

17541

21819

3 Hours / 100 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.

**Marks**

1. (A) Attempt any **THREE** of the following :

12

- (a) Draw symbols of SIT, MCT and FCT. List any one application of each.
- (b) Define chopper. List the types of choppers on the basis of operation quadrant. Name the chopper which operates in four quadrants.
- (c) Draw the circuit diagram of Half Bridge Inverter with  $R_L$  load. Draw current and voltage waveforms.
- (d) Distinguish between solid state and servo type stabilizers with respect to operating principle, efficiency, distortion and applications.

(B) Attempt any **ONE** of the following :

6

- (a) Describe the working of class-A chopper using SCR with circuit diagram. How output voltage can be controlled ?
- (b) Draw the circuit diagram of Full Bridge Inverter. Describe the operation of Full Bridge Inverter with output voltage waveforms.

[1 of 4]

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 connection. Describe the role of static and dynamic equalizing circuits.
- (b) Draw the circuit diagram of Mc-Murray Bedford Inverter. Explain its operation with its output voltage waveform.
- (c) Draw the block diagram of sequential timer for resistance welding. Describe the function of each block. List different signals generated.

**3. Attempt any FOUR of the following : 16**

- (a) Describe how SCR can be protected from over current with suitable labelled circuit diagram.
- (b) Draw the circuit diagram and explain the working of non-isolated SMPS.
- (c) Draw the block diagram of ON-LINE UPS & explain the function of each block.
- (d) Draw the circuit of synchronous weld control and describe the working of the circuit.
- (e) Draw the circuit diagram of Morgan's chopper and describe its operation.

**4. (A) Attempt any THREE of the following : 12**

- (a) Draw circuit diagram of step-up chopper. State how output is related to duty cycle.
- (b) How AC voltage is stabilized by solid state stabilizers ? Describe with block diagram.
- (c) Why protection circuits are needed for power devices ? List different types of protection circuits.
- (d) Draw the circuit diagram of single phase cycloconverter with input & output waveforms.

- (B) Attempt any ONE of the following :** **6**
- (a) Draw the circuit diagram of parallel connection of three SCRs and describe with forward characteristics. Justify symmetrical arrangement of SCRs.
  - (b) Describe how output voltage & harmonics can be controlled using PWM control method of Inverter.
- 5. Attempt any TWO of the following :** **16**
- (a) Draw the circuit diagram of Relay Type AC voltage stabilizer & describe its working. List any two advantages, disadvantages & applications.
  - (b) State the principle of resistance welding. Draw the diagram of magnetic energy storage welding with waveform & state two advantages and disadvantages.
  - (c) Draw the diagram of isolated SMPS & describe its operation. List any two advantages and disadvantages.
- 6. Attempt any FOUR of the following :** **16**
- (a) Describe the working of MCT. Explain the working principle of MCT.
  - (b) Distinguish between Relay Type and Servo Type stabilizers (any four points).
  - (c) Draw the block diagram of Off-Line UPS and describe the function of each block.
  - (d) What are line contactors ? Draw and describe the working of line contactor using SCR.
  - (e) Define Battery parameters – Back-up Time, Transfer Time, Power Rating with its typical value.
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