

Duration: 3 Hours

[Max Marks: 80]

- Note:** 1) Question No. 1 is compulsory
 2) Attempt any **three questions** out of remaining five
 3) All Questions carry **equal** marks
 4) Assume suitable data if required and state it clearly

	Marks
Q1 Solve all the following	
a Show the turn-on process of SCR using waveform	5
b What are the advantages of using a PWM rectifier?	5
c Where the DC-DC converters are used?	5
d. How does the snubber circuit protect semiconductor switches?	5
Q2	
a Why is the gate driver circuit required? Draw a Bootstrap and isolated gate driver (block diagram or circuit diagram)	10
b Explain working of a buck-boost converter. Draw waveforms and derive equation to calculate output voltage	10
Q3	
a Defined different performance parameters of single-phase bridge inverter.	10
b What is a safe operating area of a semiconductor switch? How is the conduction and switching loss calculated?	10
Q4	
a Draw out voltage waveforms of three-phase fully controlled rectifiers driving R-load and derive it's output voltage equation for firing delay angle of 60 degree.	10
b How a three-phase inverter works in 180 degree conduction mode. Draw waveforms of line and phase voltages.	10
Q5	
a Draw waveforms and explain single phase controlled rectifier diving R-L load with and without freewheeling diodes.	10
b Explain working of SCR and V-I characteristics of it.	10
Q6	
a Write a short note on 'Protection of SCR'.	10
b Compare power BJT, MOSFET and IGBT	10