

AIM

To expose the students to the concepts of various types of electrical machines and transmission and distribution of electrical power .

OBJECTIVES

To impart knowledge on

- i. Constructional details, principle of operation, performance, starters and testing of D.C. machines.
- ii. Constructional details, principle of operation and performance of transformers.
- iii. Constructional details, principle of operation and performance of induction motors.
- iv. Constructional details and principle of operation of alternators and special machines.
- v. Power System transmission and distribution.

UNIT I D.C. MACHINES 9

Constructional details – emf equation – Methods of excitation – Self and separately excited generators – Characteristics of series, shunt and compound generators – Principle of operation of D.C. motor – Back emf and torque equation – Characteristics of series, shunt and compound motors - Starting of D.C. motors – Types of starters - Testing, brake test and Swinburne’s test – Speed control of D.C. shunt motors.

UNIT II TRANSFORMERS 9

Constructional details – Principle of operation – emf equation – Transformation ratio – Transformer on no load – Parameters referred to HV/LV windings – Equivalent circuit – Transformer on load – Regulation - Testing – Load test, open circuit and short circuit tests.

UNIT III INDUCTION MOTORS 9

Construction – Types – Principle of operation of three-phase induction motors – Equivalent circuit – Performance calculation – Starting and speed control – Single-phase induction motors (only qualitative treatment).

UNIT IV SYNCHRONOUS AND SPECIAL MACHINES 9

Construction of synchronous machines-types – Induced emf – Voltage regulation; emf and mmf methods – Brushless alternators – Reluctance motor – Hysteresis motor – Stepper motor.

UNIT V TRANSMISSION AND DISTRIBUTION 9

Structure of electric power systems – Generation, transmission, sub-transmission and distribution systems - EHVAC and EHVDC transmission systems – Substation layout – Insulators – cables.

L = 45 Total = 45

TEXT BOOKS

1. D.P.Kothari and I.J.Nagrath, ‘Basic Electrical Engineering’, Tata McGraw Hill publishing company ltd, second edition, 2002.
2. C.L. Wadhwa, ‘Electrical Power Systems’, Wiley eastern ltd India, 1985.

REFERENCE BOOKS

1. S.K.Bhattacharya, ‘Electrical Machines’, Tata McGraw Hill Publishing company ltd, second edition, 1998.
2. V.K.Mehta and Rohit Mehta, ‘Principles of Power System’, S.Chand and Company Ltd, third edition, 2003.