



22427

12223

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
  - (2) Illustrate your answers with neat sketches wherever necessary.
  - (3) Figures to the right indicate full marks.
  - (4) Assume suitable data, if necessary.
  - (5) Use of Non-programmable Electronic Pocket Calculator is permissible.
  - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

**1. Attempt any FIVE of the following :**

**5 × 2 = 10**

- (a) Draw the symbol of IGBT and LASCR.
- (b) Define holding current and latching current.
- (c) List the types of turn-ON methods of SCR.
- (d) Draw circuit diagram of half wave controlled rectifier with resistive load.
- (e) Define Inverter. List the types of inverters.
- (f) State the types of Choppers.
- (g) Draw the circuit diagram of light dimmer circuit using DIAC.



**2. Attempt any THREE of the following :****3 × 4 = 12**

- (a) Draw and describe V-I characteristics of SCR and indicate following parameters on the characteristics : (i) forward Breakover Voltage ( $V_{BO}$ ) (ii) Reverse Breakdown Voltage (iii) Latching Current (iv) Holding Current :
- (b) Describe the working of battery charger using SCR with circuit diagram.
- (c) Describe the principle of operation of step-up chopper with circuit diagram and input-output waveforms.
- (d) Describe the operation of UJT triggering circuit of SCR with circuit diagram.

**3. Attempt any THREE of the following :****3 × 4 = 12**

- (a) Describe the operation of single phase centre – tap full wave controlled rectifier with resistive load.
- (b) Draw circuit diagram and voltage-current waveform of single phase half wave controlled rectifier with Resistive Inductive (RL) load.
- (c) Describe series inverter with circuit diagram and waveform.
- (d) Describe with circuit diagram the operation of temperature controller using SCR.

**4. Attempt any THREE of the following :****3 × 4 = 12**

- (a) Describe the working of class-A commutation of SCR with circuit diagram and waveforms.
- (b) Describe the operation of full wave centre tapped controlled rectifier with resistive load.

- (c) Draw the basic block diagram of UPS. Describe the following blocks : (i) Surge Suppressor (ii) Rectifier and charger (iii) Inverter (iv) Filter
- (d) Describe the working of step down chopper with circuit diagram and input – output waveforms.
- (e) List the different types of gate triggering methods and describe AC gate triggering circuit for SCR.

**5. Attempt any TWO of the following :**

**2 × 6 = 12**

- (a) Describe the working principle of POWER MOSFET using constructional diagram. Draw the V-I characteristics of power MOSFET and indicate cut off region, ohmic region and saturation region.
- (b) State the need of protection circuit of SCR. Describe the working of snubber circuit with circuit diagram.
- (c) Explain the operation of three phase half – wave controlled rectifier with circuit diagram. Also sketch its input output waveform.

**6. Attempt any TWO of the following :**

**2 × 6 = 12**

- (a) Describe with constructional details bidirectional working of TRIAC. Draw its V-I characteristics.
  - (b) Describe the operation of parallel inverter with circuit diagram and waveform.
  - (c) Describe the working principle of GTO with circuit diagram. State any two application of GTO.
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