

Name

Reg.No

SIXTH SEMESTER B.TECH (ENGINEERING) DEGREE EXAMINATION, MAY 2013
(2009 Admissions)

EE/PTEE 09 604 - ELECTRIC DRIVES

Time : Three Hours

Maximum : 70 Marks

Part A

Answer all questions

1. Define passive and active load torques.
2. Write the fundamental torque equation of a general motor load system.
3. Name the speed control methods of dc motors.
4. For variable frequency control of induction motor operating below base speed, v/f ratio is maintained constant. Why?
5. List the advantages of electric braking instead of mechanical brakes in traction.
(5 x 2 = 10 Marks)

Part B

Answer any FOUR questions

6. Explain the basic block diagram of an electrical drive, with functions of each block.
7. Give the classification of load torques.
8. Explain regenerative braking in separately excited dc motor.
9. Explain closed loop speed control of a 3ϕ induction motor with static rotor resistance control.
10. Variable frequency control of an induction motor is more efficient than stator voltage control. Why?
11. Explain important features of a stepper motor.
(4 x 5 = 20 Marks)

Part C

Answer all questions

12. (a) Explain different methods of current sensing and speed sensing.
(Or)
(b) Explain the following for an electrical drive.
 - (i) Current limit control
 - (ii) Closed loop torque control
 - (iii) Closed loop speed control
13. (a) A 200 V, 875 rpm, 150 A separately excited dc motor has an armature resistance of 0.06Ω . It is fed from a single phase fully controlled rectifier with an ac voltage source of 220 V, 50 Hz. Assuming continuous conduction, calculate
 - (i) firing angle for rated motor torque and 750 rpm.
 - (ii) firing angle for rated motor torque and -500 rpm.
 - (iii) motor speed for a firing angle of 160° and rated torque.
(Or)
 - (b) Explain the chopper control of separately excited dc motor.
14. (a) Explain slip power recovery schemes for a wound rotor induction motor.
(Or)
(b) Explain voltage source inverter (VSI) fed induction motor drive, with its multi-quadrant operation.
15. (a) Explain ac traction using PWM VSI squirrel cage induction motor drive.
(Or)
(b) Explain self controlled synchronous motor drive employing load commuted thyristor inverter.
(4 x 10 = 40 Marks)