

**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: BIO-MEDICAL**

**LEVEL-1 Multiple Choice Question Test**

**(100 Marks)**

**PART – A**

**(30 Marks)**

1. **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.
2. **Logical reasoning aptitude:** Analogies, similarities, differences, space visualization, analysis, judgment, decision making, visual memory, discrimination, observation, relationship concepts, arithmetical reasoning, verbal and figure classification
3. **Computer-related aptitude:** Hardware, software, operating systems, basic operations in MS Office - Word, Excel, Powerpoint
4. **Language aptitude:** Comprehension, vocabulary, basic grammar in English.
5. **General awareness aptitude:** Current events, general knowledge, Indian history, Indian constitution, basic geography.

**PART – B**

**(70 Marks)**

1. **Human Anatomy and Physiology:** Basics of Cells, types of tissues and organ systems; Basics of Musculoskeletal, Respiratory and Circulatory systems; Hemostasis.
2. **Basics of Cell Biology:** Cell structure and functions of the organelles; Transport across bio-membranes; Basics of cell culture and their morphological analysis; Cell division and cell cycle
3. **Biochemistry and Microbiology:** Acids, bases and pH, Buffers; Biomolecules; Enzyme kinetics; Metabolism; Structure and Properties of Carbohydrates, Proteins, Nucleic acids and Lipids and metabolic disorders associated with them; Bacteria; Archaea; Microbial eukarya; Bacterial growth, effect of temperature and pH; other microbial groups – viruses, protozoa, fungi, algae, nematodes
4. **Bio-analytical Techniques:** Foundations of UV and visible light spectroscopy-Qualitative and quantitative absorption measurements, IR spectroscopy, NMR spectroscopy, X-ray crystallography; General principle of electrophoresis and chromatography; DNA sequencing; Polymerase chain reaction and RT-PCR; Microscopic analysis techniques

**5. Sensors and Bioinstrumentation:** Basics of Resistive, Capacitive, Inductive, Electro-chemical and Optical Sensors – Origin of Biopotentials and their measurements – ECG, EEG and EMG- Blood pressure and temperature measurements – Operating principles of pulse oximeter, ventilator and defibrillator.

**6. Signals and Systems:** Basics of periodic, aperiodic and impulse signals, Sampling Theorem, Laplace and Fourier Transforms, impulse response; Basics of IIR and FIR Filters

**7. Medical Imaging:** Basic physics, Instrumentation and image forming methods in medical imaging modalities such as X-Ray, CT, and Ultrasound; Basic image processing operations such as noise removal and segmentations.

**8. Biomaterials:** Basic properties of metallic, polymeric, and composite biomaterials; Fundamental characteristics of implants- biocompatibility and biodegradability; Basics of tissue engineering

### **LEVEL – 2 Trade Test**

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

### **Scheme of Examination:**

<b>Level</b>	<b>Type of Test</b>	<b>Time</b>	<b>Details</b>	<b>Weightage for the final result</b>
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. Graduation.
- 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 06<sup>th</sup> February 2025 at TCS iON Centres in Chennai.**

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