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Question Paper Code	12399
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B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2023

Fifth Semester

Electrical and Electronics Engineering
20EEPC502 - POWER ELECTRONICS
(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

- | | <i>Marks,
K-Level, CO</i> |
|--|-------------------------------|
| 1. Distinguish between holding current and latching current of SCR. | <i>2,K2,CO1</i> |
| 2. Infer the necessity of a snubber circuit. | <i>2,K2,CO1</i> |
| 3. Classify the various modes of operation of single phase fully controlled bridge converters. | <i>2,K2,CO2</i> |
| 4. Classify the functional modes of dual converters. | <i>2,K2,CO2</i> |
| 5. Classify different control strategies in DC chopper. | <i>2,K2,CO3</i> |
| 6. Distinguish between PWM and FM control. | <i>2,K2,CO3</i> |
| 7. Infer why thyristors are not preferred for inverters? | <i>2,K2,CO4</i> |
| 8. What is meant by PWM control? | <i>2,K1,CO4</i> |
| 9. Outline the advantages of ac voltage controllers. | <i>2,K2,CO5</i> |
| 10. Classify the types of cyclo converters. | <i>2,K2,CO5</i> |

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

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| 11. a) (i) Discuss the different modes of operation of thyristor with the help of static VI characteristics. | <i>7,K2,CO1</i> |
| (ii) Explain the construction of SCR with a neat sketch. | <i>6,K2,CO1</i> |
| OR | |
| b) Explain the structure and discuss the different modes of operation of TRIAC with the help of VI characteristics. | <i>13,K2,CO1</i> |
| 12. a) With relevant waveforms, derive the expression for average and rms value of output voltage in a single phase full converter with RL load. | <i>13,K2,CO2</i> |
| OR | |
| b) Explain the operating principle of a single phase Dual converter with neat diagrams. | <i>13,K2,CO2</i> |

13. a) (i) Discuss the principle of operation of a DC-DC step-down chopper with suitable waveforms. Derive the expression for its average dc voltage and RMS voltage. *7,K2,CO3*
(ii) Explain time ratio control and current limit control strategies. *6,K2,CO3*

OR

- b) Explain the working of Boost Converter with a neat sketch with waveform and derive the expression. *13,K2,CO3*
14. a) Describe the operation of 3 phase bridge inverter for 120 degree mode of operation with aid of relevant phase and line voltage waveforms. *13,K2,CO4*

OR

- b) Explain a single phase auto-sequential commutated current source inverter with L load by considering both mode of conduction with neat diagram. *13,K2,CO4*
15. a) Explain a single phase full wave ac voltage controller with resistive load and obtain the expression for RMS output voltage and load current. *13,K2,CO5*

OR

- b) Explain the working of single phase to single phase cyclo converter with neat circuits and waveforms. *13,K2,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) (i) Explain the Application of inverter in UPS. *8,K5,CO4*
(ii) Explain the operation of multistage control of AC voltage controllers with a neat diagram. *7,K5,CO5*

OR

- b) (i) Explain Multiple PWM. *8,K5,CO4*
(ii) Inference a short note on matrix converters. *7,K5,CO5*