

Electrical and Electronics

DIPLOMA STANDARD

I. ENGINEERING MECHANICS AND PRIME MOVERS:-

Mechanical and Electrical properties of materials - Tension, compression and shear -geometrical properties of sections - Torsion - Riveted and welded joints - Bearings and Lubrication - transmission of power. Hydraulic turbines and steam turbines - I C Engines: - Petrol Engine and Diesel Engine.

II. CIRCUIT THEORY AND DC MACHINES:-

DC Circuits - Storage Batteries - Single phase AC and 3 phase AC circuits - Circuit Theorems (Simple problems in DC). Electro magnetism - automobile electric circuit - DC Generator - Types - construction - working - characteristic curves - application. DC Motor - Types - construction - working - characteristics - application - speed control.

III. A..C. MACHINES:-

Transformer - construction - EMF equation - OC & SC Test - Regulation and efficiency. Alternator - construction - EMF equation - methods of obtaining sine-wave - parallel operation - Testing. Synchronous Motor - construction - starting methods - application. Induction Motor - 3 phase - construction and working principle - starting of 3 phase induction motors - speed control. single phase induction motors - working principle - applications.

IV. MEASUREMENTS:-

Classification of instruments - operating forces and constructional details of M.I., MC and Dynamometer type instruments. Direct measurement of EMF, current and power maximum demand indicator - synchroscope. Construction and working of single phase and 3 phase Energymeters - Measurement of resistance - AC Bridges - Anderson bridge for measurement of inductance. Measurement of speed by stroboscopic method, cable fault detection by Murray and Varley's Method.

V. ELECTRONIC DEVICES:-

Cathode Ray Oscilloscope, Semi conductor Diodes - Junction Transistors (BJT) - Field effect Transistors (JFET & MOSFET) and Uni junction Transistor (UJT). Special semiconductor devices - Gunn diode, varactor diode, Zenar diode, Tunnel diode - Silicon controlled Rectifier - DIAC - TRIAC - Photodiode - Solar Cell. Transistor configuration - Biasing and stabilising circuits (No deviation)

VI. ELECTRONIC CIRCUITS:-

Rectifiers - Half wave, full wave and Bridge - 3 phase rectifiers - voltage regulators - basic concept of SMPS. Oscillators - colpitt's Hartley - crystal - multivibrators (astable, monostable and bistable) - Digital electronics - De Morgauns Theorem - Half adder - Full Adder - multiplexer - Demultiplexer - BCD to 7 - segment decoder - D to A and A to D convertors - Ripple counter.

VII. GENERATION AND TRANSMISSION:-

Generation of electrical energy - Economics of power generation - Line Insulators and Underground cables Transmission lines voltage regulation - sag. Lightning arrestors - earthing Fuses - HRC fuse.

VIII. DISTRIBUTION AND UTILISATION:-

AC and DC Distribution - substations - Busbar system. Industrial Drives - Types of electric drives and choice of electric motor. Electric Traction - Traction mechanics - power supply - Traction motor - Braking. Illumination - Laws of illumination - construction and characteristics of Sodium and Incandescent lamps Factory lighting - street lighting. Chemical effects - Electrolysis & application to extraction of Aluminium and Zinc - copper refining - Heating & welding - methods of electric heating - Resistance welding - Electric Arc welding - Energy storage welding.

IX (A) COMPUTER PROGRAMMING:- Input devices - Output devices - flow chart - BASIC PROGRAMMING.

(B) ESTIMATING&COSTING:- Indian Electricity Rules-1956-Standard symbols used in wiring and drawing estimation for different installations (House wiring, Theatre wiring)

X. CONTROL AND MAINTENANCE:- Plant maintenance - Common defects and remedies of commutation - preparatory steps for repair of windings - location of faults in winding. Transformer installation and maintenance - maintenance of induction motors and starters. Motor control circuit for reversing jogging and inching.