CSIR – NATIONAL BOTANICAL RESEARCH INSTITUTE
LUCKNOW

No.: 3-2/2(Gr.III & II)/2024-R&A

Date : 04-03-2025

NOTICE

Syllabus for Trade Test and concerned subject (Paper-III) for recruitment to the posts of Technical Assistant and Technician (1) against Advertisement No. 02/2024

It is brought to the notice of all shortlisted candidates to be called for trade test for the recruitment to the posts of **Technical Assistant** and **Technician (1)**, as per **Advertisement No. 02/2024**, that the syllabus for the **Trade Test** and the **concerned subject (Paper-III)** has been finalized and is enclosed herewith.

Candidates are advised to refer to the detailed syllabus provided for the respective posts to prepare adequately for the examination.

The dates for Trade Test and examination will be updated in due course on official website only. Candidates are advised to visit institute's website regularly for further updates.

Controller of Administration

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ADVERTISEMENT NO.02/2024

Syllabus for Trade Test and concerned subject (Paper-III) for the posts of Technical Assistant

Post Code & Area	Syllabus
TA-01022024 (Engineering)	• Basic knowledge of Engineering Drawing, General Workshop Practices, Basics of Mechanical and Electrical Engg. & Basics of Information Technology, GRIHA Rating, Green Building Concept and Environmental Management. • Surveying using Theodolite and Total Station, Computer Aided Drawing using different 2D & 3D software, Applied Mechanics, Hydraulics and Hydraulic Machines, Road/Transport Engineering, Concrete Technology, Structural Mechanics, Building Construction, Building Drawings, Construction Materials, RCC Drawing & Design, Soil Mechanics and Foundation Engineering, Waste Water Management, Irrigation Engineering, Drawing, Quantity Surveying & Valuation, Construction Management, Accounts and Entrepreneurship Development, Design and drawing of Steel Structure and Software Applications in Civil Engineering.
TA-02022024 (Agriculture)	• Agronomy and its scope, seeds and sowing, tillage and tilth, crop density and geometry, Crop nutrition, manures and fertilizers, nutrient use efficiency, water resources, soil plant water relationship, crop water requirement, water use efficiency, irrigation scheduling criteria and methods, quality of irrigation water, water logging. Classification of weeds, crop weed competition, concepts of weed management-principles and methods, herbicides, selectivity and resistance, allopathy. Growth and development of crops, factors affecting growth and development, crop rotation and its principles, adaptation and distribution of crops, crop management technologies in problematic areas. • Geographical distribution & economic importance of major crops. Physical, Chemical and Biological Properties of Soil, Soil water retention, movement and availability; and plant growth; Soil reaction-pH, soil acidity and alkalinity, soil organic matter, Soil pollution - behaviour of pesticides and inorganic contaminants, prevention and mitigation of soil pollution. • Role of physiological growth parameters in crop productivity, Role of microbes in soil fertility and crop productivity, Principles and methods of plant disease management, Rural sociology and its significance in agricultural extension, Extension systems in India, Agricultural planning and development in India, Farm management and its principles, Climate Resilient Agriculture.
TA-03022024 (Herbarium)	• **Biodiversity:** Diversity among different groups of plants, Biogeographic zones of India, Hotspots of Biodiversity of India and world, Keystone species, IUCN Conservation procedures, RET, and CITES. • **Plant taxonomy:** Identification, Classification, Nomenclature. Functions of Herbarium, important herbaria and botanical gardens of the world and India; Documentation: Flora, Keys: single access and multi-access, Taxonomic evidences from palynology, cytology, phytochemistry and molecular data. Taxonomic hierarchy: categories and taxonomic groups, Botanical nomenclature principles and rules (ICN); ranks and names; binominal system, typification, author citation, valid publication, rejection of names, principle of priority and its limitations. Classification: Types of classification-artificial, natural and phylogenetic. Bentham and Hooker (up to series), Engler and Prantl (up to series), variations, character weighting and coding; cluster analysis; phenograms, cladograms (definitions and differences). • **Economic Botany:** Floriculture crops, ornamental plants, medicinal and aromatic plants, Wild Plant Genetic Resources. • **Techniques in Botany:** Herbarium Techniques and Curation, Principles of microscopy; Sample Preparation for light microscopy; Electron microscopy (EM)- Scanning EM (SEM) and Transmission EM (TEM).
TA-04022024 (Botanic Garden)	• Basics of plant taxonomy, Ecological factors: Soil, Water, Light and Temperature, Plant communities and Phytogeography, Plant-water relations, Mineral nutrition, Photosynthesis, Respiration, Enzymes, Plant growth regulators. • Economic Botany: Floriculture crops, Ornamental herbs, shrubs and trees, medicinal and aromatic plants, conservation of rare, endangered and threatened plants. • Soil physical properties; Soil water retention, movement and availability; Role of physiological growth parameters in crop productivity; Role of microbes in soil fertility and crop productivity; Principles and methods of plant disease management; types and use of growth regulators in agriculture. • Multiplication and Management of Nursery; Soil and Climate; Vegetable Gardens, Herb Gardens, Nutrition and Kitchen Gardens and other types of Gardens – Principles, Planning and Layout; Management of Poly Houses, Green Houses, Roof Top Gardens & Vertical Gardens.
TA-04022024 (Phytochemistry / Central Instrumentation Facility)	• Atomic Structure, Periodicity of elements, Chemical bonding, Oxidation-Reduction, Gaseous, Liquid and Solid states, Ionic equilibria, Basics of organic chemistry, Stereochemistry, Chemistry of Aliphatic Hydrocarbons, Aromatic Hydrocarbons, Chemical equilibrium, Solutions and Colligative Properties, Alcohols, Phenols, Carbonyl Compounds, Carboxylic Acids and their Derivatives, Sulphur containing compounds, Nitrogen Containing Functional Groups, Polynuclear Hydrocarbons, Heterocyclic Compounds, Alkaloids, Terpenes, Amino Acids, Peptides and Proteins, Enzymes, Lipids, Phytochemistry, Carbohydrates and Dyes. • Basic Knowledge of Spectroscopy, Chromatography and Natural Product Chemistry including extraction. Basic knowledge of analytical instruments like HPLC, GLC, UV and AAS.

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Syllabus for Trade Test and concerned subject (Paper-III) for the posts of Technician (1)

Post Code & Area	Syllabus
T-01022024 Mechanic Diesel, Mechanic Tractor, Mechanic Agric. Machinery	• Hand & Power Tools, Systems of measurement, Fasteners, Cutting tools, Limits, Fits and Tolerances, Drilling machine, Taps and Dies, Hand reamers, Basic electricity, Description of Batteries & cells, Basic electronics, Introduction to welding, Introduction to Hydraulics & Pneumatics. • Tractor Industry in India – leading manufacturers, development in Tractor industry, trends, new product. Study of tractors, Different type of Tractor starting method and stopping, Engine Basics: Classification of engines, Principle & working of diesel engine [Compression ignition Engine (C.I) and Principle of Spark Ignition Engine (SI), Direct injection and Indirect injection]. Brief on common rail diesel injection engine. Cooling systems, Lubrication system, Intake and exhaust systems, Diesel fuel characteristics, concept of Quiet diesel technology & Clean diesel technology, Fuel feed system used in Tractor's description and layout, Clutch, Manual transmissions, Final drive and drive shafts, Steering systems, Wheels and Tyres, Braking systems, Tractor equipments, Tractor electrical maintenance.
T-02022024 Floriculture & Landscapping, Agricultural Assistant, Horticulture Assistant, Soil Testing & Crop Technician, Gardener	• Importance of different elements of weather and climate in agriculture, Agro-climatic regions with their special character, Texture (definition, particle size of soil ingredients i.e. sand, silt, clay) classification and importance. Porosity, bulk density & particle density. Structure (definition, classification, importance), water holding capacity, Evaluation of soil Physical & Chemical parameters, Soil classes on the basis of agro climatic zones, Problem soils and amelioration, Green manure, Bio fertilizer, Chemical fertilizers. • Nursery and seed production, Pot plants, Lawn grasses, Landscape plants, Floriculture, Bonsai, Vertical and Rooftop Gardening, Poly house, Shade Net House, Irrigation techniques.
T-03022024 Photographer / Digital Photographer	General Science & Basic Knowledge : • Basic Physics (Light, Optics, Lenses, Reflection, Refraction) and Principles of Photography; Chemistry of Photographic Materials (Basics of film & digital media); General knowledge on digital sensors and image formation Fundamentals of Photography : • Basics of lighting in photography (natural vs. artificial light), Types of cameras (DSLR, mirrorless, point-and-shoot), Settings: ISO, shutter speed, aperture, and white balance, Depth of field and exposure control, Composition techniques and framing, Digital Photography & Editing : • Digital image formats (JPEG, RAW, PNG, etc.), Color correction and color spaces (RGB, CMYK), Basics of photo editing software (Adobe Photoshop, Lightroom or similar), Image retouching and restoration, File storage, backup, and archiving techniques, Basic knowledge of printing and resolution requirements, General Knowledge & Safety : • Safe handling of photographic equipment and basic troubleshooting of cameras and lighting equipment; Understanding of copyrights and ethical aspects in photography; Awareness of photography applications in scientific research;
T-04022024 Chemical Lab Assistant / Quality Assurance Assistant / Fruit & Vegetable Processer	• Introduction to chemistry: Elements, atoms, molecules and compound, Chemical & physical changes, Methods of purification: extraction and distillation. • Acid, Base, salt, Atomic Weight, Molecular Weight, Equivalent Weight, Normality, Molarity, Molality, ppm, ppb, density, Specific gravity Weight - volume relationship. Periodic Table, Chemical equilibrium. • Introduction to organic chemistry, Estimation of Elements, Empirical Formula and Molecular formula, Aliphatic hydro carbons Halogen derivatives of hydro carbon, Aliphatic alcohol, Aldehyde and ketones, Principles of potentiometric and conductometric titrations, pH & buffer solution. • Measuring instruments, Classification of measurements, Measurement of variation-mean, mode, range, standard deviation, Laboratory Quality Management System - Terms used in ISO/IEC 17025 : 2017 requirements. • Different types of spoilages in fresh fruits and vegetables, General principles and methods of preservation, Fruit beverages, Sun drying and dehydration, Containers and packaging materials, Importance of labels. • Safety & General precautions observed in the laboratory. Fire prevention and fire control, Personal protection equipments (PPEs), First aid.

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Post Code & Area	Syllabus
T-05022024 Draftsman (Civil)	• Importance of B.I.S., Introduction of Code for practice of Architectural and Building Drawings (IS: 962-1989, SP-46:2003), Layout of drawing. Lines, Lettering, Dimensioning. Knowledge of different types of scale. Principle of R.F. Materials, Different types of projection views: Orthographic, Isometric, Oblique and Perspective. Building materials:- Sand, Clay Products, Mortar & Concrete, Timber and its alternative material, Plywood, Block board, Particle board, Fireproof reinforced plastic (FRP), Medium density fireboard (MDF) etc., Tar, bitumen, asphalt, Protective materials: Paints, Varnishes, Metal and Plastics. • Survey and Levelling, Building Construction: Principles and Sequence, Brick Masonry, Foundation, Treatments of building structures, Arches, Lintel and Chhajjahs, Carpentry joints, Doors, Windows & Ventilators, Basic electrical wiring, Floors and flooring, Stairs, Roof and Roof Coverings. • Knowledge and application of Computer Aided Drafting. Workspace creating drawing using toolbars, commands, and menus. Plotting drawing from CAD. 2D & 3D designing/drafting using Computer Aided Drafting / other prevailing software of 2D & 3D. • Introduction of First aid, Introduction of PPEs, Introduction to 5S concept & its application. Response to emergencies e.g.; power failure, fire alarm, etc.
T-06022024 Instrument Mechanic / Mechanic Agric. Machinery	• Basic hand tools, types, classification and use. Measurement & measuring instruments, Marking tools, Fasteners & Fastening devices. Precision Measuring Instruments. Element & types of screw threads used in instruments, Types of tubes used for instrumentation. Electrical components- conductor, semiconductor & insulators. Uses of multimeter. Resistor, Resistivity and colour code, Types of resistors used in instrumentation. Definition and purpose of soldering and desoldering. • Series & parallel circuits. Switches and types. Magnet and magnetism. Magnetic compass and its uses. A.C & DC electricity. UPS and SMPS, inverters and converters and their applications. • Classification of engines, Principle & working of 2&4-stroke diesel engines (Compression ignition Engine (C.I), Principle of Spark Ignition Engine (SI), Cooling and lubrication systems. Tractor equipments:- Description, function of harrows, cultivators, seed drills & tractor trailer.
T-07022024 House Keeping	• Different types of Housekeeping establishments, Duties and responsibilities of Housekeeping service personals, Hygiene and its importance, Factors influencing health and healthy leaving, Cleaning methods, frequency and schedule, Agents and equipment. Steps of dusting, mopping, sweeping, vacuum cleaning etc., basic first aid idea. Basic knowledge of proper ventilation and lighting. • Safety precautions for gas oven, electric oven and heater. Personal hygiene of food handlers. Knowledge of Laundry & Linen Management. Introduction to pest control & pest controlling practices. Introduction and classification of wastes: Collection and Disposal. Basic knowledge of gardening & horticulture. • Basic knowledge of Principle of energy conservation. Principle of working of different type of fire extinguisher and different firefighting equipment. Personal relations and soft skills, Basic computer awareness in office management.
T-08022024 Computer Operator & Programme Assistant	• Introduction to Computers and Computer system, Introduction to Windows Operating System, Introduction to the booting process, Introduction to DOS Command Line Interface & Linux Operating Systems, Using Word Processing Software, Spread Sheet Application, Power point Presentations, Database Concepts, Communicating in a Connected World (Local networks, Ethernet networks, Routing across networks, Wi-Fi network, LAN devices), Internet concepts, Web design concepts, E-commerce, Cyber security, Introduction to cloud computing, Multimedia Concepts.