Paper / Subject Code: 89305 / Special Electrical Machine (DLOC)

May 29, 2024   02:30 pm - 05:30 pm   1T00836 - T.E.(Electrical Engineering)(SEM-VI)(Choice Base Credit
Grading System) (R- 19) (C Scheme) / 89305 - Special Electrical Machine (DLOC)   QP CODE: 10056028

Time: 3 Hours   **Total Marks: 80**

NB: (1)   Question **No. 1** is **compulsory**
          (2)   **Answer** any **THREE** questions out of the remaining **FIVE** questions.
          (3)   Assume suitable data if **necessary** and **justify** them
          (4)   **Figure** to the **right** indicates **marks**

1. (a) Explain the following term in stepper motor   5
         i) pull in/out torque   ii) stepping error   iii) Bifilar winding   iv) Response range
    (b) Derive the EMF equation of permanent magnet brush less DC motor.   5
    (c) Describe the open loop control analysis of switched reluctance motor.   5
    (d) Draw and explain any two converter topologies for a three phase SRM.   5

2. (a) Explain in detail, the static and dynamic characteristics of a stepper motor.   10
    (b) Describe in detail the construction and working of variable reluctance stepper   10
         motor.

3. (a) Explain with a neat circuit any two configuration of power converters used for   10
         the control of switched reluctance motor.
    (b) Explain with neat diagrams the constructional details and operation of rotary   10
         switched reluctance motors.

4. (a) Analyse the operation of electronic commutator in PMBLDC motor with neat   10
         diagram.
    (b) With a neat sketch, explain the microprocessor-based speed control of PMSM.   10

5. (a) Describe the constructional details and working principle of synchronous   10
         reluctance motor.
    (b) Differentiate between axial and radial airgap synchronous reluctance motors.   10
         Compare the performance of synchronous reluctance motor with switched
         reluctance motor.

6. (a) Explain the constructional details and working of linear induction machine.   10
    (b) Discuss about the power controllers used in linear induction motor.   10

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