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**Question Paper Code: 37303**

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2021

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. What is saliency ratio of Synchronous Reluctance Motors?
3. Define slewing in stepper motor.
4. How will you define Step angle?
5. What are advantages of Switched Reluctance Motors?
6. State about aligned and unaligned inductance and its effect in SRM.
7. Why rotor position sensors are needed in PMSM 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) Describe the constructional details, working principle, Torque equation and applications of synchronous reluctance motor. (16)

Or

- (b) Draw and explain a typical Torque-Speed characteristics of synchronous Reluctance motor. (16)

12. (a) Enlighten the various modes of excitation of VR stepping motor with excitation table. (16)

Or

- (b) (i) With a neat sketch, explain the dynamic characteristics of stepper motor. (8)

- (ii) Derive the expression for torque production in VR stepper motor. (8)

13. (a) Explicate the constructional feature and principle of operation of switched reluctance motor. (16)

Or

- (b) What are the basic requirements of power controller in switched reluctance motor? Explain the C-dump power controller circuit for Switched Reluctance Motor. (16)

14. (a) Derive the Torque and EMF equations of the permanent magnet brushless DC Motor. (16)

Or

- (b) Explain the various power controller circuits for permanent magnet brushless DC motor with neat sketch. (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)