

SATHYABAMA UNIVERSITY

(Established under section 3 of UGC Act, 1956)

Course & Branch: B.E - EEE

Title of the paper: Special Electrical Machines

Semester: V

Sub.Code: 214507

Date: 05-05-2008

Max. Marks: 80

Time: 3 Hours

Session: AN

PART – A

(10 x 2 = 20)

Answer All the Questions

1. Define reluctance torque.
2. List the advantages of Synchronous Reluctance motor.
3. What is meant by micro stepping in Stepper motor?
4. A single stack three phase VR stepper motor has a step angle of 15° . Find the number of its stator and rotor poles.
5. What are the different power controllers used for the control of Switched Reluctance motor?
6. List the disadvantages of Switched Reluctance motor.
7. Draw the magnetic equivalent circuit of Brushless DC motor.
8. Write the torque equation of PM Brushless DC motor.
9. What is meant by field oriented control of Permanent Magnet Synchronous motor?
10. List the applications of Permanent Magnet Synchronous motor.

PART – B

(5 x 12 = 60)

Answer All the Questions

11. Describe in detail the constructional features of axial and radial air gap motors.

(or)

12. (a) Draw the phasor diagram of synchronous reluctance motor and explain.
(b) Explain the characteristics of synchronous reluctance motor.
13. Explain the logic sequencer circuit used for the clockwise rotation of variable reluctance stepper motor for 2 - Φ excitation mode.
- (or)
14. (a) Explain the constructional features and principle of operation of a variable reluctance stepper motor.
(b) Explain the mechanism of torque production in variable reluctance stepping motor.
15. (a) Explain the speed torque characteristics of Switched reluctance motor.
(b) Discuss the operation of anyone of the converters used for a switched Reluctance Motor.
- (or)
16. With a neat block diagram explain the control of a Switched Reluctance motor using a microprocessor based controller.
17. Explain the working principle of PM Brushless DC motor.
- (or)
18. (a) Derive the expression for the Emf and Torque of a PM Brushless DC motor. (8)
(b) Draw the torque vs speed characteristics of a PM Brushless DC motor. (4)
19. (a) Explain the torque speed characteristics of Permanent Magnet Synchronous motor. (7)
(b) Derive the expression for power input and torque of Permanent Magnet Synchronous motor. (5)
- (or)
20. Explain the vector control method for a permanent Magnet Synchronous motor with a block diagram and phasor diagram.

