SATHYABAMA UNIVERSITY

(Established under section 3 of UGC Act, 1956)

Course & Branch: B.E – EEE
Title of the paper: Special Electrical Machines
Semester: V — Max. Marks: 80
Sub.Code: 214507 — Time: 3 Hours
Date: 24-11-2007 — Session: FN

PART – A (10 x 2 = 20)

Answer All the Questions

1. What are the types of synchronous reluctance motor?
2. What is vernier motor?
3. What do you mean by resolutions of a stepper motor?
4. Mention any two applications of stepper motor.
5. What do you mean by Power controller?
6. What is singly excited motor give one example.
7. What are the different types of commutation used in permanent magnet brushers D.C. motor?
8. Write the EMF equation of a Permanent magnet Brushers dc motor.
9. Write the expression for 3 phase torque of a permanent magnet synchronous motor (sine wave) and explain each term in it.
10. Draw the Torque-speed characteristics of a permanent magnet synchronous motor.

PART – B (5 x 12 = 60)

Answer All the Questions

11. Explain the construction and principle of operation of
    (a) Radial air gap gas less type synchronous reluctance motor.
    (b) Axial air gap cage less type synchronous reluctance motor.

(or)

12. Explain the phasor (vector) diagram of synchronous reluctance motor.

13. (a) A stepper motor has step angle of 2.5°. Determine (i) resolution (ii) number of steps required for the shaft to make 25 revolutions (iii) Shaft speed if the stepping frequency is 3600pps.
(b) Explain the construction part of hybrid stepper motor.

(or)

14. (a) A four – stack VR stepper motor has a step angle of 1.8°. Find the number of its rotor and stator teeth. (4)
(b) Explain the construction of multi stack VR stepper motor. (8)

15. Explain the construction and working principle of switched reluctance motor.

(or)

16. (a) Explain the advantages and application of switched reluctance motor.
(b) Compare variable reluctance stepper motor and switched reluctance motors.

17. (a) Draw Explain the performance characteristics of permanent magnet dc motor. (5)
(b) Name any 3 different types of permanent magnets used in PMDC motor. (3)
(c) Mention the advantages of PMDC motor. (4)

(or)

18. (a) Draw the controller circuit for a PMBL square wave d.c. motor drive showing all the components.
(b) Explain the operation of above controller circuit for a PMBL square wave DC motor drive.

19. (a) Explain the construction and performance of permanent magnet synchronous motor. (8)
(b) Draw 2 pole and 4 pole surface mounted version of rotor in PM synchronous motor. (4)

(or)

20. (a) Explain the phasor diagram of permanent magnet synchronous motor. (8)
(b) Write short notes about microprocessor based control in PM synchronous motor. (4)