Reg.No :

Question Paper Code :19EE2A

B.E / B.Tech DEGREE EXAMINATION, NOV / DEC 2021

Fifth Semester

EE19502 - POWER ELECTRONICS

Electrical and Electronics Engineering

(Regulations 2019)

Time : Three Hours Maximum : 100 Marks

Answer ALL Questions

PART A (10 x 2 = 20 Marks)

1. Draw the VI characteristics of SCR.
2. Define Latching current.
3. Define delay angle or firing angle.
4. Mention some of the applications of controlled rectifier.
5. List the limitations of variable frequency control.
6. What is meant by duty-cycle?
7. Give two advantages of CSI.
8. Compare CSI and VSI.
9. What are the two types of control normally used in AC voltage controller?
10. Mention few applications of AC regulator.

PART B (5 x 13 = 65 Marks)

11. a. Explain in detail about structure, operation and characteristics of SCR.

(OR)

b. Explain the switching characteristics of IGBT.

12. a. With neat waveforms explain the working of 1Φ full converter with RL load. Derive the expression for average voltage.

(OR)

b. Explain the operation of 3-phase full converter with R load.

13. a. Discuss the operation of buck converter and derive the expression of ripple voltage.

(OR)

b. Describe the principle of step-up chopper. Derive an expression for the average output voltage in terms of input dc voltage & duty cycle.

14. a. Discuss the different types of PWM schemes.

(OR)

b. Explain the operation of 3Φ VSI at 180^0 mode and write the expression for output phase voltage and line voltage.

15. a. Draw the circuit diagram of single phase A.C voltage controller with RL load. Explain with neat wave forms.

(OR)

b. Draw the circuit diagram of single phase to single phase cycloconverter and explain its operation with waveforms.

PART C (1x15=15 Marks)

16. a. A single phase full converter is supplied from 230V, 50Hz source. The load consists of R =10 ohm and a large inductance so as to render the load current constant. For the firing angle of 30^o , determine a) average output voltage b) average output current c) average andrms values of thristor currents and d) power factor.

(OR)

b. A three phase full converter bridge is connected to supply voltage of 230V per phase and a frequency of 50Hz. The source inductance is 4mH. The load current on dc side is constant of 20A. If the load consists of a dc source voltage of 400V having an internal resistance of 1ohm. Calculate a) firing angle b) overlap angle.

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