

## 13EE2204-ELECTROMECHANICAL ENERGY CONVERSION –II

(EEE)

Instruction/week: 4 hrs.

Max. Sessional marks: 40

Univ. Exam: 3 hrs.

Univ. Exam marks : 60

### UNIT-I

**Testing of 1- $\phi$  transformers:** Sumpner's test - separation of hysteresis and eddy current losses - Parallel operation of transformers with equal and unequal voltages- load sharing.

**Autotransformer:** principle-saving of copper - realization of two winding transformer as autotransformer.

### UNIT-II

**Poly-phase transformers:** Poly-phase connections – Star/Delta, Delta/Star, Star/Star, Delta/Delta, Star/zigzag Star, Delta/zigzag Star connections and their Phasor diagrams - Scott connection - Open Delta connection - Testing of three phase transformers.

### UNIT-III

**3- $\phi$  induction motor:** Constructional details – types - production of rotating magnetic field - principle of operation - phasor diagram - Equivalent circuit - Torque equation - Starting and maximum torques - Maximum output - Slip for maximum output - Torque-slip characteristic - losses and efficiency - no load and blocked rotor tests - determination of equivalent circuit parameters.

### UNIT-IV

**Testing of 3- $\phi$  induction motor:** Brake test - Pre-determination of performance from no load and blocked rotor tests - circle diagram.

**Methods of starting:** Auto transformer, star delta and rotor resistance starters.

### UNIT-V

**Speed control of induction motors:** Pole changing - cascade connection - injection of e.m.f. into rotor circuit - introduction to V/f control of three phase induction motor.

Double cage induction motor-Construction theory - equivalent circuit - characteristics and applications - Induction generator - Theory, construction, operation, equivalent circuit and applications.

### TEXT BOOKS:

1. "Theory and performance of Electrical machines"-J.B Gupta, SK Kataria publishers.
2. "Electrical Machines" by Ashfaq Hussain , Dhanpat rai & co.

### REFERENCES:

1. "Electrical Machinery", by Dr. P.S Bimbhra, khanna publishers.
2. "Electrical machines" by I.J.Nagarath and D.P.Kothari second edition, Tata Mc Graw-Hill.
3. "Performance & Design of Alternating Current machines" by M. G. Say, CBS publishers