Reg. No. : | | | | | | | | | | |

Question Paper Code: 12052

M.E. DEGREE EXAMINATION, DECEMBER 2013.

First Semester

Power Electronics and Drives

01PPE101 - ANALYSIS OF ELECTRICAL MACHINES

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. Represent graphically energy and co-energy.
2. Compare single and doubly excited system.
3. Enumerate the merits of the application of reference frame theory to electrical machines.
4. List out the variables observed from several frames of reference.
5. Write the voltage and torque equations of DC machine.
6. What is the significance of state equations?
7. Give the expression for torque of induction machine.
8. What is the function of free acceleration characteristics?
9. What is rotor angle?
10. What is park's transformation?

PART - B (5 x 14 = 70 Marks)

11. (a) Derive the expression for stored magnetic field energy in a doubly-excited system. (14)

Or

(b) Discuss in detail the calculation of air gap mmf and per phase machine inductance using physical machine data. (14)

12. (a) Derive the expression for static and rotating reference frames. (14)

Or

(b) With a suitable diagram, explain the transformation of a balanced set. (14)

13. (a) Derive the voltage equation of a DC machine and explain the dynamic characteristics of DC shunt motor. (14)

Or

(b) Write the solution of dynamic characteristics by Laplace transformation. (14)

14. (a) For a three phase symmetrical stator windings of induction machine obtain the voltage equations in arbitrary reference frame and also show their equivalent circuits. (14)

Or

(b) Explain the computer simulation of a symmetrical three phase induction machine in the arbitrary reference frames. (14)

15. (a) Derive the voltage equation in arbitrary reference and rotor reference frame for synchronous machine. (14)

Or

(b) Obtain the dynamic model of three phase synchronous machine using park's transformation. (14)

PART - C (1 x 10 = 10 Marks)

16. (a) Describe the dynamic performance of induction machine during three phase fault conditions. (10)

Or

(b) Explain the steps involved in the computation of dynamic performance of synchronous machine with the help of a flow chart. (10)

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