

AMEE15 ELEMENTS OF POWER SYSTEM

UNIT-1 POWER SYSTEM COMPONENTS

- 1.1 Single line Diagram of Power system, Brief description of power system Elements:
- 1.2 Synchronous machine, transformer, transmission line, bus bar, circuit breaker and isolator
- 1.3 Supply System Different kinds of supply system and their comparison, choice of transmission voltage
- 1.4 Transmission Lines: Configurations, types of conductors,
- 1.5 Resistance of line, skin effect, Kelvin's law. Proximity effect

UNIT-2 OVER HEAD TRANSMISSION LINES

- 2.1 Calculation of inductance and capacitance of single phase, three phase,
- 2.2 Single circuit and double circuit transmission lines,
- 2.3 Representation and performance of short, medium and long transmission lines,
- 2.4 Ferranti effect. Surge impedance loading

UNIT-3 CORONA AND INTERFERENCE

- 3.1 Phenomenon of corona, corona formation, calculation of potential gradient,
- 3.2 Corona loss, factors affecting corona, Methods of reducing corona and interference.
- 3.3 Electrostatic and electromagnetic interference with communication lines
- 3.4 Overhead line Insulators: Type of insulators and their applications, potential distribution over a string of insulators, methods of equalizing the potential, string efficiency

UNIT-4 MECHANICAL DESIGN OF TRANSMISSION LINE:

- 4.1 Catenary curve, calculation of sag & tension, effects of wind and ice loading, sag template, vibration dampers
- 4.2 Insulated cables: Type of cables and their construction, dielectric stress, grading of cables, insulation resistance, capacitance of single phase and three phase cables, dielectric loss, heating of cables

UNIT-5 NEUTRAL GROUNDING

- 5.1 Necessity of neutral grounding, various methods of neutral grounding, earthing transformer, grounding practices
- 5.2 Electrical Design of Transmission Line: Design consideration of EHV transmission lines, choice of voltage, and number of circuits, conductor configuration, insulation design, and selection of ground wires.
- 5.3 EHV AC and HVDC Transmission: Introduction to EHV AC and HVDC transmission and their comparison, use of bundle conductors, kinds of DC links, and incorporation of HVDC into AC system

Reference Books:

1. M. V. Deshpande, "Elements of Power System Design", Tata McGraw Hill,
2. Soni, Gupta & Bhatnagar, "A Course in Electrical Power", Dhanpat Rai & Sons,