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M.E. / M.TECH. DEGREE EXAMINATIONS, MAY/JUNE 2017

SECOND SEMESTER

POWER ELECTRONICS AND DRIVES

PD16203 – SPECIAL ELECTRICAL MACHINES

(Regulation 2016)

Q. Code: 424845

Time: Three Hours

Maximum : 100 Marks

Answer ALL questions

PART A - (10 X 2 = 20 Marks)

1. Compare conventional DC motor and PMBLDC motor.
2. Mention some applications of PMBLDC motor.
3. Draw the Speed-Torque characteristics of PMSM.
4. What are the types of synchronous reluctance motor?
5. List any four applications of Switched Reluctance Motor.
6. Why the term 'effectiveness' instead of 'efficiency' is used with respect to Switched Reluctance Motor?
7. What are the main features of stepper motor which are responsible for its wide spread use?
8. Determine the step angle of a four phase stepper motor with 8 stator teeth and 6 rotor teeth.
9. Mention the advantages of Hysteresis motor.
10. Mention the application of linear motor.

PART B - (5 X16 = 80 Marks)

11. (a) Derive the expression for the EMF and torque equation of PMBLDC motor. (16)

(OR)

- (b) Explain the magnetic circuit analysis of PMBLDC motor. (16)

12. (a) (i) Explain the power controller for PMSM. (8)

- (ii) Explain the vector control of PMSM motor. (8)

(OR)

- (b) Describe in detail the constructional features of Synchronous reluctance motor. (16)

13. (a) Explain the types of power controllers for SRM. (16)

(OR)

- (b) With a neat diagram explain the constructional features and principle of operation of Switched Reluctance Motor. (16)

14. (a) Explain the linear and non-linear analysis of a stepper motor. (16)

(OR)

- (b) (i) State and explain static and dynamic characteristics of VR stepper motor. (8)

- (ii) Explain the dual voltage driver for a two phase on drive of a four phase motor with necessary circuits. (8)

15. (a) Explain in detail the principle of operation and constructional features of Hysteresis motor. (16)

(OR)

- (b) Explain in detail the principle of operation and constructional features of Linear Induction Motor. (16)