Electrical Machines ME-505A Contracts: 3L Credits- 3

Module-I

DC Machines:

 EMF generated in the armature. Methods of Excitation, Armature reaction & its effect in the performance, Methods of decreasing the effects of Armature reaction, Effect of Brush shift. Commutation process. [3]
Operating Characteristics of DC Generators: Separately Excited generators, Shunt Generators, Series Generators and Compound Generators. [2]

• Torque equation of D.C motor, Operating Characteristics of Shunt, Series & Compound motors. [2]

• Losses and efficiency of DC machines, Hopkinson's and Swinburne's test [2]

•D.C Machine application: Generator application, Motor application [1]

Module-II

3-Phase Induction machine:

•Induction motor as a Transformer, Flux and MMF phasors in Induction motors, [1]

•Equivalent circuit, Performance equations, Induction motor phasor diagram [2]

•Toque-slip characteristic, Power slip characteristic. [1]

•Speed control of Induction motor [2]

•Polarity Test, Application of Polyphase Induction motor. [1]

Module-III

Synchronous Machines:

- Construction, Types, Excitation system, Generator & motor modes [2]
- Armature reaction, Theory of salient pole machine, Two reaction theory, Voltage regulation [3]

• Parallel operation of alternators, Synchronous machine connected to infinite bus, effect of

change of excitation and speed of prime mover. [3]

• Starting of Synchronous motor, V-Curve, Damper winding, Hunting. [2]

Module-IV

Fractional Kilowatt motors:

• Single phase Induction motor: Construction, Double revolving field theory. Starting methods, Speed -torque characteristics, Phasor diagram, Application [3]

• Principle of operation of AC servo motors, Stepper motors, Techo generators, Brush less DC motors. [3]

Numerical Problems to be solved in the tutorial classes.

Text Books:

1 Electrical Machinery, P.S. Bhimra, 6th Edition, Khanna Publishers.

2 Electric machines, D.P. Kothari & I.J Nagrath, 3rd Edition, Tata Mc Graw-Hill Publishing Company Limited. 3 Electrical Machines, P.K. Mukherjee & S. Chakrabarty, Dhanpat Rai Publication.

Reference Books:

1. Electric Machinery & Transformers, Bhag S. Guru and H.R. Hiziroglu, 3rd Edition, Oxford University press.

- 2. Electrical Machines, R.K. Srivastava, Cengage Learning
- 3. Theory of Alternating Current Machinery, Alexander S Langsdorf, Tata Mc Graw Hill Edition.
- 4. The performance and Design of Alternating Current Machines, M.G.Say, CBS Publishers & Distributors.
- 5. Electric Machinery & transformer, Irving L Koskow, 2nd Edition, Prentice Hall India