

**End Semester Examinations - 2015-16 Even Semester - May 2016**

**14EE3008 Special Machines and Controllers**

**Set B**

**Time : 3 hrs**  
**Total Marks: 100**

1. a) With necessary Block diagram, Circuit diagram, flow chart and Algorithms, design a Stirring mechanism for a process control application to rotate a stir for 270 Degrees in clockwise direction and to rotate 180 degrees in anticlockwise direction

Specification of motor:

Number of Rotor Teeth: 4

Number of phase: 3

(15)

- b) Discuss the significance of the single stack and multi stack stepper motors

( 5)

**OR**

2. a) Explain the Half step and full step operation of a permanent magnet stepper motor  
(15)
- b) Estimate the following of a stepper motor having 3 Stack, 12 number of tooth per stack  
(5)
- i) Tooth pitch
- ii) Step size
- iii) Number of steps

3. a) With relevant Equivalent circuit, Discuss the Torque production on the Switched Reluctance motor. Derive the Torque Equation  
(15)
- b) Discuss the constant torque, constant power and falling power regions on the Torque speed characteristics of SRM  
(5)

**OR**

4. a) Analyse the torque – current waveform of a SRM in the following modes of operation  
(15)
- i) Low speed motoring mode
- ii) High speed motoring mode
- iii) High speed Generating mode
- b) Discuss the torque- speed characteristics of a Switched Reluctance motor  
(5)

5. With necessary Block diagram, Circuit diagram, flow chart and Algorithms, Discuss the control strategy of driving a Brushless DC motor in counter Clockwise direction  
( 20)

**OR**

6. Discuss in detail about the space vector control model of the PMSM (20)
7. With necessary diagrams, explain the control methods of the Permanent Magnet Synchronous motor (20)

**OR**

8. a) Compare the functional and characteristics Difference of Linear DC motor and Rotary DC motor (10)
- b) Discuss the Magnetic levitation principle on the Linear Induction motor (10)
9. a) With necessary diagrams, explain the functionality of Linear Induction motor and state the relation for linear and angular velocity of Induction machines (15)
- b) List the merits and demerits of a Linear DC motors over Linear Induction motor (5)

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**Wishing you All the Best**

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