Reg. No. : | | | | | | | | | | |

Question Paper Code: 31373

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

Seventh Semester

Electrical and Electronics Engineering

01UEE703 - SPECIAL ELECTRICAL MACHINES

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. What are the primary design considerations of synchronous reluctance motor?
2. State the advantages of synchronous reluctance motor.
3. Define slewing in stepper motor.
4. What is meant by full step operation in stepper motor?
5. What are the types of power controllers used for switched reluctance motor?
6. Why rotor position sensor is essential for the operation of switched reluctance motor?
7. Why the PMBLDC motor is called electronically commutated motor?
8. What are the features of one phase winding and one pulse BLPM dc motor?
9. What is meant by synchronous reactance?
10. Why PMSM operating in self controlled mode is known as commutatorless DC motor?

PART - B (5 x 16 = 80 Marks)

11. (a) Draw the phasor diagram of synchronous reluctance motor and explain. Also discuss the speed torque characteristics. (16)

Or

(b) Explain the constructions and working principle of synchronous reluctance motor and derive the torque equation. (16)

12. (a) Describe the working of 3 stack stepper motor having 12 poles in the stator and the rotor. (16)

Or

(b) Explain the construction and various modes of excitation of PM stepper motor. (16)

13. (a) Describe the various power controller circuits applicable to switched reluctance motor and explain the operation of any one scheme with suitable circuit diagram. (16)

Or

(b) Derive the expression for frequency of variation of inductance of switched reluctance motor. (16)

14. (a) Develop magnetic equivalent circuit of 2 pole 120^0 magnet arc PMBLDC motor. (16)

Or

(b) Derive an expression for permeance coefficient (PC) for PMBLDC motor in terms of magnet permeance Pms, rotor leakage per phase Prl and air gap reluctance Rg. (16)

15. (a) (i) Draw and describe torque speed characteristics of PMSM. (8)

(ii) Explain the role of PMSM in wind energy system. (8)

Or

(b) Explain in detail, about microprocessor based control of permanent magnet synchronous motor. (16)

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