भारतीय प्रौद्योगिकी संस्थान गुवाहाटी

Indian Institute of Technology Guwahati

Ref. No. R&P/198/JT/IPM/DR/2025/2161A Date: 11.12.2025

अधिसूचना/ NOTIFICATION

Sub: Syllabus of written examination for the post of "Junior Technician"

Ref: Advertisement no. IITG/R/10/2025 dated 18.07.2025

Maximum Marks: 100 **Time: 90 minutes**

Distribution of Syllabus
English Language
General Aptitude
Subject of Specialization

1. The syllabus for English Language and General Aptitude will be common to all the candidates.

2. The syllabus for subject of specialization, prepared based on the educational qualification mentioned in the advertisement is placed at **Annexure A.**

3. The question from English Language will be subjective type. However, questions from General Aptitude and Subject of Specialization will be Multiple Choice Questions (MCQ).

4. The written examination for the post of Junior Technician will tentatively be held in the month of January 2026 at IIT Guwahati.

5. There will be a skill test for all the posts which will be of qualifying nature.

6. The date and time of written examination and skill test will be declared in due course of time.

7.

Tie-Breaking Rules in Total Marks
1. The candidate with the highest marks in the subject of specialization section of the question paper will be ranked higher. 2. If candidates have equal marks in the subject of specialization section of the question paper, the candidate with higher marks in their 10th standard examination will be ranked higher 3. If candidates have equal marks in both in the subject of specialization section of the question paper and their 10th standard examination, the candidates senior in age in terms of Date of Birth will be ranked higher.

8. Candidates are requested to visit the Institute website (https://www.iitg.ac.in) regularly for any update in this regard.

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The Syllabus common to all the candidates-

English Language	Letter Writing, Report writing,
General Aptitude	General scientific knowledge; Simple Arithmetic (Percentage, Average, Calculation of area, volume, density, etc.); Mathematical Reasoning & Aptitude; Logical Reasoning; Graphical Representation (Bar Chart, Pie Chart, Line Chart, etc.); Basics of Internet, Email; Sustainable Development Goals (SDGs); Environmental Issues, General proficiency in English and Communication skills; Comprehension; Structure of a technical report; case studies and laboratory exercises to write a technical report.

Annexure A

Syllabus as per subject of specialization

Subject: Electrician (ITI Trade)

Electrician theory, occupational safety and health, conductor, semiconductor, insulator, and electric cables, tools for an electrician, soldering. DC theory, basic electricity, electrical accessories, electro-chemical effect and chemical cell, magnetism and electromagnetism, AC theory, earthing and basic electronics. Transistor, amplifiers, oscillators, specific solid-state devices, digital electronics, electrical wiring, DC motor and generator, transformer and electrical measuring instruments. Illumination, industrial wiring, house wiring layout. Machine control panel, electrical instruments, electrical power generation, transmission and distribution. Workshop calculation, material science, mass, weight, and density, speed and velocity, work, power and energy. AC calculations, number system, estimation and cost, graph, profit and loss, simple and compound interest.

Subject: Mechanical Enng./Turner (ITI trade)

Safety Precautions and Hazards: General Safety, First Aid, 5S, Power Failure, Fire Extinguisher etc.
Lathe: Types, specifications, Function of different Parts, different types of operations, accessories & attachments, Cutting Tools, Different parameters, Chip formation, Tool Life, Tool Geometry, Fits, Limits and Tolerance.
CNC Machine: Types and Programming and coordinate system; Interchangeability System: Advantage & disadvantages
Maintenance: Coolant and Lubricant; Maintenance of Machine
Miscellaneous: Different of Gauges and their importance, Types of Metals and Characteristics.

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Subject: Carpentry (ITI trade/Construction and wood working)

Safety Precautions and Hazards: General Safety, First Aid, 5S, Power Failure, Fire Extinguisher etc.
Wood Working: Different types of Tools and devices, different types of wood working process and joints, Different types of wood structure & defects. Auxiliary materials used in carpentry.

Syllabus for Written examination for Junior Technician Recruitment at Central Instruments Facility (CIF)

Subject: Chemistry

Physical Chemistry

Spectroscopy: Spectral width, spectral intensity, rotational, vibrational, electronic and Raman spectroscopy of diatomic and polyatomic molecules; laws of thermodynamics; thermochemistry; Nernst equation and its application; pH and buffer; potentiometric and conductometric titrations; Reaction Kinetics, Reaction Rate; 1st order kinetics. Basic principles of quantum mechanics: Postulates; particle-in-a-box, harmonic oscillator and the hydrogen atom,

Inorganic Chemistry

Atomic Structure and Bonding; **Chemical Periodicity:** Periodic table, elements, and groups; Coordination chemistry - structure and isomerism; VSEPR Theory; Crystal field theory: CFSE, and applications of CFT; Magnetism; Nuclear Reactions; acid and base; redox, and complexometric titrations using EDTA; precipitation reactions.

Organic Chemistry

Reaction Mechanisms: Detailed understanding of reaction pathways; **Reagents: Oxidation and reduction; Name Reactions: Aldol condensation, Cannizaro, Lossen, Shmidt, Curtious reagement; Stereochemistry:** Isomerism, chirality, and asymmetric synthesis; Preparation and reactions of alkanes, alkenes, alkynes, alcohols, alkyl and aryl halides, nitro compounds, amines, aldehydes, ketones, carboxylic acid; Modern spectroscopic techniques in structural elucidation of organic compounds: UV-vis, IR, NMR, EPR.

Precautions during handling hazardous chemicals: acids, inorganic and organic salts; Safety measures and addressing the emergencies (during chemical/gas-related accident and a Water/Fire/Lift/other electrical-related accident); Preparation of solution: Concept of Concentration: Normality, Molarity, Molality, Formality; Handling common measuring devices: Digital Multimeter, Power Supply, CRO/DSO; Knowledge of electrical earthing; Identification of common electrical/ Electronic components: Fuses & Safety circuits; Preservation of optical components and sensors; Precautions during handling electrical/electronic equipment/X-ray machines, Gas cylinders, Lasers; addressing the emergencies (during chemical/gas-related accident and a Water/Fire/Lift/other electrical-related accident); Basic Knowledge of UPS/ACs.

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Subject: Physics/ Engineering Physics

Units and dimensions of Physical quantities, Accuracy and precision in measurement, relative error, least count; Newton's law of motion, conservation of linear momentum and energy, moment of inertia; First law of thermodynamics, isothermal and adiabatic process; Simple harmonic motion, simple pendulum and compound pendulum; Image formation due to lens and mirrors, Interference of light, dispersion, diffraction, polarization; Intrinsic and extrinsic semiconductor, p-n junction diode, I-V characteristics, Transistor, characteristics of CB, CE, CC modes; Boolean Algebra, Logic Gates: AND, OR, NOT, NAND, NOR; Coulomb's law, Gauss law, Electric field and magnetic field, Biot-Savart law, Ampere's law, Faraday's law of electromagnetic Induction, Self and Mutual Inductance, AC and DC current, LC, RC and LCR circuit, Lorentz force; X-ray diffraction.

Precautions during handling hazardous chemicals: acids, inorganic and organic salts; Safety measures and addressing the emergencies (during chemical/gas-related accident and a Water/Fire/Lift/other electrical-related accident); Preparation of solution: Concept of Concentration: Normality, Molarity, Molality, Formality; Handling common measuring devices: Digital Multimeter, Power Supply, CRO/DSO; Knowledge of electrical earthing; Identification of common electrical/ Electronic components: Fuses & Safety circuits; Preservation of optical components and sensors; Precautions during handling electrical/electronic equipment/X-ray machines, Gas cylinders, Lasers; addressing the emergencies (during chemical/gas-related accident and a Water/Fire/Lift/other electrical-related accident); Basic Knowledge of UPS/ACs.

Subject: Chemical Engineering

Atomic Structure and Bonding, Modern spectroscopic techniques in structural elucidation of organic compounds (UV-vis, IR, NMR).Concept of internal energy and enthalpy; The First Law of Thermodynamics and its applications; Second Law; Power and refrigeration cycles, Introduction to chemical process technology; Overview of process flow-sheeting; Petroleum process technology: Overview of crude oil refinery processes, Crude distillation, Hydro processing, Sulphur production and sulphuric acid industries; nitrogen industries: ammonia, nitric acid, urea; Phosphorous industries: production of elemental phosphorous, P_2O_5, H_3PO_4, mixed fertilizers; Chlor-Alkali industries; Cement industries; Soaps and detergents; Pulp and paper industries; Coal and coal chemicals; integrated and energy efficient flow-sheeting; Integrated process and product design; Introduction to bio-refineries, Introduction to transport phenomena, motion of particles through fluid, Flow through packed and fluidized beds; Flow measurement using flow meters; Flow over notches; Energy losses in pipes and bends; Actuators: Pneumatic Valve, Hydraulic actuator, Electric actuator; Sensors: Temperature Measuring Devices, Pressure Measuring Devices; Flow Measuring Devices.

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Precautions during handling hazardous chemicals: acids, inorganic and organic salts; Safety measures and addressing the emergencies (during chemical/gas-related accident and a Water/Fire/Lift/other electrical-related accident); Preparation of solution: Concept of Concentration: Normality, Molarity, Molality, Formality; Handling common measuring devices: Digital Multimeter, Power Supply, CRO/DSO; Knowledge of electrical earthing; Identification of common electrical/ Electronic components: Fuses & Safety circuits; Preservation of optical components and sensors; Precautions during handling electrical/electronic equipment/X-ray machines, Gas cylinders, Lasers; addressing the emergencies (during chemical/gas-related accident and a Water/Fire/Lift/other electrical-related accident); Basic Knowledge of UPS/ACs.

Subject: Electrical & Electronics Engineering

Diodes: Semiconductor Diode, V-I characteristics of Diode, Half-Wave and Full-Wave Rectifier Circuits, Wave Shaping Circuits, Clippers and Clampers, Zener Diodes. Transistors: Bipolar Junction Transistor, MOSFET: Biasing, Small Signal model, Amplifiers. Operational Amplifiers: Ideal Op-Amp, Application of Op-Amp: Comparator, Inverting and non-Inverting Amplifiers, Differential and Integral Amplifier, Adder-Subtractor. Boolean Algebra, Logic Gates: AND, OR, NOT, NAND, NOR; Electric field and magnetic field, Biot-Savart law, Ampere's law, Faraday's law of electromagnetic Induction, Self and Mutual Inductance, AC and DC current, LC, RC and LCR circuit, Lorentz force; Optical fibers, dipole and monopole antennas. Measurement of displacement, force, torque, pressure, flow, temperature and level. On-off, P, PI, PID controllers. Optical Instrumentation, optical sources and detectors, interferometer, basics of fiber optic sensing.

Precautions during handling hazardous chemicals: acids, inorganic and organic salts; Safety measures and addressing the emergencies (during chemical/gas-related accident and a Water/Fire/Lift/other electrical-related accident); Preparation of solution: Concept of Concentration: Normality, Molarity, Molality, Formality; Handling common measuring devices: Digital Multimeter, Power Supply, CRO/DSO; Knowledge of electrical earthing; Identification of common electrical/ Electronic components: Fuses & Safety circuits; Preservation of optical components and sensors; Precautions during handling electrical/electronic equipment/X-ray machines, Gas cylinders, Lasers; addressing the emergencies (during chemical/gas-related accident and a Water/Fire/Lift/other electrical-related accident); Basic Knowledge of UPS/ACs.

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Subject: Biotechnology

Basic Biochemical Calculations: Mole, molecular weight, mole/mass fractions calculations, Evolution of life: Origin of Life; Darwin's concepts of evolution; Biodiversity. Cell: the structural and functional unit of life; Cell division and cell cycle: Mitosis; Meiosis; Genetic consequences of cell cycle, Nutrients, bioenergetics and cell metabolism; Gene, fundamental unit of heredity; Chromosome structure and function; Genetic engineering/Cloning and its applications. Biological systems: Body systems required to sustain human physiology, Structure and function of biomolecules: DNA, Protein, carbohydrate, lipid; DNA and protein isolation and characterisation; Enzymes: structure, mechanism and reaction kinetics; photosynthesis; Introduction to microbiology and study of microorganisms: Scope of Microbiology; History of Microbiology: Spontaneous generation; Germ theory of diseases; Cell theory; Contributions of Antonie van Leuwenhoek, Joseph Lister, Robert Koch, Louis Pasteur, Edward Jenner, John Tyndall, Sergei N. Winogradsky, Alexander Fleming, etc; Theory, Operation and handling of instruments: like microscope, UV-VIS spectrophotometer, Gel electrophoresis, PCR, Reverse Osmosis Water Filter, Vacuum pumps etc.

Precautions during handling hazardous chemicals: acids, inorganic and organic salts; Safety measures and addressing the emergencies (during chemical/gas-related accident and a Water/Fire/Lift/other electrical-related accident); Preparation of solution: Concept of Concentration: Normality, Molarity, Molality, Formality; Handling common measuring devices: Digital Multimeter, Power Supply, CRO/DSO; Knowledge of electrical earthing; Identification of common electrical/ Electronic components: Fuses & Safety circuits; Preservation of optical components and sensors; Precautions during handling electrical/electronic equipment/X-ray machines, Gas cylinders, Lasers; addressing the emergencies (during chemical/gas-related accident and a Water/Fire/Lift/other electrical-related accident); Basic Knowledge of UPS/ACs.

11/12/25

संकायाध्यक्ष, प्रशासन/
Dean of Administration