

Total No. of Questions : 10]

SEAT No. :

**P2874**

**[4958]-1063**

[Total No. of Pages :2

**T.E.(Electrical)**

**POWER ELECTRONICS**

**(2012 Course)(Semester-I)(303143)**

*Time :2½Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) *Solve Q1 or 2,Q3or 4, Q5 or 6 , Q 7 or 8, Q 9 or 10.*
- 2) *Assume suitable data if necessary.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*
- 5) *Use of electronic calculator is allowed.*

- Q1) a)** Draw and explain static characteristic of SCR. **[5]**
- b) Explain single phase ac voltage regulator feeding R load. Draw output voltage waveform. **[5]**

**OR**

- Q2) a)** Describe working of single phase two pulse SCR controlled converter with R load Draw waveforms of load voltage, load current. **[5]**
- b) Explain V-I Characteristic of TRIAC in 1<sup>st</sup> and III<sup>rd</sup> quadrant. **[5]**
- Q3) a)** Explain method adopted for the protection of SCR against-dv/dt rate.[3]
- b) Explain working of three phase fully controlled converter with output waveforms for firing angle of 60° with R load **[7]**

**OR**

- Q4) a)** Draw and explain single phase semi converter with output waveforms for RL load. **[5]**
- b) A three phase half wave controlled converter is fed from 3 phase, 400V, and 50Hz source and is connected to a load taking a constant current. Calculate average value of load voltage for a firing angle of 30°&60°. **[5]**

**P.T.O.**

- Q5) a)** Explain four quadrant chopper feeding RLE load in detail with neat diagram. [12]
- b) Give a comparison between MOSFET and IGBT [4]

**OR**

- Q6) a)** Explain Turn on and turn off process in MCT. State its merits. [8]
- b) Draw a power circuit diagram for a type-A chopper. Show load voltage waveforms for  $\alpha = 0.3$  and  $\alpha = 0.8$ . For both these duty cycles, calculate:
- i) the average value of output voltage in terms of source voltage. [8]

- Q7) a)** Explain single phase full bridge inverter with necessary waveforms for R - L load. [8]
- b) What is pulse width modulation? Explain sinusoidal PWM technique in detail. [8]

**OR**

- Q8) a)** Explain with circuit diagram and waveforms operation of single phase current source inverter. [8]
- b) What are different voltage control methods for inverter? Explain any one type of control method. [8]
- Q9) a)** Explain working of three phase six step voltage source inverter in  $180^\circ$  mode of operation. For star connected balanced load draw output voltage waveforms. Show devices conducting in each step. [12]
- b) What are different harmonic reduction techniques? Explain any two techniques. [6]

**OR**

- Q10) a)** What is multilevel inverter? Explain any one type in detail. [6]
- b) Explain working of three phase six step voltage source inverter in  $120^\circ$  mode of operation. For star connected balanced load draw output voltage waveforms. Show devices conducting in each step. [12]

