A **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 95301

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2024

Fifth Semester

Electrical and Electronics Engineering

19UEE501 - POWER ELECTRONICS

(Regulation 2019)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. A SCR is a _____ switch CO1- U

   (a) two directional (b) unidirectional (c) three-directional (d) four-directional

2. For normal SCRs, turn-on time is CO1- U

   (a) less than turn-off time tq (b) more than tq (c) equal to tq (d) half of tq

3. A fully controlled converter uses _____ CO2- U

   (a) diodes (b) only thyristors (c) both diodes and thyristors (d) None of the above

4. The frequency of ripple in the output voltage of the three phase controlled bridge rectifiers depend on _____ CO2- U

   (a) load inductance (b) firing angle (c) supply frequency (d) load resistance

5. Output voltage for Buck converter is _____ CO3- U

   (a) 8D×Vin (b) 5D×Vin (c) 2D×Vin (d) D×Vin

6. A step - down choppers can be used in CO3- U

   (a) Electric traction (b) Electric vehicles (c) supply frequency (d) All of the above

7. A voltage source inverter is used when source and load inductances are respectively CO4- U

   (a) Small and large (b) Large and small (c) Large and large d) Small and small

8. Which of the following does not measure the quality of the inverter output CO4- U

   (a) Harmonic factor (b) Total Harmonic Distortion

   (c) Distortion factor (d) Power Factor

9. In AC voltage controllers the CO5- U

(a) variable ac with fixed frequency is obtained

(b) variable ac with variable frequency is obtained

(c) variable dc with fixed frequency is obtained

(d) variable dc with variable frequency is obtained

10. A cyclo converter is a _____ CO5- U

(a) one stage power converter (b) one stage voltage converter

(c) one stage frequency converter (d) none of the above

PART – B (5 x 2= 10 Marks)

11. Define holding current and Latching current. CO1-U

12. Write any four parameters of phase controlled converter. CO2-U

13. What are the two types of control strategies? CO3-U

14. Define space vector. CO4-U

15. What are the two methods of control in ac voltage controllers? CO5-U

PART – C (5 x 16= 80Marks)

16. (a) Draw the switching characteristics of IGBT and explain it. CO1-U (16)

Or

(b) Explain the Gate Driver circuit of MOSFET CO1- U (16)

17. (a) Analyze the operation of a single phase full bridge converter with RL load for continuous and discontinuous load currents. CO2- Ana (16)

Or

(b) Explain the operation of single phase half controlled rectifier with inductive load. Also derive an expression for the average output voltage CO2- Ana (16)

18. (a) Discuss the principle of operation of DC-DC step down chopper with suitable waveform. Derive an expression for its average DC output voltage. CO3- Ana (16)

Or

(b) Discuss the principle of operation of DC-DC step up chopper with suitable waveform. Derive an expression for its average DC output voltage. CO3- Ana (16)

19.	(a)	With a neat circuit and relevant waveforms discuss the operation of an ideal single phase CSI.	CO4- Ana	(16)
		Or		
	(b)	Describe different types of pulse width modulation techniques (PWM) inverter.	CO4- Ana	(16)
20.	(a)	Explain the operation of single phase voltage controller feeding a resistive load.	CO5- U	(16)
		Or		
	(b)	Explain the operation of the step down cyclo converter with necessary waveforms	CO5- U	(16)

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