



(Pages : 2)

10642

Reg. No. : .....

Name : .....

**Fourth Semester B.Tech. Degree Examination, February 2016**  
**(2013 Scheme)**

**13.405 : POWER ELECTRONICS (E)**

Time : 3 Hours

Max. Marks : 100

**PART – A**

Answer **all** questions. **Each** question carries **two** marks. **(10×2=20 Marks)**

1. Draw V-I characteristics of SCR.
2. Draw the thermal equivalent circuit of an SCR.
3. Draw gate characteristics of SCR.
4. What is synchronization in SCR triggering ?
5. Draw SCR circuit for phase controlled rectifier.
6. What is the use of freewheeling diode in SCR Control ?
7. State the basic principle of switching regulator.
8. What is chopper ?
9. Differentiate between forced commutation and natural commutation.
10. Draw basic series inverter circuit with wave form.

**PART – B**

Answer **any one full** question from **each** Module. **(4×20=80 Marks)**

**Module – I**

11. a) Explain switching characteristics of thyristor during turn-on and turn-off. **10**  
b) The trigger circuit of a thyristor has a source voltage of 15V and the load line has a slope of – 120V per ampere. The minimum gate current to turn-on the SCR is 25mA. Compute.  
a) Source resistance required in the gate circuit,  
b) The trigger voltage and trigger current for an average gate power dissipation of 0.4 watts. **10**

OR

P.T.O.



12. a) Explain working of static parallel connection of SCR equalization circuit. 10  
 b) Describe with circuit and waveform of resonant pulse commutation techniques. 10

### Module – II

13. a) With circuit and wave form describe RC-half wave trigger circuit. 10  
 b) Explain the construction and working principle of  
 i) IGBT ii) Power MOSFET 10

OR

14. a) With circuit, explain pulse transformer firing circuits for SCR. 10  
 b) Explain DIAC triggering circuit for TRIAC in phase control. 10

### Module – III

15. Explain single phase fully controlled circuit with RL load with wave form for continuous and discontinuous current modes of operation. Derive the relevant expression for output voltage. 20  
 OR  
 16. Describe with circuit, the wave form and operation of 6 pulse converter. Derive the output voltage expression. 20

### Module – IV

17. a) Explain with diagram working of step-up chopper. 10  
 b) Describe with waveforms, the operation of a current commutated chopper. 10  
 OR  
 18. a) With diagram, describe three phase full bridge inverter 120 deg conduction mode. 12  
 b) Explain the working principle of a current source inverter. 8