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: 14507 (2002/2003) | Time: 3 Hours
Date: 25-11-2006 | Session: FN

PART – A (10 x 2 = 20)

Answer ALL the Questions

1. What are the types of synchronous reluctance motor?
2. What is a Vernier motor?
3. Mention any 3 applications of stepper motors.
4. What is slewing in a stepper motor?
5. Switched Reluctance motor is singly excited motor. Why?
6. What is the power rating of a normal switched reluctance motor?
7. What type of commutation is used in PMBL (permanent magnet brush-less) D.C?
8. Write an equation for the e.m.f induced /ph of a square wave PMBL D.C motor and explain each term in it.
9. What is the difference in stator windings between square wave PMBL D.C motor and sine wave PMBL D.C motor?
10. How quasi-sinusoidal distribution of flux is achieved in a sine wave PMBL D.C motor?

PART – B (5 x 12 = 60)

Answer ALL the Questions

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

(or)

12. With the help of a vector diagram explain the torque produced in a synchronous reluctance motor.

13. Derive the expression for torque developed in a Variable Reluctance type stepper motor and discuss the effect of saturation.

(or)

14. Explain the static and dynamic characteristics of a stepper motor.

15. (a) Explain the differences between variable reluctance stepper motor and switched reluctance motors.

(b) Explain the advantages and applications of switched reluctance motors.

(or)

16. (a) Explain the hysteresis type of current regulator control circuit for a switched reluctance motor.

(b) Explain the general torque-speed characteristics of a switched reluctance motor.

17. (a) Draw the controller circuit for a PMBL square wave D.C motor drive showing all the components.

(b) Explain the operation of the above controller circuit for a PMBL square wave D.C motor drive.

(or)

18. Derive an expression for torque T in terms of T_0, w and w_0 for a square wave PMBL D.C. motor.

19. Derive the expression for 3 Ph torque in a sine wave PMBL D.C motor.

(or)

20. Draw and explain the torque – speed characteristics of a sine wave PMBL D.C motor.