Roll No.										

Paper Code: EE-603

B.Tech.

(SEM VI) EVEN SEMESTER EXAMINATION, 2015-16

SPECIAL ELECTRIAL MACHINES

[Time: 3 Hours] **[Max. Marks: 100]**

Note: - Attempt All Questions. All Questions carry equal mark.

1. Attempt any two of the following: - **[10x2=20]**

(a) Explain the construction and performance of deep bar type and double cage type of three phase induction motors.

(b) What do you mean by slip power recovery? Explain static Scherbius and Kramer drives with suitable diagrams, mathematical equations and with relevant characteristics.

(c) A 440V, 50Hz, 6pole, 950RPM, Y-connected induction motor has following parameters referred to the stator: $R_s=0.5\Omega$, $R'_r=0.4\Omega$, $X_s=X'_r=1.2\Omega$, $X_m=50\Omega$. Motor is driving a fan load, the torque of which is given by $T_L=0.0123\omega^2_m$. Now one phase of the motor fails. Calculate the speed and current of the motor. Will it be safe to allow the motor to run for a long period? Why?

2. Attempt any two of the following:- **[10x2=20]**

(a) Why do the single-phase induction motors not have starting torque? With the help of neat diagrams, explain the operation of shaded pole single phase induction motor.

(b) Explain two phase AC servomotor with suitable diagram, mathematical equations and speed- torque characteristic. Explain the characteristics based difference between a 3-phase induction motor and an AC servomotor.

(c) Write short notes on any two:

(i) Split phase induction motor
(ii) Capacitor start induction motor
(iii) Capacitor start and capacitor run induction motor

3. Attempt any two of the following: - **[10x2=20]**

(a) Explain construction and principle of operation of switched reluctance motor giving its neat and clean diagrams. Also derive its torque equation. Draw and explain its drive circuit.

(b) Explain constructional features of a variable reluctance stepper motor and a permanent magnet stepper motor with their neat and labeled diagrams. Write any 6 advantages and any three dis-advantages of this motor.

(c) Explain the torque versus stepping rate characteristics of a stepper motor. Define slew range and ramping.

4. Attempt any two of the following: - **[10x2=20]**

(a) Explain brushless dc motor using suitable diagrams and waveforms. Discuss its important features and also write any three applications of this motor.

(b) Discuss the construction and operating principle of hysteresis motors. Draw its speed torque characteristic.

(c) Explain sinusoidal PMAC motor drives with the help of equivalent circuit and phasor diagrams. Explain the functional diagram of current regulated VSI fed sinusoidal PMAC motor drive for servo application.

5. Attempt any two of the following: - **[10x2=20]**

(a) Explain the construction, working principle and characteristics of Universal motors with suitable diagrams.

(b) What are the applications of Linear Induction motors? Derive the equation of force developed in Linear Induction motor.

(c) Write a brief note on Repulsion motors.