



- Notes :
1. All questions carry equal marks.
 2. Answer **any five** questions as per internal given choice.
 3. Assume suitable data wherever necessary.
 4. Illustrate your answers wherever necessary with the help of neat sketches.
 5. Use of non programmable calculator is permitted.
 6. Due credit will be given to neatness and adequate dimensions.
 7. Use of slide rule, Logarithmic Tables, Steam Tables, Mollier's Chart, Drawing Instruments, Thermodynamic tables for moist air, Psychometric Charts and Refrigeration charts is permitted.

1. a) What are the different turning-ON methods of a thyristor? Explain each method. 8
- b) Draw & explain dynamic characteristics of SCR in detail. 8

OR

2. a) Draw relaxation oscillator circuit using UJT for generating triggering to SCR also explain operation. 8
- b) What is IGBT? What are the advantages of IGBT over power BJT and power MOSFET? 8
3. a) Describe the operation of 3 phase six pulse bridge converter with resistive load, draw relevant waveform for firing angle $\alpha = 30^\circ$. 8
- b) Draw and explain dual-converter and prove that $\alpha_1 + \alpha_2 = 180^\circ$. 8

OR

4. a) Explain the effect of battery load on the performance of single phase fully controlled bridge converter. 8
- b) What is the effect of source inductance in single-phase full-wave controlled bridge rectifier with RL load? b) Draw the voltage and current waveforms 8
5. a) Explain the operation of basic series inverter, also Enlist the various drawbacks. 8
- b) Explain 3ϕ bridge inverter operation for 180° mode of operation with relevant phase voltage waveform. 8

OR

6. a) Distinguish between voltage source and current source inverter. 8
- b) Enlist the different output voltage control techniques of Inverter, Explain any one detail. 8

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. 8
- b) Explain multiphase chopper with the help of circuit diagram and relevant waveforms. 8

OR

8. a) Enlist and explain the output voltage control techniques of chopper, with waveform. 8
- b) A step-up chopper is used to deliver a load voltage of 500 Volt from 200 Volt D. C. source. If the blocking period of SCR is 80 μ sec. Calculate the required pulse width. 8
9. a) What do you mean by Snubber circuit? Draw and explain the function of each component. 8
- b) Calculate the number of SCR each with a rating of 500 V and 75 Amp. required in each brunch of series parallel combination for a circuit with a total voltage and current rating 7500 volt and 1000 Amp. Assume a derating factor of 14%. 8

OR

10. a) Explain in detail the various causes of overvoltages and overcurrent in thyristor circuit. 8
- b) What problems arise when SCRs are connected in series? How are these problems solved? 8
