

Total No. of Questions :10]

SEAT No. :

**P3608**

**[5560]-563**

[Total No. of Pages : 2

**T.E. (Electrical)**  
**POWER ELECTRONICS**  
**(2015 Pattern) (Semester - I)**

*Time : 2½ Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) *Answer any one questions from Q1 & Q2, Q3 & Q4, Q5 & Q6, Q7 & Q8, Q9 & Q10*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Black figures to the right indicate full marks.*
- 4) *Assume suitable data if necessary.*

- Q1)** a) Explain with neat circuit diagram operation of R-C triggering circuit of Thyristor [5]
- b) Write short note on Class E Chopper. [5]

OR

- Q2)** a) Describe working of single phase semi converter with RL load. Draw waveforms of load voltage, load current. [5]
- b) Draw and explain output and transfer characteristics of MOSFET [5]

- Q3)** a) Describe working of single phase circulating type of dual converter with output voltage waveform. [5]
- b) State and explain different modes of operation of SCR with the help of V-I characteristic. [5]

OR

- Q4)** a) Explain the following ratings of the thyristor.
- i) Latching current
  - ii) Holding current [5]
- b) For a type A chopper circuit, source voltage  $V_s = 220V$ , chopping period,  $T = 2000 \mu s$ , on period  $= 600 \mu s$ , load circuit parameters:  $R = 1\Omega$ ,  $L = 5mH$  and  $E = 24V$ . Calculate the maximum and minimum values of steady state output current. [5]

**P.T.O.**

- Q5) a)** With neat diagram explain four mode operation of a TRIAC. [8]
- b)** Explain working of three phase fully controlled converter with RL load & firing angle of  $30^\circ$ . Draw output voltage waveforms & obtain expression for phase voltage & Line voltage. [8]

OR

- Q6) a)** A three phase full converter operating from three phase, 415V, 50Hz supply with resistive load, Determine average output voltage for  $\alpha = 30^\circ$  and  $\alpha = 90^\circ$ . [8]
- b)** What is two stage ac voltage regulator? Explain its operation with output waveform for RL Load. [8]
- Q7) a)** For single pulse width modulation with quasi square wave show that output voltage can be expressed as 
$$V_0 = \sum_{n=1,3,5,\dots}^{\infty} \frac{4V_s}{n\pi} \sin \frac{n\pi}{2} \sin n\omega t$$
 Where  $V_s$  is source voltage and pulse width is  $2d$ . [8]
- b)** Explain with circuit diagram and waveforms operation of single phase current source inverter. [8]

OR

- Q8) a)** Explain Sinusoidal Pulse width modulation with necessary waveforms. [8]
- b)** A single phase full bridge inverter is operated from 48V battery and is supplying power to a pure resistive load of  $10\Omega$ . Determine [8]
- Output voltage (rms voltage)
  - Output rms power
- Q9) a)** List different harmonic elimination techniques used in inverter. Explain any two methods in detail. [10]
- b)** Draw a neat diagram and explain cascaded multi level converter. [8]

OR

- Q10) a)** Explain working of three phase six step voltage source inverter in  $180^\circ$  mode of operation. For star connected load draw output voltage waveforms. Show devices conducting in each step. [10]
- b)** Write short note on Flying Capacitor multilevel converter. [8]

