

Total No. of Questions : 11]

SEAT No. :

**P3592**

[Total No. of Pages : 2

**[4959]-1064**

**B.E. (Electrical)**

**SPECIAL PURPOSE MACHINES**

**(2012 Pattern) (Elective - I)**

*Time : 2½ Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) *Solve 6 questions Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10 & 11 is compulsory.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
- 5) *Assume suitable data, if necessary.*

**Q1)** Obtain magnetic force and torque from co-energy. **[7]**

OR

**Q2)** Derive the relationship for energy stored singly excited magnetic system. **[7]**

**Q3)** What are the differences between sinusoidal PMSM and trapezoidal PMSM? **[7]**

OR

**Q4)** Explain process of electronic commutation in PMSM. **[7]**

**Q5)** Explain with block diagram constant torque angle operation of PMSM. **[6]**

OR

**Q6)** Explain block diagram of field oriented control of PMSM machine. **[6]**

**Q7)** a) Explain different operational characteristic and constructional features of synchronous reluctance machine. **[8]**

b) With block diagram explain control of reluctance motor. **[8]**

**P.T.O.**

OR

- Q8)** a) Obtain mathematical expressions for static and dynamic torque production in reluctance machine. [8]  
b) Discuss selection of number of poles and pole arc in switched reluctance machine. [8]
- Q9)** a) Explain operation of VRM and PM type stepper motors. [9]  
b) Derive equation for mechanical torque produced in VRM stepping motor. [9]

OR

- Q10)** a) With block diagram explain control of stepping motor by using micro stepping method. [9]  
b) Explain various applications of stepper motors. [9]
- Q11)** Solve any two of the following : [16]  
a) Explain process of torque production in linear induction motor.  
b) Explain various important characteristics of linear induction machine.  
c) Explain different types of linear Induction motors with their construction.

