SYLLABUS FOR INSTRUCTOR (ELECTRICAL)/ TECHNICIAN(ELECTRONICS)

1. **FUNDAMENTALS OF ELECTRICITY:-**
   Effects of electric current, fundamental terms, definition, solder, flux, definition and properties of conductors, insulators, semiconductors, different types of insulators, type of wires and cables, specification of wires and cables - insulators, low medium and high voltage various type of cables.
2. **LAW OF RESISTANCE, OHM'S LAW, KIRCHHOFF'S LAWS:-**
   Resistance, PD, current, specific resistance, laws of resistance, ohm's law, series and parallel circuit, Kirchhoff's laws, wheat stone bridge, effects of variation of temperature on resistance, work, power, energy, efficiency, and the heating effect of electric currents.
3. **CELLS AND BATTERIES:-** Electrolysis, faradays laws of electrolysis, basic principle of electro plating and electrochemical equivalents. Primary cell and secondary cell lead acid cell, methods of charging care and maintenance of cells, grouping of cells of specified voltage and current, inverter, battery charger nickel alkali cell, efficiency of cells, power and capacity of cells.
4. **HOUSE WIRING AND EARTHING**:- Different methods of earthing IE, pipe, plate importance of earthing, improving earth resistance, E L C B type of wiring and their uses, IE rules wiring accessories, Such as lamp holder, switch, plug, bracket, ceiling rose cutout, ICTP, ICDP.
5. **MAGNETISM:-** Classification of magnets, method of magnetising magnetic materials, properties, care and maintenance para and diamagnetic, and ferromagnetic, materials principle of electromagnetism, max well's cork screw rule, Fleming's left and right hand rules. magnetic field of current carrying conductor, solenoid M.M. Flux density reluctance, hysteresis, eddy current, principle of electro magnetic induction, faradays laws, Lenz's law, electro statics capacitor, different types of function and uses.

6. **ALTERNATING CURRENT AND POLY PHASE:-** Comparison and advantage AC and DC related terms, frequency, instantaneous value R M S value, average value, peak factory, form factor, sine wave, phase and phase difference inductive and capacitive reactance, impedance power factor, active and reactive power single phase and 3 phase system, power consumption series and parallel, PF, three phase star delta connection line and phase voltage, current and power in 3 phase circuits with balanced and unbalanced load.

7. **BASIC ELECTRONICS:-** Semi conductor, atomic structure P type and N type types of materials, P N junction classification diodes, reverse and forward bias, heat sink specification of diode, PIV rating, half wave, full wave and bridge circuit, fitter circuits passive filter. L E D, diode types of transistor UJT, SCR, regulator ICS and zener diode uses and its application, IC voltage regulator JFET, logic gate, AND gate.

8. **ELECTRONICS MEASUREMENT & INSTRUMENTATIONS:-**
   Measurement Fundamentals, Explanation of accuracy, precision, sensitivity, resolution, dynamic range, response and repeatability of measuring instruments. Role of Units in measurements and different types of units - Type of errors - Definition of Primary and Secondary Standards - Concept of Calibration
   Electronic Voltmeter & Multi Meter: Advantages of electronic voltmeter over ordinary voltmeter.
   Working principle of Digital Multi Meter - Different types of DMM: Integration and successive approximation type, Advantages of DMM over Conventional Multi Meter

Measurement with CRO: Dual Trace Oscilloscope, Working Principle; Uses of Oscilloscope for frequency response measurement, Digital Storage Oscilloscope, Working Principle; uses in the field of Transient responses, X-Y Display Unit. Working Principle; Uses as phase measurement
Frequency Measurement: Comparison method; Capacitor charge-discharge method; Pulse counting Method by Digital frequency meter; Detailed study of digital frequency meter.

Power Measurement Basic power measurement method**,** Power measurement method by terminating (absorption) method**,** Feed-through power measurement**,** Low-level power measurement

9. **DC GENERATOR AND MOTORS:-** Introduction to dc generator and working principle, parts of DC generator, classification of generator self excited and separately excited their application types and characteristics of DC generator, series shunt and compound their application, emf equation DC motor working principle, types of motor, torque, speed back emf. Characteristics, speed control of DC motor, necessity of starter types of starters. 2 points, 3 points, 4 pointS starters protective device used method of speed control.
10. **AC GENERATORS, MOTORS AND STARTERS:-** Parts and construction of alternator principles of working, types of alternator, emf equation, various applications and power rating of alternator, general idea of loading and regulation of alternator, parallel operation of alternators, synchronizing method.

AC single phase motor and types, capacitors start/run - start and run FHP motors and their uses various application of AC single phase motors.

11. **THREE PHASE MOTORS:** construction principle of operation of three phase induction motors squirrel cage and slip ring induction motors rotors slip, rotor frequency and motor torque starting method, speed control method importance of phase sequence in three phase induction motor single phasing preventer starters, DOL starters, delta starters and auto transformer starter rotor resistance starter.
12. **TRANSFORMERS:-**

POWER TRANSFORMERS:- Its construction working parallel operation of transformer their connection, cooling transformer, EMF equation, transformation ratio, ideal transformer, construction of core, shell, berry type, auxiliary parts, breather, conservator, Buchholz's relay, other protective device, transformer oil testing OFF load and ON load, auto transformer, its construction, working and uses, CT, PT, losses and efficiency.

13. **MEASURING INSTRUMENT:-**

TYPES OF MEASURING INSTRUMENT:- MC and MI construction and working principles of ammeter, volte meter, om meter, waltt meter, energy meter, PF meter, Megger, earth tester, CT, and PT tong tester / clip on meter multi meter.

14. **GENERATION, TRANSMISSION AND DISTRIBUTION OF ELECTRICITY**

GENERATION:- Diesel power station, stream power station, hydroelectric power station, nuclear power station.

SUBSTATION: - Indoor, outdoor, pole mounting, EHT substation, HT substation, medium and low voltage substation.

UG CABLE : - Construction of cable, types , and testing.