R09

Code No: D5403

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech II - Semester Examinations, March/April 2011
DYNAMICS OF ELECTRIC MACHINES
(POWER ELECTRONICS & ELECTRIC DRIVES)

Time: 3hours **Max. Marks: 60**

Answer any five questions
All questions carry equal marks

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1. a) Explain about generalized machine theory. How does the modeling of the simplest possible rotating machine can be done?
   b) Explain about magnetic saturation. How does it affect the modeling of a DC machine? [12]

2. a) Derive the equivalent circuit of induction motor.
   b) Obtain Lan grange's equations and explain their applications. [12]

3. a) Explain the dynamic model of an interconnected machine system.
   b) Derive the transient model of a separately excited dc generator. [12]

4. Explain the transient analysis of separately excited DC generators. [12]

5. a) Draw and explain Torque – speed curve of induction motor.
   b) A 325KW, 440v, 60Hz, star connected six pole squirrel – case induction motor has a full load efficiency of 93 percent of and a power factor of 0.88. The motor constants in ohms per phase referred to the stator are:

   X1 = 0.060, R1 = 0.0075
   X2 = 0.060, R2 = 0.0065 , $X\varphi$ =3.0

   While the motor is operating in the steady state under rated conditions, a three – phase short circuit occurs on its supply line near the motor terminals. Determine the motor RMS short circuit current. [12]

6. a) Explain about rotating field theory in detail.
   b) Derive the steady state equivalent circuit of a squirrel cage induction motor and compare it with the transient model. [12]

7. Derive general equations for small oscillations of synchronous machine. [12]

8. Write short notes on the following
   a) Mutually coupled coils.
   b) Steady state analysis of D.C motors.
   c) Dynamics operation of synchronous generator. [12]

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