

17444

16172

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) Assume suitable data, if necessary.
 - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. (A) Attempt any SIX :

12

- (a) Draw the symbol of MOSFET and IGBT.
- (b) Draw the structural diagram and symbol of SCR.
- (c) List any four methods of triggering of SCR.
- (d) Define rectification. State any two devices used for rectification.
- (e) Give the classification of chopper. Define inverter.
- (f) Define any two performance parameters of inverter.
- (g) State the function of freewheeling diode in any rectifier circuit.
- (h) Define the term commutation of SCR.

- (B) Attempt any TWO :** **8**
- (a) Define holding current and latching current. State their typical values.
 - (b) Draw and explain single phase half wave controlled rectifier with resistive load. State the equations of average voltage and current.
 - (c) Draw and explain the block diagram of SMPS.
- 2. Attempt any FOUR :** **16**
- (a) Draw the characteristics of power BJT. Explain Quasi-saturation.
 - (b) Draw the characteristics and explain the working of SCS.
 - (c) Draw the structural diagram and symbol of GTO. Describe its working.
 - (d) Draw the circuit diagram of Resistance triggering. Explain the working with necessary waveforms.
 - (e) Define firing angle. Explain the method of phase control technique.
 - (f) Draw and explain step-down chopper with relevant waveforms.
- 3. Attempt any FOUR :** **16**
- (a) State the types of power MOSFETS. Explain the working of any one type with a constructional diagram.
 - (b) Compare SCR & TRIAC with any four points.
 - (c) Explain pulse triggering of SCR, with a neat circuit diagram and necessary waveforms.
 - (d) Draw the circuit diagram and waveforms of 3-phase half wave controlled rectifier.
 - (e) Give a detailed classification of inverters.
 - (f) Draw a fully controlled bridge configuration of single phase rectifier. Explain working with necessary waveforms.

4. Attempt any FOUR :**16**

- (a) Compare 'Power BJT' with 'Power MOSFET' for their performance factor, construction and area of applications.
- (b) Explain the working of "PUT" with relevant diagrams. Why it is called programmable ?
- (c) Explain Complementary Commutation with necessary diagrams and waveforms.
- (d) Draw a neat circuit diagram of single phase half bridge inverter. Explain with waveforms.
- (e) Draw and explain on-line UPS.
- (f) Compare three phase controlled and uncontrolled rectifier with resistive load, for any four points.

5. Attempt any FOUR :**16**

- (a) Name any four triggering devices. Draw the characteristics of "DIAC".
- (b) With necessary waveforms explain the turn-off mechanism of SCR.
- (c) Explain the principle of step up chopper with a neat diagram.
- (d) Draw the set-up of a temperature controller using SCR.
- (e) Draw and explain light dimmer circuit using DIAC-TRIAC.
- (f) With necessary diagrams explain how a freewheeling diode improves the power factor of a single phase half wave rectifier connected with inductive load.

P.T.O.

6. Attempt any FOUR :**16**

- (a) Draw the structure and symbol of SUS. State the difference between SUS and PUT.
 - (b) Explain resonant commutation with necessary waveforms.
 - (c) A single phase half wave controlled rectifier is supplied with a voltage $v = 110 \sin (.628 t)$. Find the average DC output voltage and current, if the firing angle is 15° and $R_L = 200 \Omega$.
 - (d) State the need of 3-phase rectifier. State the expression for average DC output voltage of a 3-phase controlled rectifier during,
 - (i) Continuous conduction mode
 - (ii) Discontinuous conduction mode
 - (e) Draw the circuit diagram of battery charger and state significance of each component.
 - (f) Draw electronic timer and state its working.
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