a)	Describe the principle of operation of 3 phase voltage source inverter with 180° conduction mode with necessary waveforms and circuits. Also obtain the expression for line to line voltage	[5M]	4	2
	b)	Explain the operation of the single phase full bridge inverter with RL loads.	[5M]	4	2
OR					
9.	a)	What is meant by Pulse Width Modulation? Describe the various PWM techniques used in Voltage control of Inverters.	[5M]	4	2
	b)	Explain the working of a single phase half bridge voltage source inverter with pure R load. Draw the output voltage & output current waveforms and derive an expression for rms output voltage.	[5M]	4	2
UNIT-V					
10.	a)	Describe the operation of two stage sequence control of AC voltage controller.	[5M]	5	2
	b)	Draw the waveforms for 3-phase a.c voltage regulator for R load for firing angle 60 degrees	[5M]	5	2
OR					
11.	a)	Describe working of 3-Phase AC-AC regulators with R load only and draw the relevant waveforms.	[5M]	5	2
	b)	A single phase full –wave ac voltage controller is connected with a load of $R = 10 \Omega$, with an input voltage of 230 V, 50 Hz. When the firing angle of thyristors is 45° , determine i) power output at load, ii) average value of thyristor current and iii) rms value of thyristor current.	[5M]	5	4
