22326

**12425**

**3 Hours / 70 Marks** Seat No. | | | | | | | | |

***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) Give the application of power transistor (any four).

(b) Draw V-I characteristics for : TRIAC.

(c) Give the applications of SMPS (any four).

(d) State any four methods of SCR triggering.

(e) Draw symbols of IGBT and GTO.

(f) Define :

(i) Firing Angle

(ii) Conduction Angle

(g) State the need of UPS.

**2. Attempt any THREE of the following :** **12**

(a) Describe with neat sketch the constructional details of IGBT.

(b) Explain the operation of single phase fully controlled midpoint configuration rectifier with RL load.

(c) Compare SCR & TRIAC (any four).

(d) How SCR commutates in class A method ? Explain with diagram.

**3. Attempt any THREE of the following :** **12**

(a) Draw and explain two transistor analogy of SCR.

(b) Draw circuit diagram of UJT triggering of SCR and draw waveform to show firing angle control.

(c) Draw circuit diagram of battery charger circuit using SCR. Explain its working.

(d) Explain the operation of 1-$\phi$ fully controlled bridge converter with "R" load.

**4. Attempt any THREE of the following :** **12**

(a) Explain auxiliary commutation with a neat diagram. Also draw its waveform.

(b) Explain the operation of UPS with a neat block diagram.

(c) Explain the operation of crowbar circuit for overvoltage protection with neat diagram.

(d) A single phase fully controlled rectifier supplied with voltage V = 200 sin 314 t, $\alpha = 30°$ and load resistance 60 $\Omega$. Find :

(i) Average output DC voltage and

(ii) Load current

(e) Describe emergency lighting system with neat diagram.

**5. Attempt any TWO of the following :** **12**

(a) Draw and explain V-I characteristics of SCR and define the following terms :

(i) Forward break over voltage

(ii) Latching current

(iii) Holding current

(b) Explain pulse transformer and opto coupler based triggering of SCR.

(c) Draw and explain the working of I-$\phi$ half wave controlled rectifier with RL load. Explain the effect of freewheeling diode.

**6. Attempt any TWO of the following :** **12**

(a) Draw the circuit diagram of DC static circuit breaker and give its operation.

(b) State classification of phase controlled rectifier. Also differentiate between controlled and uncontrolled rectifiers (4 points).

(c) Draw symbol and V-I characteristics of :

(i) LASCR

(ii) SCS

(iii) DIAC

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