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Question Paper Code : 51444

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2014.

Sixth Semester

Electrical and Electronics Engineering

EE 2352/EE 62/10133 EE 602 — SOLID STATE DRIVES

(Regulation 2008/2010)

(Common to PTEE 2352 – Solid State Drives for B.E. (Part – Time) Sixth Semester
Electrical and Electronics Engineering – Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State the condition for steady state stability of motor load system?
2. Define active load torque.
3. Write down the speed torque equation of single phase fully controlled converter fed separately excited DC motor.
4. Write down the control strategies of chopper.
5. Write down the advantages of PI controller.
6. Write down the transfer function of converter.
7. What are the drawbacks of stator voltage controlled Induction motor drive?
8. Write any two advantages of vector control.
9. Define self-control technique of synchronous motor.
10. Write any two applications of synchronous motor drives? Justify the selection.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the four quadrant operation of low speed hoist in detail. (8)
(ii) Derive an equation to find out equivalent load torque in a motor load system with translational and rotational motion? (8)

Or

- (b) Derive the mathematical condition to obtain steady state stability of equilibrium point? (16)

12. (a) Explain the operation of single phase controlled converter fed separately excited DC motor in continuous and discontinuous modes with neat diagram, waveforms and also comment the steady state analysis? (16)

Or

- (b) Explain the four quadrant operation of chopper fed DC drive. (16)

13. (a) Explain the armature voltage control with field weakening mode operation of separately excited DC motor drive. (16)

Or

- (b) Explain the design procedure of speed controller with inner current controller of a separately excited DC motor.

14. (a) (i) Explain the concept of v/f control scheme. (8)
(ii) Explain the variable frequency operation of induction motor in closed loop with constant air-gap flux. (8)

Or

- (b) (i) Compare VSI and CSI fed induction motor drive. (8)
(ii) Explain the block diagram of vector control of induction motor drive. (8)

15. (a) (i) Explain the open loop v/f control method of synchronous motor drive. (8)
(ii) Explain the concept of self-control technique. (8)

Or

- (b) Explain the closed loop operation of permanent magnet synchronous motor drive in detail. (16)