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Question Paper Code : 80510

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Seventh Semester

Electrical and Electronics Engineering

EE 2403/EE 73/10133 EEE 25 – SPECIAL ELECTRICAL MACHINES

(Regulations 2008/2010)

(Common to PTEE 2403 for B.E. (Part-Time) Sixth Semester – 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. What is the function of drive circuit in stepping motor?
4. Define step angle in stepping motor.
5. Enumerate the different power controllers used for the control of SRM.
6. Mention the different modes of operation of switched reluctance motor.
7. What is permeance coefficient?
8. Name the power controllers used in permanent magnet brushless D.C. motor.
9. Define the term load angle.
10. Write the draw backs in PM synchronous motor.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Draw the phasor diagram of synchronous reluctance motor. (4)
(ii) Explain the construction of radial and axial flux machines. Discuss the advantages and disadvantages of each construction. (12)

Or

- (b) Explain in detail the operating principle and construction of synchronous reluctance motor with neat diagrams. Derive the torque equation of synchronous reluctance motor. (16)
12. (a) With a neat block diagram explain microprocessor control of stepping motor. (16)

Or

- (b) Explain the working of single and multistack configured stepping motors. (16)
13. (a) Explain the construction and working of switched reluctance motor with neat sketches. (16)

Or

- (b) (i) Explain the importance of closed loop control in SR motor. (10)
(ii) Compare and contrast the performances of SR motor and VR stepper motors. (6)
14. (a) Explain the characteristics and control of permanent magnet brushless D.C. Motor. (16)

Or

- (b) Describe the magnetic circuit analysis and derive the EMF and torque equations of permanent magnet brushless D.C. motor. (16)
15. (a) Write short note on :
(i) Armature reaction in PMSM
(ii) Synchronous Reactance. (8 + 8)

Or

- (b) Draw and discuss the various power controllers used in PMSM with neat diagram. (16)