PX5151 ANALYSIS OF ELECTRICAL MACHINES

DETAILED SYLLABUS

OBJECTIVES

- To provide knowledge about the fundamentals of magnetic circuits, energy, force and torque of multi-excited systems.

- To analyze the steady state and dynamic state operation of DC machine through mathematical modeling and simulation in digital computer.

- To provide the knowledge of theory of transformation of three phase variables to two phase variables.

- To analyze the steady state and dynamic state operation of three-phase induction machines using transformation theory based mathematical modeling and digital computer simulation.

- To analyze the steady state and dynamic state operation of three-phase synchronous machines using transformation theory based mathematical modeling and digital computer simulation.

UNIT I PRINCIPLES OF ELECTROMAGNETIC ENERGY CONVERSION

Magnetic circuits, permanent magnet, stored magnetic energy, co-energy - force and torque in singly and doubly excited systems – machine windings and air gap mmf - winding inductances and voltage equations.

UNIT II DC MACHINES

Elementary DC machine and analysis of steady state operation- Voltage and torque equations – dynamic characteristics of permanent magnet and shunt d.c. motors – Time domain block diagrams - solution of dynamic characteristic by Laplace transformation – digital computer simulation of permanent magnet and shunt D.C. machines.

UNIT III REFERENCE FRAME THEORY

Historical background – phase transformation and commutator transformation – transformation of variables from stationary to arbitrary reference frame - variables observed from several frames of reference.

Diploma, Anna University-UG, PG., HSC & SSLC

Notes   *Available @*
Syllabus
Question Papers   www.AllAbtEngg.com
Results and Many more…

UNIT IV INDUCTION MACHINES

Three phase induction machine, equivalent circuit and analysis of steady state operation – free acceleration characteristics – voltage and torque equations in machine variables and arbitrary reference frame variables – analysis of dynamic performance for load torque variations – digital computer simulation.

UNIT V SYNCHRONOUS MACHINES

Three phase synchronous machine and analysis of steady state operation - voltage and torque equations in machine variables and rotor reference frame variables (Park's equations) – analysis of dynamic performance for load torque variations – Generalized theory of rotating electrical machine and Krons primitive machine.

REFERENCES

1. Paul C.Krause, Oleg Wasyzczuk, Scott S, Sudhoff, "Analysis of Electric Machinery and Drive Systems", John Wiley, Second Edition, 2010..

2. P S Bimbhra, "Generalized Theory of Electrical Machines", Khanna Publishers, 2008

3. A.E, Fitzgerald, Charles Kingsley, Jr, and Stephan D, Umanx, " Electric Machinery", Tata McGraw Hill, 5th Edition, 1992

4. R. Krishnan, Electric Motor & Drives: Modeling, Analysis and Control, New Delhi, Prentice Hall of India, 2001.