Duration: 3hrs **[Max Marks:80]**

N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

1 Attempt any FOUR (4*5=20) [20]

a Draw SCR characteristics and Define Holding and Latching current.

b What is a cycloconverter? Give some of its industrial applications.

c IGBT is superior to BJT and power MOSFET: Justify.

d Draw and explain a basic gate drive circuit for TRIAC.

e What is pulse width modulation? List the various PWM techniques in inverter.

2 a Explain the effect of source inductance on the performance of a single phase fully controlled bridge converter. Derive expression of output voltage and current. [10]

b Explain the need of commutation in SCR. What are different methods of commutation of SCR. Explain any one force commutation method in detail. [10]

3 a Describe the basic structure of IGBT and Explain the V-I characteristics. [10]

b What is the need of triggering circuits? Draw synchronized UJT triggering circuit for SCR. Describe it briefly with relevant voltage and current waveforms. [10]

4 a Write short note on protection of SCR against di/dt, dv/dt overcurrent and overvoltage. [10]

b Explain continuous mode fly-back converter. Derive the relation for load voltage. [10]

5 a List the advantages and disadvantages of the Buck and Boost converter. [10]

b Explain the working of single phase to single phase cycloconverter with circuit diagram and waveforms. [10]

6 a Explain the principle of operation of on-off controlled AC voltage controller [10]

b Explain the operation of single phase bridge inverter with the help of voltage and current waveform for resistive load. [10]

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