

Reg. No.

Question Paper Code

11964

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

Second Semester

M.E - Power Electronics and Drives

20PPEPC201 - SOLID STATE AC DRIVES

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

- |  | <i>Marks,<br/>K-Level, CO</i> |
|--|-------------------------------|
| 1. How rotating magnetic field is produced in Induction Motor?   | 2,K1,CO1                      |
| 2. What is meant by field weakening how it happens?  | 2,K1,CO1                      |
| 3. Mention the advantages of PWM based Inverter.   | 2,K1,CO2                      |
| 4. What is the major difference in performance of the Induction Machine fed by Sine wave and PWM wave? | 2,K1,CO2                      |
| 5. State the value of slip at which maximum torque occurs.   | 2,K1,CO3                      |
| 6. Injection of Voltage in the Rotor Circuit is impossible for Squirrel Cage IM – Give Reason.         | 2,K1,CO3                      |
| 7. Mention the advantages of FOC of Induction Machines.  | 2,K1,CO4                      |
| 8. What is meant by Parks transformation?  | 2,K1,CO4                      |
| 9. State the Starting methods of Synchronous Motor.  | 2,K1,CO5                      |
| 10. Draw the equivalent circuit of the synchronous motor.  | 2,K1,CO5                      |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

- |   |           |
|---|-----------|
| 11. a) Explain the DC dynamic and plugging of IM.                                       | 13,K2,CO1 |
| <b>OR</b>   |           |
| b) Draw and Explain Voltage / Frequency Control of Induction Motor.                     | 13,K2,CO1 |
| 12. a) Describe the 6-Step Inverter Voltage control of IM Drive with suitable diagrams. | 13,K2,CO2 |
| <b>OR</b>   |           |
| b) Explain about closed loop controlled drive using CSI and mention its advantages.     | 13,K2,CO2 |
| 13. a) Describe the Static Scherbius System with a neat diagram.                        | 13,K2,CO3 |

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

**11964**



**OR**

- b) Explain in detail the rotor resistor control method of IM with relevant expression and characteristics. *13,K2,CO3*

14. a) Describe the Field Oriented Control of Induction Motor in detail. *13,K2,CO4*

**OR**

- b) With block diagram, briefly discuss the control strategy of DTC. Also derive the expression for torque. *13,K2,CO4*

15. a) Derive Torque Expression for Synchronous Motor. *13,K2,CO5*

**OR**

- b) Explain with a neat circuit diagram and waveforms the operation of inverter fed synchronous motor drive. *13,K2,CO5*

**PART - C (1 × 15 = 15 Marks)**

16. a) (i) Write notes on flux vector estimation method. *7,K2,CO4*  
(ii) Explain the concept of power factor control. *8,K2,CO5*

**OR**

- b) (i) With block diagram, briefly discuss the control strategy of DTC. *8, K2, CO4*  
(ii) Explain the starting methods of synchronous motor. *7, K2, CO5*