Duration:3hrs Max marks:80

Note:- 1. Question No. 1 is compulsory
2. Attempt any **three** questions out of remaining **five** questions
3. Assume suitable data if necessary & justify the same.

Qu.1 Attempt **any four**.

(a) Explain V-I characteristics of an SCR [5]

(b) Compare BJT & MOSFET devices [5]

(c) Explain the working of any one single phase PWM rectifier. [5]

(d) Compare VSI & CSI [5]

(e) Draw the circuit diagram of Boost Dc to Dc convertor along with the following waveforms (i) Inductor voltage (ii) Inductor current (iii) Switch current (iv) Diode current. [5]

Qu.2 (a) Explain the switching performance of IGBT with relevant waveforms. Compare with MOSFET [10]

(b) A single phase full wave controlled bridge rectifier is operated with RL load. Draw the diagram and derive the average output voltage. What are its advantages? [10]

Qu.3 (a) What is need of snubber circuit? Explain the working of turn off snubber circuit. [10]

(b) Explain the operation of three phase bridge inverter feeding a resistive load for 120^0 conduction mode. Draw the pulse sequence for the switching & sketch all phase voltages waveforms. [10]

Qu.4 (a) In a buck boost convertor consider all components to be ideal. Let V_d = (8 -40 V), V_o = 15 V constant , switching frequency = 20 KHz, & C= 470 µF. Calculate the value of minimum inductance that will keep the convertor operating in CCM mode if P ≥ 2W [10]

(b) With neat circuit diagram explain the operation of AC voltage controller feeding RL load. [10]

Qu.5 With neat circuit diagram explain the operation of three phase fully controlled bridge converter with R load. Derive the average output voltage. Also sketch the following waveforms (i) Input voltage (ii) Output voltage for firing angle $\alpha = 60^0$ (iii) Gate triggering sequences [20]

Qu.6 (a) Explain with neat circuit diagram & waveforms the operation of step down convertor (Buck). Derive the expression of (i) Output voltage ratio (ii) Inductor current ripple (iii) Ripple in output voltage [10]

(b) Describe the operation of single phase to single phase step down cycloconverter [10]
