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

Question Paper Code: 55301

B.E./B.Tech. DEGREE EXAMINATION, MAY 2022

Fifth Semester

Electrical and Electronics Engineering

15UEE501-POWER ELECTRONICS

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Which semiconductor power device out of the following is not a current triggered device? CO1- R

   (a) Thyristor (b) G.T.O (c) Triac (d) MOSFET

2. The di/dt capacity of a thyristor increases CO1- R

   (a) When the gate current is zero

   (b) When the gate current increases

   (c) When the gate current increases

   (d) When the anode to cathode voltage rating increases

3. The output voltage waveform of a three Phase square wave inverter contains CO2- R

   (a) Only even harmonics (b) Both odd and even harmonics

   (c) Only odd harmonics (d) Only triple harmonics

4. Reduction of harmonic content in the output of a system is possible in a inverter CO2- R

   (a) Current source (b) Current source (c) Square PWM (d) Load commutated

5. A freewheeling diode is placed across the dc load CO3- R

   (a) to prevent reversal of load voltage

   (b) to permit transfer of load current away from the source

   (c) both (a) and (b)

   (d) None of the above

6. In a 3 phase full wave diode rectifier if V_{ml} is the maximum voltage of line voltage then each diode is subjected to a peak inverse voltage of CO3- R

(a) V_{ml} (b) $\sqrt{3}\ V_{ml}$ (c) $2V_{ml}$ (d) $3\ V_{ml}$

7. In controlled converter is feeding RL load, the ripple content of load current is decided by CO4- R

(a) Load resistance alone (b) Load inductance alone

(c) Both R and L (d) Both R and L

8. A four quadrant operation requires CO4- R

(a) Two full converters in series

(b) Two full converters connected back to back

(c) Two full converters connected in parallel

(d) Two semi converters connected back to back

9. In a single phase full wave ac regulator using two thyristors only, the gate circuits of the two thyristors CO5- R

(a) Must be isolated (b) May or may not be isolated

(c) May or may not be isolated (d) Should not be isolated

10. In single phase half wave regulator, the average current over one full cycle CO5- R

(a) Is always positive (b) May be positive or negative

(c) May be positive or negative (d) Is always negative

PART – B (5 x 2= 10 Marks)

11. What is latching current of SCR? CO1- R

12. Why thyristor are not preferred for inverter? CO2- R

13. List the applications of uncontrolled rectifiers. CO3- R

14. Compare semi and full converter. CO4- R

15. Why is half wave AC voltage regulator not used? CO5- R

PART – C (5 x 16= 80 Marks)

16.	(a)	Draw and explain the transfer, output and switching characteristics of MOSFET.	CO1 App	(16)
		Or		
	(b)	With neat sketch explain the operation Boost converter with its waveform for the continuous and discontinuous current mode of operation.	CO1 App	(16)
17.	(a)	Construct a three phase inverter (180º conduction)and explain the operation with suitable waveform.	CO2-App	(16)
		Or		
	(b)	Describe the three phase auto sequentially commutated CSI with power circuit. Draw the equivalent circuits and relevant waveforms.	CO2-App	(16)
18.	(a)	Analyze the working of a single phase half wave diode bridge rectifier feeding resistive load and determine the form factor and rectifier efficiency.	CO3-Ana	(16)
		Or		
	(b)	Explain the working principle of three phase diode bridge rectifier with relevant diagram and wave form.	CO3-Ana	(16)
19.	(a)	Analyze the operation of single phase fully controlled bridge converter feeding RL load give corresponding circuit configuration and waveforms for continuous conduction mode.	CO4- U	(16)
		Or		
	(b)	Derive the expressions for all external parameters measures of six pulse converters.	CO4-Ana	(16)
20.	(a)	Explain the operation of two stage sequence control of AC voltage controller.	CO5- U	(16)
		Or		
	(b)	Explain the operation of TRIAC based single phase full wave AC voltage controller.	CO5- U	(16)

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