

22527

23242

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.

**Marks**

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

**10**

- (a) Draw labelled construction diagram of SCR.
- (b) List any two applications of following power devices :
  - (i) MCT
  - (ii) FCT
- (c) Define latching current and holding current of the SCR.
- (d) State classification of Inverter.
- (e) State the need of Inverter.
- (f) Define dual converter and state it's types.
- (g) State principle of Induction Heating.



- 2. Attempt any THREE of the following : 12**
- (a) Describe the control techniques of chopper with neat waveform.
  - (b) Explain with neat sketch the working of single phase parallel inverter.
  - (c) Describe cyclo-converter with neat diagram and waveform.
  - (d) State the classification of choppers.
- 3. Attempt any THREE of the following : 12**
- (a) Describe Jones chopper with neat diagram.
  - (b) Explain with neat circuit diagram of single phase full bridge inverter with RL load.
  - (c) Describe with neat circuit diagram of single phase to single phase cyclo-converter.
  - (d) Draw and explain electric welding control circuit using SCR.
- 4. Attempt any THREE of the following : 12**
- (a) Compare Class A and Class B chopper (any four points).
  - (b) Explain four quadrant chopper.
  - (c) A DC chopper (step-down) has a resistance load  $R = 10 \Omega$  and input voltage  $V_S = 200 \text{ V}$ . When the chopper remain ON, its voltage drop is  $2 \text{ V}$ . The chopper frequency is  $1 \text{ kHz}$ . If the duty cycle is  $50\%$ , determine :
    - (i) Average output voltage
    - (ii) RMS output voltage
  - (d) Draw the circuit diagram of single phase to three phase cyclo-converter and sketch the input / output waveform.
  - (e) Explain circulating current mode dual converters with neat labelled circuit diagram.

**5. Attempt any TWO of the following :****12**

- (a) Describe the circuit diagram and operation of DC static circuit breaker.
- (b) Describe use of thyristor in static VAR compensation.
- (c) Compare induction heating and dielectric heating on following points :
  - (i) Principle
  - (ii) Frequency of generation
  - (iii) Area of heat generation
  - (iv) Type of heating
  - (v) Material used
  - (vi) Application

**6. Attempt any TWO of the following :****12**

- (a) With neat diagram, explain the operation of SIT and state two applications.
  - (b) Draw neat circuit diagram of three phase bridge inverter and explain meaning of 180° mode and 120° mode Bridge Inverter.
  - (c) Explain the operation of Mc-Murray Bedford half bridge inverter with circuit diagram and waveforms.
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