EE 352

ELECTRICAL MACHINERY-III

UNIT-I

Synchronous Machines: Constructional Details, Types of windings –Winding factors -e.m.f. equation -Fractional pitch and fractional slot windings -Suppression of harmonics and tooth ripple -Armature reaction and reactance -Synchronous impedance.

UNIT-II

Synchronous Generator: Voltage Regulation -Phasor diagram of alternator with non-salient poles -O.C. and S.C characteristics –Synchronous impedance, Ampere turn, ZPF methods for finding regulation –Principle of two reaction theory and its application for the salient pole synchronous machine analysis -Synchronism and parallel operation.

UNIT-III

Synchronous Motor: Theory of operation- Vector diagram –Variation of current and p.f. with excitation -Hunting and its prevention –Current and power diagram Predetermination of performance –Methods of Starting and Synchronizing. Synchronizing Power. Synchronous Condenser.

UNIT-IV

Transient Stability Studies of Synchronous Machines: Elementary ideas of transient behavior of an Alternator -Three phase short circuit of an Alternator -

Elementary ideas of the stability of synchronous machine connected to infinite Bus. Special Machines -Permanent Magnet Motors,

Switched Reluctance Motors, Hysteresis Motors.

UNIT- V

Two phase servo motor characteristics- Single phase motors- Theory and operation of single phase motors-Shaded pole ,Split phase and capacitor motors - Compensated and uncompensated series and repulsion motors. Linear Induction motors.

Suggested Reading:

1. I.J.Nagrath & D.P. Kothari, Electrical Machines, Tata McGraw 2004, 3rd Edition

2. S.K.Bhattacharya, Electrical Machines, Tata McGraw Hill, 2002.

3. P.S.Bhimbhra, Generalized Theory of Electrical Machines, Fifth Edition,

Khanna Publishersl995,

4. M.G Say, The Performance and Degin of A.C Machines-Pitman Publications, 1985.