17444

21718

3 Hours / 100 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) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. (A) Answer any SIX : **2 × 6 = 12**

(a) Name any two triggering devices used for triggering SCR.

(b) State any two advantages of IGBT.

(c) List two applications of TRIAC.

(d) State the classification of Chopper.

(e) State difference between forced commutation and natural commutation. (any 2 points)

(f) List two applications of Inverter.

(g) Define firing angle and conduction angle.

(h) Draw labelled basic block diagram of UPS.

(B) Answer any TWO : **4 × 2 = 8**

(a) What is the polyphase rectifier ? State its need.

(b) Compare between step up and step down chopper. (any 4 points)

(c) Draw the neat circuit diagram of fan speed regulator using Triac. Describe its working.

2. Answer any FOUR : **4 × 4 = 16**

(a) Draw the single phase full wave bridge type controlled rectifier. Draw the waveforms of input voltage, load voltage and voltage across SCR.

(b) Draw circuit of step down chopper and explain its working with neat waveforms.

(c) State the function of SMPS. Sketch block diagram of SMPS and label it well.

(d) Sketch equivalent circuit of SCR using BJT. Describe its working principle.

(e) State different trigger methods and describe R-triggering method for SCR with circuit diagram and waveforms.

(f) Define distortion factor and lowest order harmonics with respect to inverter.

3. Answer any FOUR : **4 × 4 = 16**

(a) Differentiate SCR and TRIAC with respect to (i) symbol, (ii) layered diagram, (iii) operating quadrant, (iv) application.

(b) Compare controlled and uncontrolled rectifiers. (any 4 points)

(c) Draw constructional diagram of GTO and state its operating principle.

(d) Draw VI characteristics of power transistor. Label different regions.

(e) Describe the effect of free wheeling diode in controlled rectifier.

(f) Sketch circuit of three phase uncontrolled half wave rectifier with resistive load. Draw its input and output waveforms.

4. Answer any FOUR : **4 × 4 = 16**

(a) State the need of Inverter. List four applications of Inverters.

(b) Draw symbol and characteristics of DIAC and SUS.

(c) Describe the working of DC flasher circuit using SCR with neat diagram.

(d) Explain dv/dt turn on method of SCR.

(e) Draw the circuit diagram of light dimmer using DIAC and TRIAC and sketch the input and output voltage waveforms.

(f) Draw circuit diagram of single phase half bridge inverter. Explain its working with output voltage waveforms.

5. Answer any FOUR : **4 × 4 = 16**

(a) Draw labelled circuit diagram of battery charger using SCR.

(b) Draw the layer diagram of PUT. With neat circuit diagram, describe its working as relaxation oscillator.

(c) Draw 1ϕ HWCR with inductive load. Draw input and output waveforms. Describe its operation.

(d) Describe the working of class B commutation with neat circuit diagram.

(e) Draw the labelled constructional diagram of N-channel IGBT.

(f) Draw the circuit diagram of three phase half wave controlled rectifier. Draw the waveforms of input voltage and output voltage.

P.T.O.

6. Answer any FOUR : **4 × 4 = 16**

(a) Draw circuit diagram and explain the working emergency light system using SCR.

(b) Draw single phase centre tapped controlled rectifier with RL load and draw its load voltage waveforms.

(c) Explain class C commutation with circuit diagram.

(d) State two applications each for (i) SCR and (ii) PUT.

(e) Explain the secondary breakdown in power BJT and how it can be avoided ?

(f) Compare R-triggering and RC-triggering of SCR on the basis of (i) circuit diagram, (ii) firing angle, (iii) cost, (iv) average output voltage.