

17541

11718

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

Marks

1. (A) Attempt any THREE : 12

- (i) Draw constructional details of MCT. Draw its static characteristics.
- (ii) Give classification of choppers. List its applications.
- (iii) With the help of neat circuit diagram and waveforms explain operation of series inverter.
- (iv) Why it is desired to stabilize a.c. line voltage ? Give classification of a.c. voltage stabilizers.

(B) Attempt any ONE : 6

- (i) Write theoretical formula for output voltage of step-up chopper. A d.c. chopper remains ON for 30 μ sec. and OFF for 10 μ sec. Determine (1) the duty cycle (2) chopper frequency. If supply voltage is 100 V, calculate dc output voltage.
- (ii) Describe importance of PWM Inverter. How harmonics can be reduced with help of PWM control ?

2. Attempt any TWO :**16**

- (a) Draw circuit diagram of Morgan's chopper. Explain its working with waveforms.
- (b) Draw circuit diagram of Mc. Murray Inverter. On what principle it works ? Explain circuit working of Mc. Murray Inverter.
- (c) Explain principle of Spot welding and Butt welding with basic electrode arrangement. List two applications of each.

3. Attempt any FOUR :**16**

- (a) Explain overvoltage protection with metal oxide varistors (MoVs).
- (b) What is difference between isolated and non-isolated SMPS ? List applications of SMPS.
- (c) Draw block diagram of UPS and describe blocks of it.
- (d) Draw SCR contactor circuit. Explain its working.
- (e) Draw Jone's Chopper. State its Quadrant of operation. State its advantages.
(Any two)

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

- (i) Draw a two quadrant chopper operated in 1st and 4th quadrant. Why it is called two quadrant chopper ? Explain its working.
- (ii) Draw schematic diagram of relay type voltage stabilizer. Explain its working.
- (iii) Draw cross-section and symbol for SIT.

(iv) Differentiate between series and parallel Inverters on the basis of

- (1) Position of commutating components
- (2) Method of commutation
- (3) Necessity of transformer
- (4) Output waveforms

(B) Attempt any ONE :

6

- (a) Draw a complete equalizing with static and dynamic equalizing circuit. What is role of dynamic equalizing capacitor and damping resistor ?
- (b) What is meaning of cycloconverter ? For getting $F_{out} = \frac{F_{in}}{3}$, draw circuit diagram of single phase cycloconverter. Explain its working with input and output waveforms.

5. Attempt any TWO :

16

- (a) Draw block diagram of SMPS. Explain its working. Write function of series pass element and catch diode in it.
- (b) What is special feature of energy storage welding ? Draw circuit of capacitor storage welding. Explain its working.
- (c) Compare Relay type and Servo type voltage stabilizer on the basis of
 - (i) Principle of operation
 - (ii) Circuit diagram
 - (iii) Use of moving part
 - (iv) Cost
 - (v) Maintenance
 - (vi) Speed of operation
 - (vii) Voltage Adjustment action
 - (viii) Application

P.T.O.

6. Attempt any FOUR :**16**

- (a) Explain crowbar protection circuit.
 - (b) Explain with neat schematic diagram of solid state voltage stabilizer.
 - (c) Draw block diagram of OFF line UPS. Explain its working.
 - (d) Explain working of sequence timer.
 - (e) Write specifications of ON line and OFF line UPS for (i) Back up time (ii) Input d.c. voltage (iii) Transfer time (iv) Protection circuits.
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