

INDIAN INSTITUTE OF TECHNOLOGY MADRAS, CHENNAI-600036.

Advertisement No. IITM/R/2/2024 dated 02.03.2024

Syllabus & Scheme of Examination

Post: Junior Technician

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 06th February 2025 at TCS iON Centres in Chennai.**