

B.E. DEGREE END SEMESTER EXAMINATION NOV/DEC 2012
ELECTRICAL AND ELECTRONICS ENGINEERING BRANCH
VIII SEMESTER
EE9036 SPECIAL ELECTRICAL MACHINES

Time:3 Hours

Marks:100

(Answer all questions)

PART A (10 X 2 =20 MARKS)

1. Explain the terms remanence and coercivity for permanent magnet.
2. What are the advantages of brushless dc motor compared to dc motor?
3. What is the difference between step angle and conduction angle?
4. Prove that torque is independent of current direction for SR motor having linear $i-\Psi$ curve.
5. Explain the term stepping rate in stepper motors.
6. Explain the advantage of two phase excitation.
7. What is meant by sinusoidal distributed winding?Is it practically feasible?
8. Draw the torque –speed characteristic of PMSM.
9. What is meant by synchronous reactance?
10. What are the applications of linear motor.

PART B (5 X 16 = 20 MARKS)

11. a.(i) A permanent magnet brushless d.c motor has a stall torque of 1 Nm with stall current of 5 A. Estimate its no-load speed in rpm when fed from 28 V dc voltage supply. During an overload the motor temperature becomes excessive and the magnets lost 12 % of their remanent flux density. If the phase resistance is 0.8 ohm, determine the speed at which the motor will run when the load torque is 0.3 Nm. Assume a supply voltage of 28 V. Ignore friction and other losses. (10)
 - (ii) For a 2 pole,120 degree arc magnet PMBLDC motor draw the magnetic equivalent circuit (6)
 - 12.a. (i) Draw the variation of inductance of three phases of 6/4 SRM. (7)
 - (ii) A switched reluctance motor with six stator poles and 4 rotor poles has a stator pole arc of 30 and rotor pole arc of 32. The aligned inductance is 10.7 mH and the unaligned inductance is 1.5 mH . Saturation can be neglected . Calculate the instantaneous torque when the rotor is i) 30 before the aligned position ii) 25 before the aligned position. The phase current is 7 A. For both cases calculate what is the maximum energy conversion in one stroke if the current is limited to 7 A. Determine the average torque corresponding to the energy conversion. (9)
- (OR)**
- 12.b.(i) Derive an expression for mechanical power developed in switched reluctance motor(10)
 - (ii) Explain the terms aligned and unaligned inductance in SRM and how these inductances affect the torque production. (6)