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NEE-603/NEN-014

(Following Paper ID and Roll No. to be filled in your  
Answer Books)

Paper ID : 120613

Roll No. **B.TECH.****Theory Examination (Semester-VI) 2015-16****SPECIAL ELECTRICAL MACHINE****Time : 3 Hours****Max. Marks : 100****Section-A**

1. Attempt all parts. All parts carry equal marks. Write answer of each part in short. (2 × 10 = 20)
- (a) What are the drawbacks associated with the operation of induction motor with unbalanced rotor impedances?
- (b) During plugging operation of a wound rotor induction motor, usually an external resistance is inserted into the rotor circuit, why?
- (c) How do switched reluctance motors differ from synchronous reluctance motors?

(1)

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- (d) Draw the torque speed characteristics of two phase AC servomotor
- (e) How do you start a Single Phase Induction Motor?
- (f) State the role of damper winding in a synchronous motor.
- (g) Draw the torque-speed characteristic of hysteresis motor.
- (h) What are the advantages and disadvantages of stepper motors?
- (i) Why BLDC motor seems to have better efficiency as compare to conventional DC Motor ?
- (j) List the applications of Linear Induction motor.

### Section-B

2. Attempt any 5 questions from this section. (10×5=50)

- (a) Explain that the rotor resistance starter allows fast start with less heating of induction motor.

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- (b) For variable speed control of induction motor, explain the following points:
- (i) For speed control below base speed  $v/f$  (Voltage / frequency) ratio is maintained constant, why ?
  - (ii) For speeds above base speed, the terminal voltage is maintained constant, why ?
- (c) What are the important features of a hysteresis synchronous motor? What are its applications?
- (d) What are the main features of stepper motors which is responsible for its wide spread use?
- (e) Describe an efficient uni-polar drive for stepper motors.
- (f) Draw the circuit for trapezoidal PMAC motor fed from a current regulated voltage source inverter.
- (g) Explain the construction and principle of operation of linear induction motor.
- (h) Explain the torque versus stepping rate characteristics of a stepper motor. What is the slew range?

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**Section-C**

**Note : Attempt any 2 questions from this section. (15 × 2=30)**

3. Describe the operation of brushless dc motor drive and explain its advantages.
4. Explain the construction, principle of operation, characteristics of universal and repulsion motors in detail with circuit diagram.
5. Explain the working principle of slip power recovery method of speed control of slip ring induction motor with neat diagrams and the mathematics involved in it.

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