

Reg. No.

--	--	--	--	--	--	--	--	--	--

M.E. / M.TECH. DEGREE EXAMINATIONS, MAY/JUNE 2017
SECOND SEMESTER

POWER ELECTRONICS AND DRIVES
PD16202 – SOLID STATE AC DRIVES
(Regulation 2016)

Q. Code: 814323

Time: Three Hours

Maximum : 100 Marks

Answer **ALL** questions

PART A - (10 X 2 = 20 Marks)

1. What are the limitations of the variable Voltage control of Induction motor drives?
2. What are the reasons for Torque Pulsations in an Induction Motor?
3. Mention the applications of Induction motor fed from AC Voltage Controller.
4. Compare the performance between CSI and VSI fed Induction motor drives.
5. What are the advantages of static resistance controlled slip ring induction motor?
6. Mention the special features of static Kramer drive over static Scherbius drive.
7. What do you mean by DTC?
8. What are the advantages of field oriented control of Induction motor?
9. Why self controlled Synchronous motor is free from hunting oscillations?
10. What is the significance of load Commutated Synchronous motor drive?

PART B - (5 X16 = 80 Marks)

11. (a) (i) Develop the equivalent circuit of a Squirrel cage induction motor. (8)
(ii) Briefly explain about constant V/F control. (8)
(OR)
(b) Explain about various braking methods of induction motors. (16)

12. (a) Explain the closed loop variable frequency PWM inverter fed induction motor drive with dynamic braking. (16)

(OR)

- (b) Explain the operation of current source inverter fed induction motor drive with necessary power circuit. (16)

13. (a) A 3 phase, 460V, 1164 rpm, star connected, wound rotor induction motor has the following parameters: $R_s = 0.4\Omega$, $R_r' = 0.6\Omega$, $X_s = X_r' = 1.8\Omega$, $X_m = 40\Omega$, stator to rotor turns ratio is 2.5. The motor speed is controlled by static rotor resistance control. Filter resistance is 0.02Ω and the external resistance is chosen such that at $\delta = 0$, the breakdown torque is obtained at stand still. (16)

1. Calculate the value of external resistance.

2. Calculate δ for a speed of 960 rpm at 1.5 times the rated torque.

(OR)

- (b) (i) Discuss the merits and demerits of rotor control over stator control. (8)

- (ii) Explain the operation of static modified Kramer system. (8)

14. (a) Explain with necessary equations how the field oriented control scheme is implemented in an induction motor. (16)

(OR)

- (b) With block diagram, briefly discuss the control strategy of Direct Torque Control. Also derive the expression for Torque. (16)

15. (a) Develop the equivalent circuit of a wound field cylindrical rotor synchronous motor. Also derive the performance equations of the drive. (16)

(OR)

- (b) Explain about control of load commutated synchronous motor drive. (16)