Total No. of Questions :8] *[Total No. of Printed Pages :2*

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MEPS-302(A)

M.E./M.Tech., III Semester

Examination, June 2016

Special Machines (Elective-II)

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.
ii) All questions carry equal marks.
iii) Assume any missing data, if required.

1. a) Explain 3 phase 3 pulse brushless D.C. Motor. How torque is developed in this Motor?
   b) Derive E.M.F. equation of square wave permanent brushless D.C. Motor.

2. a) Write the advantages and disadvantages of permanent magnet brushless D.C. Motor.
   b) A permanent Magnet D.C. Motor has armature resistance of 1Ω. The speed of the motor is 2000 r.p.m. when fed from 50V D.C. source while talking 1.2 A. Determine :
      i) No bad rotational losses
      ii) The motor output when running at 1800 r.p.m. when source voltage is 48V.
      iii) Stall torque when fed from 20V source.

3. a) Explain effect of saturation in switched reluctance motor.
   b) Give torque speed characteristics of switched reluctance motor.

4. a) Derive an expression for linear induction motor in terms of loadings and linear dimensions.
   b) Describe the working principle and application of linear induction motor.

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5. a) A reluctance motor can develop unidirectional torque only at synchronous speed. Prove the statement.
   b) Write the construction feature of stepper motor. Describe the working and principle.

6. a) Explain construction and working principles of reluctance motor.
   b) Briefly explain the following characteristics of stepper motor.
      i) Torque displacement characteristic.
      ii) Torque stepping rate characteristic.

7. a) Give comparison between variable Reluctance and Permanent Magnet Stepper Motor.
   b) An overhead crane in a factory is driven horizontally by means of two similar linear induction motor whose rotors are the two steel 1 beams on which the crane rolls. The 3 phase 2 pole linear stators which are mounted on opposites energized by variable frequency source. The tests are one of the motors gave following results.
      Stator CM and Iron loss = 1 kW
      Power to stator = 5 kW
      Crane speed = 2.5 m/s
      Calculate :
      i) Synchronous speed and slip
      ii) Power input to rotor
      iii) CU losses in the rotor
      iv) Gross mechanical power developed
      v) Thrust

8. Write short notes on :
   a) Give the application of linear induction motor.
   b) Advantages of linear induction motor.
   c) Multi Stack stepper motor.

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