

22326

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.

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| 1. Attempt any FIVE of the following : | 10 |
| (a) Draw the symbol of IGBT and MOSFET. | |
| (b) State the application of power transistor (any two). | |
| (c) State the types of protection circuits (any four). | |
| (d) Give the types of SCR turn on methods. | |
| (e) Define firing angle and conduction angle. | |
| (f) Give any four specifications of UPS. | |
| (g) State the requirements of SMPS. | |
| 2. Attempt any THREE of the following : | 12 |
| (a) Describe the constructional details of MOSFET with sketches. | |
| (b) Draw VI characteristics of SCR with neat sketch and explain its regions. | |
| (c) Explain the operation of RC triggering circuit with neat sketch. | |
| (d) Explain the operation of single phase half controlled rectifier with RL load. | |
| 3. Attempt any THREE of the following : | 12 |
| (a) Describe overcurrent protection with suitable circuit arrangement. | |
| (b) Explain the operation of synchronized UJT triggering circuit with a neat sketch. | |
| (c) Explain the operation of single phase fully controlled midpoint configuration rectifier with RL load. | |
| (d) Explain the operation of battery charger using SCR with a neat sketch. | |

- 4. Attempt any THREE of the following :** **12**
- (a) Describe SCR mounting and cooling with neat sketch.
 - (b) Explain with sketch the operation of an auxiliary voltage commutation.
 - (c) A single phase fully controlled rectifier supplied with voltage $V = 100 \sin 314 t$, $\alpha = 30^\circ$ and load resistance is 50Ω . Find (i) Average output dc voltage and (ii) Load current.
 - (d) Explain the operation of emergency light system with a neat sketch.
 - (e) Explain illumination control by using TRIAC with the help of neat sketch.
- 5. Attempt any TWO of the following :** **12**
- (a) For the device GTO, answer the following :
 - (i) Give the constructional details with a neat sketch.
 - (ii) State the advantages of GTO over SCR.
 - (b) For a class C commutation, answer the following :
 - (i) Explain the operation with circuit diagram.
 - (ii) Interpret with waveforms.
 - (c) Explain the modes of operation in TRIAC with quadrant diagram.
- 6. Attempt any TWO of the following :** **12**
- (a) State the effect of source inductance in controlled rectifies with waveforms.
 - (b) Justify with sketches the effect of freewheeling diode in a fully controlled rectifier with RL load.
 - (c) If a person use one ceiling fan (80 W), two tube lights (40 W per one tubelight), two CFL (7 watt per one CFL) simultaneously with UPS having 12 V, 150 AH battery, calculate backup time of UPS battery.
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