

TAMIL NADU PUBLIC SERVICE COMMISSION

SYLLABUS

TRADE – ELECTRICIAN

(ITI STANDARD)

CODE: 438

UNIT-I : SAFETY RULES – FUNDAMENTAL OF ELECTRICITY

Safety Rules, Hazards, Types of Fire Extinguishers, Personal Protective Equipments, Types of Wires and Joints. Soldering Methods, Ohm's Law – Simple Electrical Circuits and Problems. Kirchhoff's Law and its application – Under Ground Cables - Capacitor types Functions Grouping and uses.

UNIT-II: AC CIRCUITS – CELLS AND BATTERIES – WIRING INSTALLATION

AC Circuits – Power, Energy, Power Factor in AC Single Phase Circuits, Poly phase circuit, Cells and Batteries - Basic Wiring Practice, Wiring Installation and Earthing – Types - Testing a Domestic Wiring Installation – Location of Faults, Remedies. Industrial Wiring – Isolator, Switches, Fuses, Relays, Timers and Limit Switches – Types of Circuit Breakers.

UNIT-III: ILLUMINATION AND ELECTRICAL MEASURING INSTRUMENTS

Illumination – Construction Details of Various Lamps – Electrical Measuring Instruments and types - Ammeter, Voltmeter, Ohm Meter, Power Factor Meter, Frequency Meter, Multi meter, Watt Meter, Energy Meters (1 Phase and 3 Phase). Tong Tester (Clamp on Meter), Smart Meters, Automatic Meter Reading - Supply Requirements.

UNIT-IV: ELECTRICAL APPLIANCES

Domestic Appliances – Concept of Neutral and Earth – Cooking Range, Induction Heater, Food Mixer – Automatic Electric Iron Box, Electric Geyser Wet Grinder, Washing Machine and Fans.

UNIT-V: TRANSFORMERS

Transformer – Principle, Classification, EMF Equation, Transformer Losses. Open Circuit Test, Short Circuit Test – Efficiency – Voltage Regulation. Parallel Operation of Single Phase and Three Phase Transformers – Methods of Cooling of Transformer – Necessity of Cooling - Transformer Oil and Testing – General Maintenance of three Phase Transformer.

UNIT-VI: DC MACHINES

DC Generators – Principle of Operation – Construction – Parts – Types – Characteristics – Build up of emf – Application – Losses efficiency

DC Motors – Principle of Operation – Starters – DOR – Armature reaction – Commutation – Speed Control Methods – Applications – Winding lap and Wave – Losses and efficiency – Maintenance, Service and repair.

UNIT-VII: AC MACHINES

Three Phase Induction Motors – Principle of Working – Construction – Parts – Types – Squirrel Cage Induction Motor – Slip ring Induction Motor – Characteristics – Slip Vs Torque – Type of Starters – Basic Contactor Circuit – Parts and Functions.

Single Phasing Prevention – Losses and efficiency – Methods of Speed Control – Windings – Types – Concentric / Distributed – Single / double layer winding and related terms – Maintenance Service and repair – Trouble Shooting.

Single Phase Induction Motors - Working Principle – Types – Construction – Parts – Starting & running Methods – Domestic and Industrial – Applications Maintenance and Trouble Shooting

UNIT-VIII: SYNCHRONOUS MACHINE

Alternators - Working Principle – Construction – Parts – Types – Relation between Poles, Speed and Frequency – Voltage Regulation – Losses and efficiency – Characteristics – Phase Sequence – Parallel Operation – Care and Maintenance.

Synchronous Motor – Working Principle – Power factor improvement.

UNIT-IX: ELECTRONICS

Resistors – Colour Code, Types and Characteristics – Active and Passive Components Diodes – Rectifiers – Characteristics – Transistors, SCR, DIAC, TRIAC – Applications – Digital Electronics – Logic gates and Combinational Circuits – UPS and Invertors.

UNIT-X: POWER GENERATION, TRANSMISSION AND DISTRIBUTION

Types of Power Generation –Conventional and Non-Conventional Energy Sources – Solar and Wind Energy – Solar Panels – Transmission and Distribution Network – Line Insulators – Over Head Poles – Safety Precautions and IE Rules for Service Lines – Terms related to Distribution.