

# 17541

14115

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) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

1. a) Attempt any **THREE** of the following: 12
- (i) Draw symbols of SIT, MCT and FCT. Draw the V-I characteristics of each.
  - (ii) What is a chopper? What is the effect of duty cycle on output voltage of a chopper?
  - (iii) With neat diagram explain the principle of resistance welding.
  - (iv) Distinguish between relay type and servo type stabilizers with respect to operating principle, efficiency, distortion and applications.
- b) Attempt any **ONE** of the following: 06
- (i) Describe the working of class A chopper using SCR with circuit diagram. Draw the output waveforms.
  - (ii) Draw the circuit diagram and o/p waveforms and explain the working of half-bridge inverter.

P.T.O.

- 2. Attempt any TWO of the following:** **16**
- a) State the need of series and parallel connections of SCR. Draw neat labelled circuit diagram of three SCRs connected in series combination. Describe the role of static and dynamic equalizing circuit.
  - b) Describe the operation of series inverter using SCRs with circuit diagram. Draw the labelled waveforms of load current and output voltage. What are the drawbacks of series inverter?
  - c) Draw and explain the block diagram of capacitor energy storage welding. State the two advantages and two disadvantages.
- 3. Attempt any FOUR of the following:** **16**
- a) Draw and explain the working of crowbar circuit.
  - b) Draw and explain the working of non-isolated SMPS.
  - c) Draw the block diagram of ON-LINE UPS and explain the working.
  - d) Draw the circuit diagram of synchronous weld control and describe the working of the circuit.
  - e) Describe the operation of Morgan's chopper with circuit diagram.
- 4. a) Attempt any THREE of the following:** **12**
- (i) Describe the operation of single phase cycloconverter with neat circuit diagram and waveforms.
  - (ii) What is the need for protection circuits for power devices? List different types of protection circuits.
  - (iii) Draw the circuit of Relay type voltage stabilizer and explain the working.
  - (iv) Draw the basic block diagram of UPS. List the specifications of UPS.

- b) **Attempt any ONE of the following:** **06**
- (i) Draw the circuit diagram of parallel connections of three thyristors and describe with forward characteristics. Justify symmetrical arrangement of SCRs.
  - (ii) With neat waveforms describe how output voltage and harmonics can be controlled using PWM control method in inverters.
5. **Attempt any TWO of the following:** **16**
- a) Draw and explain the working of Jone's chopper with neat circuit diagram and waveforms.
  - b) Explain the principle and operation of isolated SMPS. State two advantages and disadvantages.
  - c) Draw and explain the working of parallel inverter using SCRs with circuit diagram and o/p voltage and load current waveforms.
6. **Attempt any FOUR of the following:** **16**
- a) Draw the equivalent circuit of MCT and explain the working.
  - b) Draw and explain the working of servo type voltage stabilizer.
  - c) Draw neat labelled diagram of line contactor using SCR and explain the working.
  - d) Define the battery parameters : Back up time and Transfer time.
  - e) What is snubber circuit? List the types of snubber circuits and draw the circuit diagram of any one type.
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