

2.8 30508 ELECTRICAL TECHNOLOGY AND SAFETY

UNIT-1

- 1.1 Construction and Principle of operation of d.c machines, e.m.f equation of a generator, use of interpoles
- 1.2 Characteristics of shunt, series and compound generators, starting and speed control, losses and efficiency.
- 1.3 Construction and Principle of operation of single phase transformers, e.m.f equation, phase diagrams, equivalent circuit, regulation, losses and efficiency.
- 1.4 Protective relays, Requirement of relay, types of protection, classification, distance relay, differential relay, state relays.

UNIT-2

- 2.1 Synchronous machines, types, e.m.f equation, winding factors, armature reaction and leakage resistance. Synchronous motor, methods of starting applications.
- 2.2 Induction Motors, Construction and principle of operation, equivalent circuit, Torque, slip characteristics, method of starting, applications.
- 2.3 Circuit breakers, function of switch gear, arc phenomenon, initialization of an arc, arc interruption, recovery voltage and re-striking voltage–MCB and ELCB.
- 2.4 Faults in power systems– causes–types.

UNIT-3

- 3.1 Fuses, types, selection, advantages and disadvantages. Grounding, neutral grounding, solid grounding, resistance grounding, arc suppression coil grounding.
- 3.2 Equipment grounding for safety, grounding substation, grounding of line structure. Earthing
- 3.3 Effect of electric and magnetic fields, Human safety aspects, effect of current and voltage on human beings, typical V-I characteristics of skin, Electric shocks and their prevention.
- 3.4 Insulation, classes of insulation, FRLS insulation, continuity test.

UNIT-4

- 4.1 Safety during installation of plant and equipment. Safe sequences in installation, risk during installation. Safety during testing and commissioning.
- 4.2 Test on relays, protection and interlock systems for safety.
- 4.3 Hazardous zones, classification of hazardous zones. Intrinsically safe and explosion proof electrical apparatus. Selection of equipment's in hazardous area.
- 4.4 Electrical fires, hazards of static electricity. Safe procedures for electrical maintenance, statutory requirements. Safety provisions in Indian Electricity Act & Rules.

Reference Books:

1. H. Cotton: Electrical Technology, Wheeler Publishing Company.
2. S.L. Uppal :A Textbook of Electrical Engineering, Khanna Publishers, Delhi..
3. NSC, Chicago: Accident Prevention Manual for Industrial Operations
4. M.G. Say: Electrical Earthing and Accident prevention, Newnes, London, 1954.