304205

Seat No.	

T.E. (Electronics) (Semester – I) Examination, 2014
POWER ELECTRONICS
(2008 Course)

Time : 3 Hours Max. Marks : 100

Instructions :
1) *Answers to the **two** Sections should be written in **separate** answer books.*
2) ***Neat** diagrams and waveforms must be drawn **wherever** necessary.*
3) *Figures to the **right** side indicate **full** marks.*
4) *Use of nonprogrammable calculator is **allowed**.*
5) *Assume suitable data if **necessary**.*

SECTION – I

1. a) With the help of neat circuit diagram and relevant waveforms, explain operation of circulating current type single phase dual converter. Derive the expression for average o/p voltage. **10**

   b) A three phase full converter is operated from a three phase Y-connected 208 V, 60 Hz supply and the load resistance is 10Ω. If $\alpha = 60°$ find average o/p d.c. voltage, r.m.s. o/p voltage, r.m.s. o/p current, average output current and rectification efficiency. **8**

   OR

2. a) Explain effect of source impedance on the performance of single phase full converter, derive the expression for average o/p voltage. **10**

   b) What are the different types of triggering methods for Phase Controlled Rectifiers ? Explain any one in detail, **8**

3. a) Explain with circuit diagram operation of step up chopper. Derive an expression for its o/p voltage. **8**

   b) A dc chopper has a resistive load of 10Ω and the input voltage is 220 V. When the chopper switch remains on, its voltage drop is 2 V and the chopping frequency is 1 kHz. If the duty cycle is 50%, determine
      i) the average output voltage
      ii) the rms output voltage
      iii) the chopper efficiency
      iv) the effective input resistance of the chopper. **8**

   OR

4. a) Explain the operation of four quadrant chopper with circuit diagram and waveforms. **8**

   b) Explain the operation of Buck-Boost converter. Derive the equation of average output voltage. **8**

P.T.O.

5. a) Explain with circuit diagram and waveforms operation of SLR half bridge DC to DC converter in discontinuous mode. 10

   b) Compare ZVS and ZCS. 6

OR

6. a) What is cyclo converter ? Explain single phase cyclo converter with various wave forms. 10

   b) Write note on Matrix converters. 6

SECTION – II

7. a) Explain the operation of three phase transistorized inverter for resistive star connected load. Draw relevant waveforms with 120° conduction mode. 10

   b) Write a note on voltage control and harmonic reduction in voltage source inverter. 8

OR

8. a) Compare voltage source inverter and current source inverter. 6

   b) Explain with relevant waveforms sequential current source inverter in detail. 12

9. a) Draw a twelve pulse converter used in HVDC transmission. Write the advantages of HVDC transmission over HVAC transmission. 8

   b) What are different protections circuits for power devices ? Explain with circuit diagram how to protect a power device from dv/dt rating. 8

OR

10. Write a note on (**any two**) : 16

    a) Electronic ballast

    b) Electric welding

    c) HF induction heating.

11. a) What is importance of power factor ? Explain symmetric angle control method for the power factor improvement. 8

    b) Explain measurement of power line disturbances. 8

OR

12. a) Explain types of power line disturbances with sources and preventive techniques. 8

    b) Write a note on energy audit. 8
