Paper Code:MEE101	Roll No.										

M.Tech.
(SEM I) EVEN SEMESTER EXAMINATION2015-16
FUNDAMENTALS OF ELECTRIC DRIVES

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

Note- *Attempt All Questions. All Questions carry equal marks***:-**

1. **Answer any two parts of the following:10x2=20**
   a) Discuss in detail about the various role of various component of electric drives. Draw a block diagram to show their interconnections and discuss about each block.
   b) State purpose of Electric Braking and name different methods of Electric Braking. Explain Plugging with suitable diagrams for d.c. motors and state what care must be taken while applying Plugging.
   c) A 220-V, dc shunt motor having an efficiency of 85% drives a hoist having an efficiency of 80%. Determine the motor rating and the current drawn from the supply to raise a load of 400Kg at speed of 4.5 m/s. Determine also the current drawn if the same load is lowered at 4.5 m/s assuming the same efficiencies.

2. **Answer any two parts of the following:**   **10x2=20**
   a) Discuss Transient Stability of synchronous motor drive system and develop expression for Stability by Equal Area Criterion method. How it is determined whether the drive is stable, just stable or unstable.
   b) What is understood by the term acceleration time as applied to starting of induction motors. Obtain from fundamentals the expression for acceleration time of starting a cage rotor induction motor under no load condition. How Grapho-Analytic method is applied for determining the acceleration time on load.
   c) What is load equalization? Derive the moment of inertia of the flywheel.

3. **Answer any two parts of the following:**   **10x2=20**
   a) Describe the classification of electric traction services. Define the coefficient of adhesion and in what way it is different from the coefficient of friction?
   b) Describe the duty cycle of main line and suburban trains.
   c) Why energy conservation is important in electrical drives? Explain the energy efficient operation of drives?

4. **Answer any two parts of the following:**   **10x2=20**
   a) Discuss various classes of motor duty and determine motor power rating for continuous and short time duty applying the principle of Root Mean Square power including the case when power requirement changes linearly from one load to another load.
   b) From basic fundamentals of heat transfer, derive expression of temperature rise and fall for an electric motor at rated load and define heating and cooling time constants. Why these two constants are different in practice.
   c) The temperature rise of a motor after operating for 30 minutes on full load is 20°C. after another 30 minutes on the same load the temperature rise becomes 30°C. Assuming that the temperature increases according to an exponential law, determine the final temperature rise and the time constant.

5. Describe the controlling of any **two**electricmachine of following: **10x2=20**
   i. Permanent magnet synchronous motor
   ii. Linear induction motor drive

     iii.   Stepper motor.