

22430

11920

3 Hours / 70 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) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

- 1. Attempt any FIVE of the following:** **10**
- a) State the types and principle of dual converter.
 - b) Define the following in connection with SCR
 - (i) Latching current
 - (ii) holding current
 - c) Draw characteristics of SCR and explain it.
 - d) Sketch the neat SCR stand mounting technique.
 - e) Compare forced commutation and natural commutation.
(any two point)
 - f) Draw the circuit diagram of step-up chopper.
 - g) Give the classification of controlled rectifier and two applications of cycloconverter.

P.T.O.

- 2. Attempt any THREE of the following:** **12**
- a) Describe with neat sketch working principle of type B chopper.
 - b) Explain with neat labelled sketch the working of three phase half wave controlled rectifier with inductive load.
 - c) Explain the working of single phase series inverter.
 - d) Describe a Morgan chopper with associated voltage and current waveforms.
- 3. Attempt any THREE of the following:** **12**
- a) Describe the use of Integral control in triggering circuits.
 - b) Draw the circuit diagram of MC Murray Bed-ford - inverter and explain its working.
 - c) Explain Dual converter without circulating current operation with neat labeled circuit diagram.
 - d) Give comparison between non-circulating current and circulating current mode.
- 4. Attempt any THREE of the following:** **12**
- a) Give classification of Inverter base on
 - (i) Nature of source.
 - (ii) Configuration of inverter.
 - (iii) Nature of waveform.
 - (iv) On the type commutation.
 - b) Explain single phase fully controlled converter with inductive load with relevant input-output waveforms.
 - c) Mention the advantages of Jone's chopper circuit over other chopper circuits. Give the application of this chopper.
 - d) Explain necessity of synchronized firing pulses for gate triggering of thyristor in fully controlled converter.
 - e) Draw the circuit of three phase controlled full-wave rectifier with resistive load and describe its working.

- 5. Attempt any TWO of the following:** **12**
- a) Draw circuit diagram of Jone's chopper. Describe its working.
 - b) Describe with sketches the working of various types of thyristor protection circuit.
 - c) Single - phase Full bridge inverter has resistive load of $R = 3\Omega$ and d.c. input voltage $E_{dc} = 50$ V. Compute
 - (i) RMS output voltage of fundamental frequency E_1
 - (ii) The output power P_0
 - (iii) The average peak currents of each thyristor.
 - (iv) The peak reverse blocking voltage of each thyristor.
- 6. Attempt any TWO of the following:** **12**
- a) A three-phase half controlled rectifier supplied with 150 v/Ph, 50 Hz the source inductance and resistance 1.2 mH and 0.07Ω respectively. Assuming thyristor voltage drop 1.5 V and continuous load current 30 A. Compute the average load voltage of firing angle of 0° , 30° and 60° .
 - b) Give the description with circuit and waveform of three phase bridge inverter.
 - c) Draw the circuit diagram of single phase to single phase cycloconverter. Explain its operation with waveform.
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