

(3Hours)

[Total Marks:80]

N.B.: (1) Question No. 1 is compulsory.

(2) Solve any three questions out of remaining five questions.

(3) Figures to the right indicate full marks.

(4) Assume suitable data if required.

1. Attempt the following :-

- (a) Draw and explain the static V-I characteristics of SCR. Define the latching and holding current. **20**
- (b) Explain the principle of operation of single phase voltage controller with R load.
- (c) What is pulse width modulation? List the various PWM techniques. How do these differ from each other?
- (d) Explain the principle of operation of Dual Converter.
2. (a) Explain with neat circuit diagram and waveforms the operation of three phase half controlled rectifier with R load. **10**
- (b) With the help of neat diagram, explain the operation of R-C firing circuit. Also draw and explain the associated waveforms. **10**
3. (a) Explain the operation of single phase, fully controlled bridge converter with RL load. Derive the expression for average load voltage and load current. **10**
- (b) With the help of neat diagram and associated waveforms discuss the operation of Buck-Boost converter. **10**
4. (a) Explain with neat diagram and waveform the operation of single phase half bridge voltage source inverter with R-L load. **10**
- (b) Draw and explain the output characteristics of n-channel MOSFET. What is the significance of the safe operating area of a power MOSFET? **10**
5. (a) Explain the working of single phase cyclo converter with the help of neat diagram and waveforms. **10**
- (b) Explain the working of three phase bridge inverter in 180° conduction mode with circuit diagram and associated waveform. **10**
6. (a) Why commutation is required in thyristor circuits? State various commutation techniques used for thyristors. Describe class 'C' commutation with relevant waveforms. **10**
- (b) With the help of neat structural diagram, explain the operation of GTO. Also explain its switching behaviour. **10**