Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

## Question Paper Code : 23513

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Seventh Semester

Electrical and Electronics Engineering

EE 2403 — SPECIAL ELECTRICAL MACHINES

(Regulations 2008)

(Common to PTEE 2403 – Special Electrical Machines for B.E. (Part-Time)
Sixth Semester – EEE – Regulations 2009)

Time : Three hours                                                    Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   State the principle of operation of synchronous reluctance motor.

2.   Compare synchronous reluctance motor and induction motor.

3.   Define the micro stepping mode of Stepper motor.

4.   Mention any two applications of variable reluctance motor.

5.   Write the torque equation of switched reluctance motor.

6.   Mention some position sensors used in switched reluctance motor.

7.   Distinguish between electronic and mechanical commutators.

8.   Draw the magnetic equivalent circuit of PMBLDC motor.

9.   Compare ideal PMSM with practical PMSM.

10.  Draw the torque/speed characteristics of permanent magnet synchronous
     motor.

PART B — (5 × 16 = 80 marks)

11. (a) Describe the constructional features of Axial and radial flux synchronous reluctance motors. (16)

Or

(b) Derive the voltage and torque equations of synchronous reluctance motor. (16)

12. (a) With a neat diagram explain microprocessor control of stepping motors. (16)

Or

(b) Explain the working of driver circuits used to drive the stepping motor. (16)

13. (a) Draw and discuss the operation of switched reluctance motor with neat diagrams. (16)

Or

(b) (i) Derive the voltage and torque equations of SRM. (12)

(ii) Discuss the need of rotor position sensor in SRM. (4)

14. (a) (i) What are the advantages of BLPM DC motor over conventional DC motor? (4)

(ii) From the magnetic circuit analysis of permanent magnet brushless DC Motor. Derive the expression for permanence coefficient. (12)

Or

(b) Derive the emf equation and torque equation of PMBLDC motor. (16)

15. (a) Explain the construction and performance of a permanent magnet synchronous motor with neat diagram. (16)

Or

(b) Derive the emf and torque equation of permanent magnet synchronous motor. (16)