Question Paper Code : 42512

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Seventh Semester

Electrical and Electronics Engineering

EE 2403 – SPECIAL ELECTRICAL MACHINES

(Regulations 2008)

(Common to PTEE 2403 – Special Electrical Machines for B.E. (Part–Time)
Sixth Semester – EEE – Regulations 2009)

Time : Three Hours   Maximum : 100 Marks

Answer ALL questions

PART – A   **(10×2=20 Marks)**

1. What are the merits of 3-phase brushless permanent magnet synchronous motor ?

2. What are SYNREL motors ?

3. Name the various modes of excitation in stepping motor.

4. Define the terms holding and detente torques as referred to stepper motor.

5. Write the voltage and torque equations of a switched reluctance motor.

6. List the methods of rotor position sensing in switched reluctance motor

7. Compare permanent magnet brushless D.C. Motor with permanent magnet synchronous motor.

8. What is commutation ?

9. Define the term load angle.

10. Write the draw backs in PM synchronous motor.

PART – B   **(5×16=80 Marks)**

11. a) Describe the constructional features of axial and radial flux synchronous reluctance motors.   **(16)**

(OR)

b) Derive the voltage and torque equations of synchronous reluctance motor.   **(16)**

12. a) Explain the construction operation of variable reluctance type stepper motor. Also explain about micro stepping. **(16)**

(OR)

b) i) Derive the reluctance torque of a stepper motor. **(8)**

   ii) Calculate the stepping angle for a 3 phase 24 pole permanent magnet type stepper motor. **(8)**

13. a) Construct and demonstrate the operation of switched reluctance motor with neat diagram. **(16)**

(OR)

b) i) Derive the voltage and torque equations of SRM. **(12)**

   ii) Discuss the need of rotor position sensor in SRM. **(4)**

14. a) i) What are the advantages of BLPM dc motor over conventional dc motor ? **(4)**

   ii) From the magnetic circuit analysis of permanent magnet brushless DC motor. Derive the expression for permeance coefficient. **(12)**

(OR)

b) Derive the emf equation and torque equation of PMBLDC motor. **(16)**

15. a) Discuss the following in permanent magnet synchronous motor
   i) Armature reaction MMF. **(8)**
   ii) Synchronous reactance. **(8)**

(OR)

b) Write short notes on :
   i) Torque/Speed characteristics of permanent magnet synchronous motor with suitable illustrating. **(8)**
   ii) Converter Volt-ampere requirements of permanent magnet synchronous motor. **(8)**

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