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**B.E./B.Tech. (Full-Time) DEGREE END SEMESTER EXAMINATIONS, APRIL/MAY 2012  
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**EC 511 - POWER ELECTRONICS  
(Regulations: 2004)**

**Duration: 3 Hours**

**Max. Marks: 100**

**Answer ALL questions**

**PART-A**

**(10x2=20 Marks)**

1. State the use of protection circuits.
2. Write about the fast recovery diode.
3. List out the practical applications of AC voltage controllers.
4. What is meant by dual convertors?
5. Enumerate the features of a variable frequency chopper.
6. What is meant by bidirectional power supplies?
7. Give the methods for voltage control, within the inverters?
8. List the various commonly used techniques in the pulse-width-modulation based inverter.
9. Why we use relays in power systems?
10. List the advantages of micro-electronic relays.

**PART-B**

**(5x16=80 Marks)**

11.

(a) Write a short note on the following topics:-

- (i) Thyristors (4)
- (ii) Power TRIAC (4)
- (iii) Power MOSFET (4)
- (iv) IGBT (4)

12.

(a) Describe the working of a single phase full converter in the rectifier with RL load and derive the expression for the average output voltage in terms of source voltage and firing angle. (16)

(or)

(b) A single-phase AC voltage controller circuit shown in figure – 1 has a resistive load of  $R = 20 \Omega$  and the input voltage is  $V_s = 240 \text{ V}$ , 120 Hz. The delay angle of thyristor T1 is  $\alpha = \pi / 4$ . Determine (a) the rms value of output voltage  $V_o$ , (b) the input power factor PF, and (c) the average input current. (16)

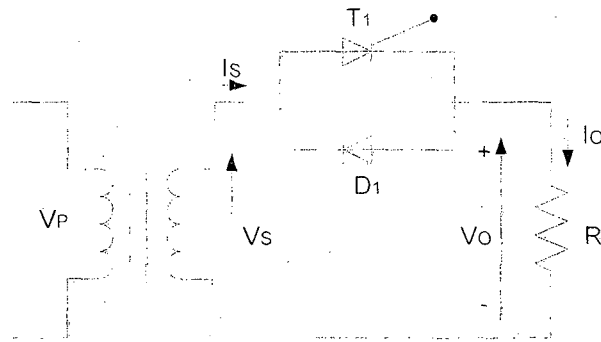


Figure - 1

13.

(a) With the help of circuit diagram and output voltage waveforms, explain the principle of operation of a chopper. (16)

(or)

(b) Describe the principle operation of a Buck-Boost Regulators. Derive an expression for its average DC output voltage. (16)

14.

(a) With the necessary explanation and equations, write the notes on following items:-

(i) Single pulse-width modulation (8)

(ii) Multiple pulse-width modulation (8)

(or)

(b) Describe in detail about the principle and operation of a pulse width modulated inverters. (16)

15. (a) Explain in detail about the Induction motor drives and explain how it applies in the power systems? (16)

(or)

(b) Explain the principle of brushless motor drives. List the advantages of solid state relay based DC drive. (16)