

Time: 3 Hours

Max. Marks: 80

- Q1. Solve any 05 4 marks each**
- a Show the turn-on process of SCR using waveform and explain in short.
  - b What are the advantages of using PWM rectifier?
  - c How the silicon-carbide devices are different than normal silicone devices?
  - d Compare VSI and CSI
  - e Where the DC-DC converters are used.
  - f How Snubber circuit protects semiconductor switches
  - g How heat sink is selected?
- Q2. Solve any two out of three 10 marks each**
- A Why the gate driver circuit is required? Draw a Bootstrap and isolated gate driver (block diagram or circuit diagram)
  - B Explain working of buck-boost converter. Draw waveforms and derive equation to calculate output voltage
  - C Compare single phase half bridge inverter and full bridge inverter (any five points)
- Q3. Solve any Two out of Three 10 marks each**
- A Define different performance parameters of single-phase bridge inverter.
  - B Explain gate triggering techniques of SCR.
  - C Describe the working of three phase bridge Inverter for 180° conduction mode and draw the gating signals and phase voltages.
- Q4. Solve any Two out of Three 10 marks each**
- A Draw the circuit diagram for a Boost dc to dc converter. Explain the functioning and draw the following waveforms (i) Inductor voltage; (ii) Inductor current; (iii) Capacitor current; (iv) Capacitor voltage and (v) Switch current.
  - B Explain any two voltage commutation techniques for SCR.
  - C Explain different PWM techniques with appropriate waveforms.
- Q5. Solve any Two out of Three 10 marks each**
- A Draw waveforms and explain single phase controlled rectifier driving R-L load with and without freewheeling diode.
  - B Explain working of SCR and V-I characteristics of it.
  - C Explain different PWM techniques with appropriate waveforms.
- Q6. Solve any Two out of Three 10 marks each**
- A Compare power BJT, MOSFT and IGBT
  - B Explain working of SCR and V-I characteristics of it.
  - C Explain Turn-ON techniques of SCR.

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