Code No. A5401

JAWAHARLAL NEHRU TECHNOLOGY UNIVERSITY, HYDERABAD
M.Tech. I Semester Regular Examinations, March – 2009
MACHINE MODELLING & ANALYSIS
(Common to Power Electronics & Electric Drives and Power Electronics)
Time: 3 hours **Max. Marks.60**

Answer any Five questions
All questions carry equal marks

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1. What do you mean by primitive 2-axis machine? Starting from fundamentals derive the expression for the torque developed by the torque developed by the primitive 2-axis machine.

2. Starting from fundamentals develop the transfer functions for a separately excited DC motor for no-load and full-load conditions. Develop the black diagrams for the above two operations.

3. Develop the mathematical model of a DC shunt motor and express the relevant equations in state-variable form. Also obtain its transfer function with necessary assumptions.

4. Discuss in detail about the transformation from rotating axes $(\alpha, \beta, 0)$ to stationary axes (d, q, 0).

5. Obtain the circuit model for a 3 ph Induction motor. Develop its terminal voltage equations in matrix form. In simplified which are expressed as
   $V = Ri + P(Li)$
   Where P is the d/dt operator.

6. Develop the two axis model for Induction motors. Develop voltage and current equations for the above motor in stator reference frame.

7. Draw the circuit model of a 3 ph synchronous motor. Obtain the two axis representation. Make necessary assumptions.

8. With necessary assumptions, starting from fundamentals develop the state variable form of voltage fed 3 ph synchronous motor.

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