

Register Number: .....

**M.E/M.TECH DEGREE EXAMINATIONS: NOV/DEC 2012**

Third Semester

**POWER ELECTRONICS & DRIVES**

PED551: Special Electrical Machines

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 2 = 20 Marks)**

1. Draw the phasor diagram of a synchronous reluctance motor.
2. What are the modes of operation of synchronous reluctance motors?
3. Mention the applications of switched reluctance motor.
4. Draw the block diagram for SRM Drive
5. What are the advantages of Vector control of PMSM?
6. What is meant by self control of PMSM?
7. Draw the speed-torque characteristics of BLDC motor?
8. List the applications of BLDC motors.
9. Mention the advantages of multi stack VR stepper motor
10. What is meant by closed loop control of stepping motor?

**PART B (5 x 16 = 80 Marks)**

11. a) Describe constructional details and principle of operation of synchronous reluctance motor. Mention its applications. (12+4)

**(OR)**

- b) Draw and explain the characteristics and phasor diagram of synchronous reluctance motor.

12. a) Explain the constructional details and principle of operation of switched reluctance motor. Derive its torque equation. (10+6)

**(OR)**

- b) i) Explain a power controller of switched reluctance motor. (8)

- ii) Explain microprocessor control of switched reluctance motor. (8)
13. a) i) Derive the torque equation of PMSM. (8)  
ii) Draw and explain the torque-speed characteristics of PMSM. (8)
- (OR)**
- b) Briefly explain,  
i) Self control scheme of PMSM. (8)  
ii) Current control scheme of PMSM. (8)
14. a) Write short notes on, (8)  
i) Hall sensors  
ii) Optical sensors. (8)
- (OR)**
- b) i) Explain the square wave PMBLDC motor drive with neat sketch. (8)  
ii) Derive the EMF equation of BLDC motor drive. (8)
15. a) Describe constructional details and modes of operation of variable reluctance stepper motor
- (OR)**
- b) i) Explain the dynamic characteristics of VR stepper motor. (8)  
ii) Write short notes on open loop control of stepper motor. (8)

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