# 17638

**11718**

**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) **Attempt any THREE of the following:** **12**

(i) Draw the symbol of the following:

1) GTO

2) SUS

3) LASCR

4) IGBT

(ii) Draw a neat circuit diagram of single phase fully controlled half wave converter with R load and give its operation.

(iii) State the need of inverter. Give its classification.

(iv) Give the operation of speed control of DC series motor with step down chopper with a neat diagram. Also draw its waveform.

**Marks**

b) **Attempt any ONE of the following:** **6**

(i) Give the operation of series inverter with a neat diagram. Draw its waveforms and also state its limitations.

(ii) Draw a neat circuit diagram of 1ϕ fully controlled bridge converter with RL load and give its operation with waveform.

**2. Attempt any FOUR of the following:** **16**

a) Explain two transistor analogy of SCR.

b) Give the concept of firing angle and conduction angle with a neat waveform.

c) Give the operation of single phase full wave controlled converter with R load with a neat diagram.

d) Give the control techniques of a chopper with a neat waveform.

e) Give the operation of speed control of 3 ϕ Induction motor using variable frequency system with a neat diagram.

f) Draw a neat circuit diagram of class B chopper and give its operation with waveform.

**3. Attempt any FOUR of the following:** **16**

a) Give the triggering methods of SCR and explain any one.

b) Draw a neat diagram of single phase fully controlled half wave converter with RL load and freewheeling diode. Give its operation.

c) Give any four specifications of SCR.

d) Give the operation of class C chopper with a neat diagram. Also draw the waveform.

e) Give the principle of induction heating control with a neat representation.

**Marks**

**4.** a) **Attempt any <u>THREE</u> of the following:** **12**

(i) Draw a neat circuit diagram of class D chopper and give its operation with waveform.

(ii) What are the requirements of pulse gate triggering of SCR?

(iii) Give the operation of automatic street lighting circuit using SCR with a neat diagram.

(iv) Explain Auxillary commutation with a neat diagram.

b) **Attempt any <u>ONE</u> of the following:** **6**

(i) Explain sinusoidal pulse width modulation with a neat diagram.

(ii) Give the operation of $3\phi$ fully controlled bridge converter with R load with a neat diagram. Also draw its waveform.

**5.** **Attempt any <u>FOUR</u> of the following:** **16**

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

b) Give the effect of source impedance on converter operation.

c) Draw a neat circuit diagram of basic parallel inverter and give its operation.

d) Give the operation of Battery charger control with a neat diagram.

e) Give the operation of single PWM using LC filter with a neat diagram.

f) Draw a neat circuit diagram of single phase full bridge inverter with RL load and give its operation.

**Marks**

**6. Attempt any FOUR of the following:** **16**

a) Draw a circuit diagram of Jones Chopper and give its operation.

b) Give the operation of static VAR compensation system with a neat diagram.

c) Give the operation of closed loop speed control method for DC servomotor with a neat diagram.

d) Give the principle of dielectric heating control with a neat diagram.

e) Draw a neat labelling VI characteristics of SCR and explain the region.