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Question Paper Code: 47303

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

Seventh Semester

Electrical and Electronics Engineering

14UEE703- SPECIAL ELECTRICAL MACHINES

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Synchronous reluctance motor align itself in

   (a) Maximum Permeance (b) Minimum Permeance

   (c) Minimum Reluctance (d) both (a) and (c)

2. The material's resistance to becoming magnetized is called

   (a) Resistance (b) Resistivity (c) Reluctance (d) Permeance

3. Operation of stepper motor at high speed is referred to asThe operation of stepping motors at high speeds is referred to as_____

   (a) Fast forward (b) Slewing

   (c) Inching (d) Jogging

4. The rotational speed of a given stepper motor is determined solely by the

   (a) Shaft load (b) Polarity of stator current

   (c) Step pulse frequency (d) Magnitude of stator current.

5. Reluctance Motors are

(a) Doubly excited (b) Singly excited

(c) Either doubly excited or singly excited (d) None of the above

6. For which one of the following applications a Reluctance Motor is preferred?

(a) Electric shavers (b) Refrigerators

(c) Signaling and timing devices (d) Lifts and hoists

7. Which one of the following permanent magnet material has low coercive force?

(a) Cobalt – samarium (b) Alnico

(c) Barium and strontium ferrites (d) Neodymium – iron - boron

8. Permanent Magnet Brushless DC Motors are compact in size due

(a) Absence of field winding (b) Presence of smaller field winding

(c) Present of magnets (d) Any of the mentioned

9. In order to get maximum torque in Permanent Magnet Synchronous Motor, the angle between the stator flux and rotor flux is kept closer to.

(a) 90^o (b) 45^o (c) 30^o (d) 60^o

10. Which of the following motor would suit applications where constant speed is absolutely essential to ensure a consistent product?

(a) brushless dc motor (b) disk motor

(c) permanent-magnetsynchronous motor (d) stepper motor

PART - B (5 x 2 = 10 Marks)

11. What is a synchronous reluctance motor?

12. Define holding torque and detent torque in Stepper motor.

13. Point out the disadvantages of Switched Reluctance Motor.

14. How the demagnetization occurs in PMBLDC motor.

15. What are the assumptions made in derivation of torque equation for Permanent Magnet Synchronous Motor?

PART - C (5 x 16 = 80 Marks)

16. (a) Discuss in detail about the principle of operation and constructional features of Synchronous Reluctance Motor. (16)

Or

(b) Derive the voltage and torque equation of synchronous reluctance motor (16)

17. (a) Describe the construction and operation of Variable Reluctance Stepper Motor with different modes. (16)

Or

(b) (i) Elaborate in detail the drive system of a stepping motor with neat sketch. (10)

(ii) Explain the closed loop control concept of Stepper motor with neat diagram. (6)

18. (a) (i) Describe the various operating modes of Switched Reluctance motor (8)

(ii) Explain the speed-torque characteristics of Switched Reluctance Motor. (8)

Or

(b) Discuss the necessity of power electronic circuit in Switched Reluctance Motor and explain different types of converter circuits in detail. (16)

19. (a) (i) Explain in detail about magnetic circuit analysis of Permanent Magnet Brushless DC Motor on open circuit. (8)

(ii) Explain the speed- torque characteristics of Permanent Magnet Brushless DC motor in detail. (8)

Or

b) (i) Explain principle of operation of Permanent Magnet Brushless DC Motor. (8)

(ii) Discuss about mechanical commutators in detail (8)

20. (a) Explain microprocessor based control of Permanent Magnet Synchronous Motor in detail. (16)

Or

(b) (i) Elaborate about torque-speed characteristics of a permanent magnet synchronous motor (8)

(ii) Derive an EMF equation of Permanent Magnet Synchronous Motor. (8)

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