EE 302

ELECTRICAL MACHINERY-II

Instruction	4/1 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT-I

Parallel operation of Single phase Transformer and load sharing. Insulation of Windings and terminals. Cooling arrangement in Transformers. Testing of Transformers -Routine Tests and Special tests -Measurement of Voltage ratio and check for voltage vector relationship. Measurement of No- load loss and current. Measurement of Insulation resistance. Maintenance of Transformers.

UNIT-II

Poly-phase Transformer Connections ,Choice of Transformer Connections, Third harmonic voltages -Phase Conversion -3phase to 2-phase transformation -Scott connection. Constructional features of three-phase transformers, tertiary winding, parallel operation of transformer, Auto Transformer -Comparison with two winding transformers- Conversion of two winding transformer to auto transformer. Tap changer on transformers, No-load tap changer, On-load tap changer.

UNIT-III

Three-phase Induction Motor -Constructional features –Rotating Magnetic field theory --Principle of operation of squirrel cage and slip ring motors -Vector Diagram , Equivalent circuit -Expression for torque- Starting torque, Maximum torque -Slip/Torque characteristics - Performance characteristics -Equivalent circuits from test –Current loci circle diagram -Predetermination of characteristics of Induction Motors .

UNIT-IV

Starting methods of Induction motors .Modes of operation, torque and power limits of Induction motors-Speed control methods -Resistance Control, Voltage control, pole changing, Cascading, variable frequency control- Slip power recovery schemes Kramer drive. Scherbius drive- Double cage Induction motors. Induction generator

UNIT-V

Unbalanced Operation: Voltage Unbalance -Unbalanced Operation of 3- phase Induction Motor -Per Phase Equivalent Circuits -Single Phasing- Unbalanced Operation of 3-Phase Transformers –Single phase load on Three phase transformers Single Phasing in 3 phase transformers- Delta /Star and Star/Delta transformers.

Suggested Reading:

1. I.J. Nagarath, D.p.Kothari, Electrical Machines. 4th Edition Tata McGraw Hill, 2010.
2. J.B. Gupta, Theory and Performance of Electrical Machines, S.K. Kataria. & Sons, 2003.
3. P.S. Bimbhra, Generalised theory of Electrical Machines, Khanna Publishers Fifth Edition 1995
4. M.G.Say, The performance and Design of A.C. Machines- Pitman, 1985.
5. Fitzerald A E and Kingzley .Electrical Machines .3rd Edition.