Reg. No.											

Question Paper Code	11891

B.E./B.Tech. - DEGREE EXAMINATIONS, APRIL/MAY 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

Marks, K-Level, CO

1.	What are the advantages of GTO over SCR?	2,K1,CO1
2.	What are the purposes of using snubber circuit?	2,K2,CO1
3.	What is the function of freewheeling diodes in controlled rectifier?	2,K1 CO2
4.	What is commutation angle or overlap angle?	2,K1,CO2
5.	Define duty cycle.	2,K1,CO3
6.	What is meant by buck regulator?	2,K1,CO3
7.	Distinguish CSI and VSI.	2,K2,CO4
8.	Define modulation index of PWM. What is its use?	2,K1,CO4
9.	Distinguish between ON-OFF control and phase control.	2,K2,CO5
10.	What is meant by cycloconverter?	2,K1,CO5

PART - B (5 × 13 = 65 Marks)
Answer ALL Questions

11. a) Elucidate the structure, different modes of operation and characteristics of TRIAC.   *13,K2,CO1*

OR

b) Explain the turn-on and turn-off characteristics of IGBT with neat waveform.   *13,K2,CO1*

12. a) Elucidate the operation of single-phase fully controlled rectifier with RL load, with the help of circuit relevant waveforms.   *13,K2,CO2*

OR

b) Enlighten the principle of operation of single phase dual converter with neat diagram and waveform.   *13,K2,CO2*

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **11891**

13. a) (i) Elucidate the operation of Class E (Four quadrant) chopper. *7,K2,CO3*

   (ii) Explain the concept of Battery Charger. *6,K2,CO3*

   OR

   b) Explicate the working of boost switching mode regulator with neat diagram and waveforms, also derive the expression for critical inductance and capacitance. *13,K2,CO3*

14. a) Explicate the operation of three-phase inverter with necessary waveforms for 180° mode. *13,K2,CO4*

   OR

   b) 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. *13,K2,CO4*

15. a) Discuss the working of a single phase AC voltage controller with RL load when its firing angle is more than the load power factor angle. Illustrate with waveforms. *13,K2,CO5*

   OR

   b) Describe the basic principle of working of single phase to single phase step down cycloconverter for a bridge type converter. Assume both continuous and discontinuous modes of operation. *13,K2,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) (i) Describe the working of a single phase full bridge inverter supplying R loads with relevant circuit and waveforms. *8,K2,CO4*

   (ii) Explicate the working principle of matrix converters. Also mention its applications. *7,K2,CO5*

   OR

   b) (i) Explain the Space vector modulations. *8,K2,CO4*

   (ii) Explicate the operation of multistage control of AC voltage controllers with neat diagram. *7,K2,CO5*