

Reg. No.

Question Paper Code

11879

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2023

Sixth Semester

Electronics and Instrumentation Engineering

20EIPC603 - POWER ELECTRONICS, DRIVES AND CONTROL

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

- | | <i>Marks,
K-Level, CO</i> |
|--|-------------------------------|
| 1. What is a Snubber circuit? | 2,K1,CO1 |
| 2. What are the advantages of GTO over SCR? | 2,K1,CO1 |
| 3. Define pulse number. | 2,K1,CO2 |
| 4. What are the functions of freewheeling diode? | 2,K1,CO2 |
| 5. Write the applications of DC Chopper. | 2,K1,CO3 |
| 6. What is meant by resonant converter? | 2,K1,CO3 |
| 7. Why PWM strategies are used in inverters? | 2,K1,CO4 |
| 8. What are the applications of CSI? | 2,K1,CO4 |
| 9. What is meant by electrical braking? | 2,K1,CO5 |
| 10. Define drive system. | 2,K1,CO5 |

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

- | | |
|---|-----------|
| 11. a) (i) Draw the two-transistor model of SCR and derive an expression for anode current. | 7,K2,CO1 |
| (ii) Develop a UJT based Trigger circuit for SCR. | 6,K2,CO1 |
| OR | |
| b) (i) Enumerate the importance of series and parallel operation of an SCR with relevant sketches. | 7,K2,CO1 |
| (ii) Describe about any one Driver and Snubber circuit for MOSFET. | 6,K2,CO1 |
| 12. a) Describe the working of 3 fully controlled bridge converter in the 3 ϕ Rectifying mode and inversion mode. And derive the expression for average output voltage and rms output voltage. | 13,K2,CO2 |
| OR | |
| b) Explain the effect of source inductance in the performance of the single-phase fully controlled rectifier. | 13,K2,CO2 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

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13. a) Explain the working of buck converter with neat waveform and also derive the expression of peak-to-peak voltage across the capacitor. 13,K2,CO3

OR

- b) What is resonant switching? Explain its concept with relevant circuit diagram. 13,K2,CO3

14. a) With neat sketches, explain the operation of three phase voltage source inverter. Draw phase and line voltage waveforms on the assumption that each thyristor conducts for 120° and the resistive load is star connected. 13,K2,CO4

OR

- b) (i) Comparison between voltage source inverter and current source inverter. 6,K3,CO4

(ii) With suitable circuits, mode diagrams and waveforms explain any one of CSI. 7,K2,CO5

15. a) (i) Briefly explain about the DC chopper drives. 7,K2,CO5
(ii) With diagram explain the types of electrical braking for DC drives. 6,K2,CO5

OR

- b) (i) Explain in detail, the open loop control of AC drives with constant v/f ratio. 7,K2,CO5

(ii) Draw and explain the block diagram of closed loop control of DC drives. 6,K2,CO5

PART - C (1 × 15 = 15 Marks)

16. a) Explain the different classes of chopper with neat sketch. 15,K2,CO3

OR

- b) Draw and explain the block schematic of SMPS and mention its advantages over linear power supply. 15,K2,CO3