

17541

11920

3 Hours / 100 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
  - (2) Answer each next main Question on a new page.
  - (3) Illustrate your answers with neat sketches wherever necessary.
  - (4) Figures to the right indicate full marks.
  - (5) Assume suitable data, if necessary.
  - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

1. (A) Attempt any THREE : 12
- (i) Draw circuit symbol of SIT, MCT and FCT. List any one application of MCT.
  - (ii) Classify choppers on the basis of Quadrant of operation. Explain how to obtain variable d.c voltage from fixed d.c.
  - (iii) Define Inverter. Draw the circuit diagram and waveform of current source Inverter.
  - (iv) Distinguish between relay type and servo type stabilizers. (any 4 points)
- (B) Attempt any ONE : 6
- (i) Explain four quadrant chopper with neat circuit diagram. List its 2 applications.
  - (ii) Draw and explain the circuit of Parallel Inverter with Resistive load. Draw load voltage and load current waveforms.

**2. Attempt any TWO :****16**

- (a) List different protection circuits for power devices. Explain over voltage and over current protection circuit.
- (b) Draw and explain the circuit of single phase cyclo-converter with neat input and output waveforms.
- (c) Draw block diagram of sequential timer for resistance welding. Explain working of each block.

**3. Attempt any FOUR :****16**

- (a) How voltage suppression are achieved by Selenium diode and MOV, explain with suitable circuit diagram.
- (b) Explain Fly back converter with continuous mode with neat circuit diagram and waveform.
- (c) Draw the block diagram of On-line UPS system. Explain function of each block.
- (d) Draw and explain the working of Jone's chopper with neat circuit diagram.
- (e) List different types of Resistance welding. Explain spot welding in detail.
- (f) Draw and explain a line contactor used in resistance welding.

**4. (A) Attempt any THREE :****12**

- (i) Describe the working of Class A chopper using SCR with circuit diagram and waveforms.
- (ii) Draw and explain the block diagram of phase control AC voltage stabilizers.

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- (iii) State the need of series and parallel connection of SCR. Draw Static and Dynamic Equalizing circuit for three SCRs connected in series.
- (iv) Name a 2 quadrant chopper. Draw neat circuit diagram of it.

**(B) Attempt any ONE :**

**6**

- (i) Draw constructional diagram of MCT. Explain Turn ON and Turn OFF method for MCT.
- (ii) Describe how output voltage of Inverter can be controlled using PWM techniques.

**5. Attempt any TWO :**

**16**

- (a) (i) State any four specifications of UPS.
- (ii) State two applications of UPS.
- (b) Draw the circuit of Mc-Murray Bedford inverter with resistive load and describe its working.
- (c) State the principle of Resistance welding. Draw the block diagram of capacitor energy storage welding with waveform and explain it.

**6. Attempt any FOUR :**

**16**

- (a) Draw the constructional diagram of FCT. Draw its V-I characteristics.
- (b) Draw and explain the block diagram line interactive UPS system.

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- (c) Draw the circuit diagram of Half Bridge Inverter with  $R_L$  load. Draw load current and load voltage waveforms.
  - (d) Define Battery Parameters :
    - (i) Back up time.
    - (ii) Transfer time
  - (e) Draw the circuit of synchronous weld control and describe its operation.
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