

22527

21222

3 Hours / 70 Marks

Seat No.

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15 minutes extra for each hour

- 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. Attempt any FIVE of the following :

10

- (a) Draw labelled output characteristics of IGBT.
- (b) Define latching current & holding current of SCR.
- (c) List any two applications of Power MOSFET.
- (d) Write the different types of inverter.
- (e) List four switching components used in inverters.
- (f) List the types of dual converters.
- (g) Write any two application of induction heating.

2. Attempt any THREE of the following :

12

- (a) Explain with a neat labelled sketch the working principle of the single phase series inverter.
- (b) Explain with circuit diagram the working principle of type D chopper.
- (c) Explain with circuit diagram the working principle of the non-circulatory current mode dual converter.
- (d) Compare step-up and step-down chopper on any four points of difference.

- 3. Attempt any THREE of the following : 12**
- (a) Draw circuit diagram of single quadrant chopper for motoring of dc motor and its labelled quadrant diagram.
 - (b) Describe the operation of McMurray half bridge inverter with circuit diagram.
 - (c) Draw the circuit diagram of single phase to single phase cyclo converter and sketch the input and output waveforms.
 - (d) Describe the principle of dielectric heating with suitable diagram.
- 4. Attempt any THREE of the following : 12**
- (a) Identify a suitable chopper for producing the output in first and second quadrant and explain its operation.
 - (b) Explain the operation of Jones chopper with neat circuit diagram.
 - (c) The applied dc voltage of a type A chopper is 200 V and a load resistance of 50Ω . Calculate the average output voltage if duty cycle is 0.4.
 - (d) Draw the input and output waveforms of cycloconverter to produce $(1/5)^{\text{th}}$ of input frequency. Show the firing sequence of thyristors in the relevant waveform.
 - (e) Describe the operation of three phase cycloconverter with labelled quadrant diagram.
- 5. Attempt any TWO of the following : 12**
- (a) Explain with neat labelled sketch the speed control of AC servo motor.
 - (b) Identify a suitable AC voltage stabiliser that uses solid state devices. Describe its operation with diagram.
 - (c) Identify a suitable type of heating method to heat conducting material. Explain its operation with diagram.
- 6. Attempt any TWO of the following : 12**
- (a) Justify FCT as a voltage controlled device with characteristics. Write its applications.
 - (b) Identify a suitable inverter in which load is connected in parallel with commutating components. Explain its operation with circuit diagram.
 - (c) Explain the operation of McMurray Bedford inverter with circuit diagram.
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