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Question Paper Code : 31250

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2012.

Seventh Semester

Electrical and Electronics Engineering

EE 1403 — SOLID STATE DRIVES

(Regulation 2008)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State the recent status of DC and AC drives.
2. What is meant by continuous rating of a motor?
3. State the conditions for continuous current conduction mode for DC motor.
4. What are the advantages of closed loop control of DC drives?
5. What is constant volts/frequency control?
6. What is the principle of vector control?
7. What do you mean by margin angle control mode in synchronous motor?
8. What are the types of PMSM?
9. Compare electronic commutation and mechanical commutation.
10. State the applications of stepper motors.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Discuss briefly the factors involved in the selection of drives. (8)

(ii) Explain the eight standard classes of motor duty. (8)

Or

(b) Discuss in detail the thermal model of a motor for heating and cooling. (16)

12. (a) Explain the operation of single phase fully controlled converter fed separately excited DC motor with neat waveforms and derive the torque – speed characteristics. (16)

Or

(b) Explain in detail the working of a multi quadrant control of chopper fed separately excited DC motor drive. (16)

13. (a) (i) Describe the effects of unbalanced source voltage applied to induction motors. (8)

(ii) With necessary diagrams, explain the theoretical principles of stator voltage control of induction motor. (8)

Or

(b) Describe slip power recovery scheme in both static Scherbius and static Kramer drives. (16)

14. (a) (i) Compare open loop V/f control with self-control. (4)

(ii) Explain the synchronous motor drive self-control operation with power factor improvement. (12)

Or

(b) Explain how vector control is implemented in a permanent magnet synchronous motor drive. (16)

15. (a) Describe using a schematic how the speed of an inverter fed brushless dc motor can be controlled. (16)

Or

(b) (i) Explain the converter topologies used in the control of SRM drives. (8)

(ii) Explain the closed loop control of SRM drive. (8)
