

Total No. of Questions : 08

M.Tech.(EE) (2013 Batch) (Sem.-2)

MODELING AND DYNAMICS OF ELECTRICAL MACHINES

Subject Code : MTEE-203

Paper ID : [A2504]

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTION TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

1. What is the need of simulation and what are the challenges in computer simulation? Discuss the widely used circuit-oriented simulators with at least one example.
2. Discuss the concept of Reference Frame and illustrate the steady state and transient models of a synchronous motor using a suitable reference frame.
3. What is the affect of magnetic saturation on the modeling of DC machines? Find the transfer function of a separately excited dc generator using basic equations.
4. How the performance of a transformer can be analyzed under various disturbances? Discuss briefly the specific case of switching and surge voltage transients in transformers.
5. Obtain the expressions for a 3-ph Induction motor (Voltage and Current) in state variable form in
 - a) Stator Reference Frame.
 - b) Synchronous Reference Frame and Rotor Reference Frame Model.
6. Considering a simple RLC circuit, interpret the Eigen properties of the state matrix of the system and examine its modal characteristics.
7. Illustrate the fundamental electrical transient characteristics of a synchronous machine by considering the response to a three phase short circuit at its terminals.
8. Write short notes on (**Any two**) :
 - a) Simulation of power electronic circuits.
 - b) Equal-area criterion for the study of transient stability.
 - c) Effect of harmonics and voltage unbalance on Induction Machines.