



Indian Institute of Technology Tirupati

Post Name: Assistant Executive Engineer (Electrical)

Advertisement No: IITTP/Staff RMT-01/2020 December 30, 2020

Syllabus for the Written Test Examination

Electric Circuits and Networks: Circuit elements- resistors, capacitors and inductors, Ohm's Law, network Kirchoff's current and voltage laws, Node and Mesh analysis, Thevenin's, Norton's, Superposition and Maximum Power Transfer theorems, two-port networks, single and three phase circuits.

Electrical Machines: Single phase transformers, three phase transformers - connections, parallel operation, testing of transformers, regulation and efficiency of transformers, Scott Connection, instrument transformers, auto-transformers, Basics of DC machines, Induction motors - principles, types, performance characteristics, starting and speed control, Synchronous machines - performance, regulation, parallel operation of generators, operation under infinite bus bars, synchronous motors, V and inverted V curves for synchronous motors.

Principles of Measurement: Units, significant digits; Errors in measurements, Analog indicating instruments: permanent magnet moving coil meter, moving iron meter, electro-dynamometer, wattmeter and energy meter; Digital methods of measurement: counter-timer, analog-to-digital converters, digital multimeter, data-acquisition systems; Graphical methods of measurement: oscilloscopes; Null balance method: dc and ac potentiometers, dc and ac bridges.

Power Systems: Structure of power systems, transmission lines models (small, medium and long), skin effect, Ferranti effect, corona discharge, overhead line insulators, underground cables (HT and LT), distribution systems, types of distribution systems, feeders, distributors and service mains, typical distributor design, Automatic Voltage Regulators (AVRs), Diesel Generator sets, Methods of power factor correction, Conservation of Energy and Energy auditing.

Switch Gears and Protection: Short circuit calculations for symmetrical and unsymmetrical faults, fuses, types of circuit breakers (HT and LT) and their functions, protective relays: distance protection, differential protection and over current relays, protection of AC Generators and

motors, transformer protection, busbar protection, protection of feeders and transmission lines, power system earthing, classification of substations, equipments for substations and switchgear installations, substation earthing, Surge and lightning protection.

Basic Electronics: Types of diodes, transistors, BJT, FET, characteristics, integrated circuits; Operational amplifiers, Fundamentals of digital circuits: binary arithmetics, logic gates, combinational logic and code converters, flipflops.

Power Electronics (Basics): SCRs, IGBTs, AC/DC Converters (rectifiers), DC/AC Converters (inverters), Static switches, Basics of Motor Drives and UPS systems.

Batteries: Types of batteries used in UPS systems, most important battery systems and their role in the energy system, energy density and storage capabilities of batteries, charge/discharge curves for the most common types of rechargeable batteries, different energy storage systems in the context of different applications involving energy storage, Battery and Converters for Photovoltaic Integration.

Tenders & Contract Management: Preliminary Estimates, Detailed Estimates for original works, Planning & design, Schedule of rates, Types of tenders, Annual budget for capital and Maintenance works, Human Resource Management, Material budget, Bar charts, Type tests and Routine tests, National and International standards for Electrical Systems, Quality assurance.

General Aptitude: Verbal and Numerical Ability.