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Register No. | | | | | | | | | | |

B.E./B.Tech. Degree(Full Time) Supplementary Examinations Oct/Nov. 2011

EC 511 POWER ELECTRONICS

Regulation 2004

VIII SEMESTER ECE

Duration : 3 Hrs. Max. Marks: 100

Part A (10 x 2 = 20 Marks)

Answer ALL Questions

1. Define latching current.
2. What is meant by commutation?
3. Under what conditions a single phase fully controlled converter gets operated as an Inverter.
4. What are the two methods of control in ac voltage controllers?
5. What is meant by PWM control in dc chopper?
6. What is the need of demagnetizing winding in transformer for forward converter?
7. Give two advantages of CSI.
8. List the methods of reducing harmonic currents in inverter.
9. What are the differences between salient pole motors and reluctance motors?
10. What are solid state relays?

Part B (5 x 16 = 80 Marks)

(Question No. 11 is compulsory)

11. i. Explain the switching performance of GTO with relevant waveforms indicating clearly the turn-on, turn-off times and their components. (10)

ii. Discuss the effect of snubber circuit in the turn off characteristics of GTO. (6)

12. a. Describe the working of 3-phase semi-converter with relevant voltage and current waveforms and discuss the effect of freewheeling diode. Derive the expression for the average output voltage of 3-phase semi-converter with resistive load.

(OR)

b. With the help of associated waveforms, explain in detail the operation of dual converter with circulating current. Compare non-circulating current mode and circulating current mode.

13. a.i. A step up chopper has input voltage of 220 V and output voltage of 660 V. If the non-conducting time of thyristor chopper is 100 micro sec, compute the pulse width of output voltage. In case the pulse width is halved for constant frequency operation, find the new output voltage. (6)

a.ii. Explain the operation of buck regulators with continuous load current using suitable waveforms. (10)

(OR)

b. Discuss the discontinuous and continuous mode operation of isolated fly back SMPS with pros and cons. Derive its voltage transfer ratio in continuous mode.

14. a. What is the need for controlling the output voltage of inverters? Classify the various techniques adopted to vary the inverter gain and brief on sinusoidal PWM.

(OR)

b.i. Explain the operation of 3 φ bridge inverter for 180 degree mode of operation with aid of relevant phase and line voltage waveforms?

ii. The single phase half bridge inverter has resistive load of R=10 ohm and the input voltage is 220V. Determine RMS output voltage and average value RMS current?

15. a. Explain the speed control of induction motor using stator voltage control. Also draw and explain the speed torque curves.

(OR)

b. With neat block diagram, describe the principle of self controlled synchronous motor fed from a three phase inverter. Draw the relevant waveforms.

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