

# CBCS Scheme

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15EE554

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018

## Special Electrical Machines

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

### Module-1

- 1 a. Explain the construction and working of a permanent magnet stepper motor. (08 Marks)  
b. Sketch and explain the static and dynamic characteristics of stepper motor (08 Marks)

OR

- 2 a. Derive an expression for a torque equation of a stepper motor. (08 Marks)  
b. Explain with a neat block diagram, closed-loop control scheme for stepper motor. (08 Marks)

### Module-2

- 3 a. Describe L- $\theta$  profile of an SRM. (08 Marks)  
b. Explain with a neat diagram, microprocessor based control of switched reluctance motor. (08 Marks)

OR

- 4 a. Describe the construction and working of permanent magnet D.C. motor. (10 Marks)  
b. Write any four comparison of conventional D.C. motor and BLDC motor. (04 Marks)  
c. Write any four applications of BLDC motor. (02 Marks)

### Module-3

- 5 a. Explain with the help of a neat diagram, construction and working of permanent magnet synchronous motor. (08 Marks)  
b. Derive an e.m.f equation of permanent magnet synchronous motor. (08 Marks)

OR

- 6 a. Explain the construction and working of synchronous reluctance motor. (12 Marks)  
b. Write the advantages and applications of synchronous reluctance motor. (04 Marks)

### Module-4

- 7 a. Derive the emf and torque equation of A.C series motor. (08 Marks)  
b. Explain the construction and working of a repulsion motor. (08 Marks)

OR

- 8 a. Explain the working of a Hysteresis motor. (08 Marks)  
b. Derive the equation of a D.C. servo motor and characteristics for voltage. (08 Marks)

### Module-5

- 9 a. Derive the thrust equation linear electric machine. (10 Marks)  
b. Write the applications of linear electric machine. (06 Marks)

OR

- 10 a. Derive the output equation of a permanent magnet axial flux motor. (08 Marks)  
b. Write notes on: i) Pulsating torque and its minimization (08 Marks)  
ii) Permanent magnet axial flux machine. (08 Marks)

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Important Note - 1 On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages  
to avoid re-reading or distribution of papers in situations arising out of equating or scanning errors.