

TRIPURA STATE ELECTRICITY CORPORATION LIMITED

(A Govt. of Tripura Enterprise)



Syllabus for Manager (Electrical/Mechanical/Civil) Grade-B

Total Marks-100 (Written Exam- 85 , Interview- 15)

Duration of Examination-3 Hours

Selection Phase - I

I) GENERAL STUDIES (COMPULSORY FOR ALL GRADE/POSTS/BRANCHES) - 35 Marks

Sl. No.	Topic	Marks
(i)	Vocabulary (Synonyms & antonyms, idioms & Phrases)	05
(ii)	General Knowledge (Knowledge of Tripura only)	15
(iii)	Current Affairs (Knowledge of Electricity Market, Renewable Market and Electricity situation in India, NE Region and Tripura)	15

ELECTRICAL ENGINEERING BRANCH (DIPLOMA) - 50 Marks

(1) Power Plant Engineering:-

- Conventional Sources of Energy-Fossil fuels, Hydroelectric and Nuclear.
- Thermal Power Station:
- Hydro-electric Power Stations:
- Nuclear Power Plants:
- Diesel Power Plants & Gas-Turbine Plants:
- Elementary idea about Major Electrical Equipments used in Power Stations:
- Combined working of Power Plants
- Control of Active and re-active Power-Load-frequency control
- Performance of Power_ Stations and Economic Considerations

(2) Electrical Design & Estimating:-

- Design and Specification
- I.E. rules related to Power Sub-Circuit.

Design of a 3-phase transformer:-

- Estimation of a small residential complex.
- Estimation of lighting scheme of a large Auditorium and Public Health Centre.

(3) Electrical Mechanics:

General Introduction of Rotating Machine

- Transformers
- 1-Phase Transformers
- Principles of 1-Phase Autotransformer
- Three Phase Transformer
- Alternator
- 3-Phase Induction Motor
- Synchronous Motor

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(4) Transmission & Distribution Power

- Transmission System
- Constructional Feature of Transmission & Distribution Lines
- Mechanical Features of Overhead lines
- Spacing of Conductors, length of Span, Relevant I.E. Rules
- Electrical Features of Overhead Lines
- Power Factor Improvement
- Using Static condenser and Synchronous condenser-related problems
- Distribution System
- Sub-Stations
- Extra High Voltage DC System of Transmission

(5) Basic Electronics:-

- Passive & Active Circuit Elements

Familiarity with the Following Components:-

- Resistors, Fuses, Capacitors, Inductor,
- Voltage source and current source
- AC and DC signals, Transformer
- RELAYS, SWITCHES, CABLES AND CONNECTORS
- Zener Diode
- Bipolar Transistor
- Field Effect Transistor
- Unijunction Transistor
- Thyristor
- Optoelectronics
- Integrated Circuits

(6) Electrical Measurement & Measuring Instruments:-

- Definition & Brief explanations of:
Range, Sensitivity, True & Indicated value, Errors (including limiting errors),
- Resolutions, Accuracy, Precision and instrument efficiency.
- Classification of Instruments:
- Basic Requirements for Measurements:
- Different types of instruments:
- Voltmeter, ammeter, multimeter, energy-meter.
- Multi-range ammeter and voltmeter
- Methods of Measuring diff. Electrical quantities
- 1-Phase Induction type energy meter.
- Errors adjustments
- Phantom loading
- Testing of energy Meters.
- Classifications of Resistances.
- Description of Meggar.
- Measurement of capacitance:

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- Magnetic Measurements:
- Instruments Transformers:
- CT
- PT or VT
- Smart Meters/Communicable Electronics Meters

(7) Circuit Theory:

Networks & A.C. Fundamentals

- Single-Phase A.C Circuits:
- R-L-C Series Circuit:
- Parallel Circuit

Resonance & Selectivity

- Series Resonance
- Parallel Resonance:

(8) Electrical Measurement & Control:-

- Measurement of Power/Energy & Industrial Metering;
- Digital Energy Meter
- Operation & Utility of Tri-vector meter.
- Digital Frequency meter:
 - (i) Mech. Resonance type (ii) Electrical Resonance type Frequency meter Power Manager.
- Synchroscope:
- Phase- Sequence Meter
- Digital Multimeter
- C.R.O. – Block diagram representation & Operation, applications
- Function generator –

(9) Electrical Installation, Maintenance and Testing:-

- General guidelines for Installation:
- Loading & Unloading of heavy electrical m/c:
- Electrical Installation Requirements:
- Earthing Installation:
- Motor Generator set for battery charging and to supply various loads.
- Synchronization of two alternators.
- Maintenance of electrical installation
- Insulations
- Troubleshooting
- Repair & maintenance with maintenance Schedule of
- D.C Machine
- Transformer
- Induction Motor
- Switchgear & Substation:
- Relays
- Brief account maintenance of contractors
- Storage Batteries

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- OH lines and Cables
- Testing
- Electricity Safety Regulations.

(10) Solar Engineering

(11) EV Charging Systems

CIVIL ENGINEERING BRANCH (DIPLOMA) - 50 Marks

(1) Building Materials & Constructions:-

- Bricks and Tile
- Stones, Sand
- Cement
- Mortar
- Concrete
- Timber
- Metals and other Engineering Materials
- Paints and Varnishes
- Building Construction
- Construction Planning and Storage of Material
- Foundation
- Bricks and Stone Masonry
- Damp Proofing
- Lintel and Arches
- Roofs and Roofs Coverings
- Doors and Windows
- Scaffolding
- Stair and Staircases
- Flooring
- Wall Finish

(2) Strength of Materials & Theory of Structure:-

- Strength of Materials
- Bending Moment & Sheer Force in Beams
- Bending Stress in Beams
- Shearing Stresses in Beams
- Columns & Struts
- Combined Bending & Direct Stress
- Compound & Complex Stress
- Strain Energy & Impact Loading

Theory of Structures:-

- Definitions & General Principles
- Primary Stress Analysis for Statically Determinate Pin Jointed Structures.
- Fixed & Continuous Beams Propped Cantilever

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- Moment Distribution Method
- Retaining Walls (Earth Retaining Structures)

(3) Foundation Engineering:-

- General Considerations for Design of Foundations
- Types of Foundation
- Bearing Capacity of Soils
- Settlement of Foundation
- Pile Foundation
- Soil Stabilization
- Soil Exploration
- Stress Distribution in Soils
- Earth Pressure

(4) Concrete Technology:-

- Materials for Cement Concrete
- Preparation of Concrete
- Concrete Mix Design
- Quality Control
- Special Concrete
- Deterioration and Restoration of Concrete

(5) Quantity Surveying:-

- Definition of An Estimate and Types
- Symmetrical & Unsymmetrical Boundary Wall(Using Modular & Traditional Bricks)
- Centre Line, Long Wall & Short Wall Method With Example
- Definition of Floor Area, Carpet Area, Plinth Area, Far
- Estimate of Different Items of Works Involved in a Single Storey Residential Building
- Estimate of R.C.C. Beams, Chujia, Lintel and Slab(One way & Two Way Reinforcement) Showing Bar Bending Schedule
- Calculations of Quantity of Materials of Different Items of Works
- Calculation of Volume of Earth Work of Different Works
- Quantity & Cost Estimate
- Contracts
- PWD Accounts
- Arbitration
- Valuation

(6) Hydraulics:-

- Introduction
- Fluid Static
- Fluid Flow
- Fluid Measurement Flow Through
- Pipes Open Channel Flow

(7) Irrigation:-

- Hydrology
- Water Requirement of Crops
- Canal Irrigation
- Well Irrigation

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- Canal Head Works
- Flood Controls
- Water Logging
- Land Reclamation
- Major Irrigation Projects In India

(8) Environmental Engineering:-

- Air Pollution
- Air Pollution Control Measures & Equipment
- Methods & Approach of Air Pollution Control
- Different Sources of Water Pollution
- Water Pollution & Its Control
- Solid Waste Disposal

(9) Surveying:-

- Linear Measurements
- Chain Surveying
- Compass Surveying
- Leveling
- Contouring
- Theodolite Surveying
- Earth Work Calculation
- Plane Table Surveying
- Computation of Areas
- Computations of Volume

(10) Transportation Engineering:-

- Projects & Profiles
- Permanent Way
- Track Geometrics
- Points & Crossing
- Stations & Yards
- Permanent Way Maintenance
- Road Drainage
- Traffic Engineering Highway Maintenance

MECHANICAL ENGINEERING BRANCH (DIPLOMA) - 50 Marks

(1) Environmental Engineering:-

- Air Pollution
- Analysis of Air Pollutants
- Air Pollution Control Measures & Equipment
- Methods & approach of Air Pollution Control

Water & Environment:-

- Water Sources
- Different Sources of Water Pollution
- Water Pollution & Its Control

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- Noise & Environmental Management System
- Noise Pollution & Control
- Environmental Legislation, Authorities & Systems

(2) Mechanics of Materials:-

- Stress and Strain
- Thin Cylinder and Spherical Shells
- Deflections of beams
- Torsion of Solid and Hollow Circular Shafts
- Springs
- Riveted Joints

(3) Machine Tool:-

- General Introduction
- Metal Cutting
- Lathe and Lathe Works
- Drilling Machine
- **BORING MACHINE SHAPER & PLANNER**
- Milling Machine Grinding Machine

(4) Fluid Mechanics:-

- Physics AL Properties of fluids
- Fluid Statics
- Fluid Kinematics
- Fluid Measurements
- Impact of Jet
- Pumps
- Hydraulic Turbine

(5) Automobile Engineering:-

- Constructional Features
- Fuel Supply System
- Cooling System
- Lubrication System
- Intake & Exhaust System
- Fuels
- Combustion In Engine
- Automobile Emission & Its Control
- Electrical System
- Chassis & Body
- Transmission System
- Gear Box
- Propeller Shaft & Final Drive
- Suspension System
- Steering System
- Breaking system
- Wheel & Tyre
- Garage & Service Station.

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(6) Non-Conventional Energy Sources:-

- Solar Power Plants
- Solar Energy
- Solar Radiation
- Wind Power Plants
- Wind Energy
- Energy from Bio-Mass.

(7) Refrigeration & Air-Conditioning:-

- Air Refrigeration System
- Vapour Compression Refrigeration System
- Vapour Absorption System
- Refrigerants
- Refrigeration Components, Control and Safety Devices
- Application of Refrigeration.

Selection Phase - II

Interview - 15 Marks.

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10-11-25

(Er. Biswajit Basu)
Managing Director

Tripura State Electricity Corporation Limited