M.E. First Semester (Electrical (Electronics & Power) Engineering) (New-CGS)
13317 : Modelling & Analysis of Electrical Machines : 1 EEPME 5

P. Pages : 2

Time :

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Max. Marks : 80

Notes : 1. Due credit will be given to neatness and adequate dimensions.
2. Assume suitable data wherever necessary.
3. Illustrate your answer necessary with the help of neat sketches.
4. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION – A

1. a) Derive the induction machines model in arbitrarily rotating reference frame. 7

   b) Derive the voltage and torque equations of d.c. machines. 7

OR

2. a) What is generalized machine theory? What are the restrictions of generalized machines theory? 7

   b) Explain the Kron's primitive machine in detail. 7

3. a) Derive the equation of cross field commutator machines. 7

   b) What do you mean by "Linear transformation"? Explain with examples. 7

OR

4. a) Derive the equations of phase current and its inverse of synchronous machines using Park's transformation state the significance of Park's transformation. 14

5. a) Derive the state space model of three phase induction machines. 7

   b) What are the commonly used induction machine models? Explain importance of them. 6

OR

6. a) Draw the equivalent circuit of three phase induction motor and state the various parameters involved in it. 7

   b) Explain the rotor reference frame model of three phase induction machines. 6

SECTION – B

7. a) Derive the mathematical representation of synchronous machines. 6

   b) Define short circuit ratio of synchronous generator. Explain the effect of SCR on stability. 7

OR

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8. a) From the basic equation, derive the expression for voltages in direct axis, quadrature axis, field current and zero sequence voltage for a synchronous machines.   13

9. a) Explain the various types of time constant in synchronous machines.   8

    b) What are the causes of disturbances in synchronous machines.   5

OR

10. a) Justify the following statement "Machine offers time varying reactances which changes from x_d'' to x_d' & finally of x_d'', i.e. $x_d'' < x_d' < x_d$.   6

    b) State & explain the various types of reactances in synchronous machines.   7

11. a) Calculate the eigen values for synchronous machines & also write the transfer function for the equation.   13

OR

12. a) Explain the changes that must be made in linearized equation of synchronous machines.   7

    b) Explain Taylors expansion procedure to obtain linearized machine equation.   6

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