Register Number……

B.E. DEGREE EXAMINATIONS: APRIL/MAY 2012

Eighth Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U07EEE10: Special Electrical Machines

Time: Three Hours **Maximum Marks: 100**

Answer All Questions:-

PART A (10 x 1 = 10 Marks)

1. Saliency ratio in synchronous reluctance motor is
   a) Lqs / Lds b) Lds / Lqs
   c) maximum value of Ld / minimum value of Lq d) Both a and b
2. Which one is not the application characteristic of synchronous reluctance motor?
   a) High cost than induction motor b) Lower power factor than induction motor
   c) Efficiency is higher than induction motor d) It require rotor position sensor
3. Number of steps per revolution in stepper motor is called as
   a) Stepping rate b) Step angle c) Resolution d) Holding torque.
4. What is the step angle of four phase stepper motor with 12 stator teeth and 3 rotor teeth?
   a) 30° b) 45° c) 60° d) 90°
5. Switched reluctance motor is
   a) Singly excited motor b) Double salient motor
   c) Single excited and double salient motor d) Same as that of synchronous reluctance motor.
6. Choose the characteristic of switched reluctance motor from the following
   a) Rotor carries field windings
   b) Shoot through fault occurred in power semiconductor circuits
   c) It is a self starting machine
   d) It does not require rotor position sensor
7. Which permanent magnet material have very good Co_ercivity?
   a) Ferrite b) Alnico c) Cobalt Samarium d) Neodymium Iron Boron
8. Emf equation of permanent magnet brushless dc motor is
   a) 2 Bg r l Wm Tph volts b) 2 Bg r l Wm volts
   c) 4.44 Bg r l Wm Tph volts d) 4.44 Bg r l Wm volts

9. Brushless permanent magnet sine wave motor is also called as

a) Permanent magnet synchronous motor b) Synchronous motor

c) Synchronous Reluctance motor d) Brushless permanent magnet dc motor

10. In which control technique both line commutated converter and load side converter are controlled by digital technique?

a) Self control b) Vector control

c) Current control Scheme d) Microprocessor based control

PART B (10 x 2 = 20 Marks)

11. Mention the advantages of synchronous reluctance motor.
12. What is vernier motor?
13. Define step angle.
14. What are the applications of stepper motor?
15. Why nonlinear analysis is need for switched reluctance motor?
16. Draw the speed torque characteristics of switched reluctance motor.
17. What are the important features of permanent magnet synchronous motor?
18. Write the emf equation of permanent magnet synchronous motor.
19. Differentiate conventional dc motor and permanent magnet brushless dc motor.
20. Why PMBLDC motor called as electronically commutated motor?

PART C (5 x14 = 70 Marks)

21. a) Draw the phasor diagram and explain the speed torque characteristics and application of synchronous reluctance motor.

(OR)

b) Explain the principle of operation and constructional features of synchronous reluctance motor with their rotor designs.

22. a) Explain the construction and operating principle of Hybrid stepper motor with neat diagram.

(OR)

b) What are the different types of drive circuits used for stepper motor and explain any two of them.

23. a) Derive torque equation for switched reluctance motor.

(OR)

b) What are the different types of power controller circuits used for switched reluctance motor and explain any two of them.

24. a) Illustrate the constructional details of permanent magnet synchronous motor with different types of rotor designs.

(OR)

b) Derive torque equation for brushless permanent magnet sine wave motor.

25. a) Draw and explain the power controller circuit for permanent magnet brushless dc motor with neat diagram.

(OR)

b) Derive an emf and torque equation of permanent magnet brushless dc motor.

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