INDIAN INSTITUTE OF TECHNOLOGY MADRAS, CHENNAI-600036.

Advertisement No. IITM/R/4/2024 dated 11.03.2024

Syllabus & Scheme of Examination

Post: Junior Technical Superintendent **Stream: Electrical Engineering**

LEVEL-1 Multiple Choice Question Test **(100 Marks)**

PART – A **(30 Marks)**

- ***Quantitative aptitude:*** Number systems, simplification, decimals, fractions, LCM, HCF, ratio & proportion, percentage, log and trigonometric functions, solutions of simple equations (linear and quadratic), basic statistics – mean and standard deviation, profit & loss, discount, simple & compound interest, mensuration, time & work, time & distance, tables & graphs.

- ***Logical reasoning aptitude:*** Analogies, similarities, differences, space visualization, analysis, judgment, decision making, visual memory, discrimination, observation, relationship concepts, arithmetical reasoning, verbal and figure classification

- ***Computer-related aptitude:*** Hardware, software, operating systems, basic operations in MS Office - Word, Excel, Powerpoint

- ***Language aptitude:*** Comprehension, vocabulary, basic grammar in English.

- ***General awareness aptitude:*** Current events, general knowledge, Indian history, Indian constitution, basic geography.

PART – B **(70 Marks)**

1. Electric circuits: Ideal voltage and current sources, R, L, C, M elements; Network solution methods: KCL, KVL, Mesh analysis; Network Theorems: Thevenin's, Norton's, Superposition and Maximum Power Transfer theorem; sinusoidal steady-state analysis, resonance, balanced three phase circuits, star-delta transformation, power factor in ac circuits.

2. Transformer: Single phase transformer: equivalent circuit, phasor diagram, open circuit and short circuit tests, efficiency; Three-phase transformers: connections; Auto-transformer

3. Electrical Machines: DC machines: separately excited, series and shunt, motoring and generating mode of operation and their characteristics; Three-phase induction machines: principle of operation, types, performance, no-load and blocked-rotor tests, starting; Operating principle of single-phase induction motors; Synchronous machines: cylindrical and salient pole machines, starting of synchronous motors; Types of losses and efficiency calculations of electric machines.

4. Power Systems: Basic concepts of electrical power generation, ac and dc transmission concepts, insulators, Distribution systems, Power factor correction, Circuit breakers.

5. Instrumentation: Bridges and Potentiometers, Measurement of voltage, current, power, energy and power factor; Instrument transformers, voltmeters and multimeters, Phase, Time and Frequency measurement; Oscilloscopes.

6. Analog and Digital Electronics: Simple diode circuits: clipping, clamping, rectifiers; Amplifiers, combinatorial and sequential logic circuits, multiplexers, demultiplexers, Schmitt triggers, sample and hold circuits, A/D and D/A converters.

7. Power Electronics: Static V-I characteristics and firing/gating circuits for Thyristor, MOSFET; Single and three-phase configuration of uncontrolled rectifiers; SMPS, Single-phase inverter, sinusoidal pulse width modulation.

Level – 2 Trade Test

- **Trade Test -** Syllabus as above under Part-B for Level-1 Multiple Choice Question Test.

Scheme of Examination:

Level	Type of Test	Time	Details	Weightage for the final result
Level -1	Multiple Choice Question Test	Time: 120 Minutes	100 Objective Questions – 100 Marks	70 %
Level–2	Trade Test	Time: 90 minutes approximately	Practical Trade Test	30 %

- A minimum of 5X candidates shall be shortlisted (for X number of posts advertised) for the Level-2 Trade Test, based on their performance in the Level-1 Multiple Choice Question Test.

NOTE:

a) The medium of examination will be ENGLISH
b) The questions will generally be on the minimum qualification level i.e. Diploma Level.
c) There shall be no negative marking for wrong answers.
d) **The Level-1 Multiple Choice Question Test is tentatively scheduled to be held on 07th February 2025 at TCS iON Centres in Chennai.**