

**General Syllabus for Entry-Level post of
Category-II Technical Assistant pay level 5 of 7th CPC Pay Matrix**

To be used against General Awareness & Reasoning, General English & General Science and Arithmetic of framework elaborated at Para 2.2 of Appendix – XI of ICFRE TSR – 2013 for all functional Groups viz. Field/Lab Research, Maintenance, Workshop, General Service and Para Medical)

A. General Awareness & Reasoning (20 MCQ):

i) General Awareness:-

Questions in this component will be aimed at testing the candidate's general awareness of the environment around him and its application to society. Questions will also be designed to test knowledge of current events and of such matters of everyday observation and experience in their scientific aspects as may be expected from an educated person. The test will also include questions relating to India and its neighbouring countries especially pertaining to history, culture, geography, economic scene, general policy and scientific research etc. These questions will be such that they do not require a special study of any discipline.

ii) Reasoning:-

Questions of reasoning would include questions of both verbal and non-verbal type. This component will include questions of analogies, similarities and differences, spatial visualization, spatial orientation, problem solving, analysis, judgment, decision making, visual memory, discrimination, observation, relationship concepts, arithmetic reasoning, verbal and figure classification, arithmetical number series, non-verbal series, coding and decoding statement, conclusion, syllogistic reasoning etc.

B. General English & General Science (20 MCQ)

i). General English:-

Questions in this component will be designed to test the candidate's understanding and knowledge of english language and will be based on spot the error, fill in the blanks, synonyms, antonyms, spelling/detecting misspelled words, idioms & phrases, One word substitution, improvement of sentences, Active/Passive Voice of Verbs, conversion into direct/indirect narration, comprehension Passage etc.

ii) General Science:-

Basic understanding of science expected of a high school student

C. Arithmetic (20 MCQ)

The questions will be designed to test the ability of appropriate use of numbers and number sense of the candidate. The part will include questions on problems relating to number system, computation of whole numbers, decimals and fractions, relationships between numbers, fundamental arithmetical operations, percentage, ratio and proportion, average, interest, profit and loss, discount, use of tables and graphs, mensuration time and distance ratio and time etc.

Subject Wise Syllabus for Entry-Level post of
Category – II (Technical Assistant – Field/Lab Research)
pay level 5 of 7th CPC Pay Matrix

To be used against 'Relevant Subject (40 MCQ)' of framework elaborated at Para 2.2 of Appendix – XI of ICFRE TSR – 2013 for both sub-functional Groups viz. Life Sciences and Physical Sciences

The questions in part D will be of a level commensurate with the essential qualification viz. Graduation Standard for Category-II Technical Assistant (Field/Lab Research) pay level 5 of 7th CPC Pay Matrix

1. *The subject shall be dependent on the relevant field / trade in which the recruitment is intended to be made.*
2. *The Functional Group (Field/Lab Research) in this Category shall broadly have two sub-functional Groups viz. Life Sciences and Physical Sciences. The Director of the institute may choose to include one or more of the following subjects in above functional groups as per requirement of respective institute.*
 - *Physics*
 - *Chemistry*
 - *Botany*
 - *Zoology and*
 - *Mathematics*
3. *Syllabus of the above subjects is hereunder.*
4. *Director of the Institute may also include any additional subject apart from above. The syllabus may accordingly be proposed by the Director.*

ZOOLOGY

ANIMAL DIVERSITY

Kingdom Protista Phylum Porifera, Phylum Cnidaria, Phylum Platyhelminthes, Phylum Nematelminthes, Phylum Annelida, Phylum Arthropoda, Phylum Mollusca, Phylum Echinodermata, Protochordates, Agnatha, Pisces, Amphibia, Reptiles, Aves, Mammals

COMPARATIVE ANATOMY AND DEVELOPMENTAL BIOLOGY OF VERTEBRATES

Integumentary System (derivatives of integument w.r.t. glands and digital tips), Skeletal System (evolution of visceral arches), Digestive System (brief account of alimentary canal and digestive glands), Respiratory System (gills, lungs, air sacs and swim bladder), Circulatory System (evolution of heart and aortic arches), Urinogenital System (Succession of kidney, Evolution of urino-genital ducts), Nervous System (comparative account of brain), Sense Organs (Types of receptors), Early Embryonic Development (Gametogenesis, fertilization etc), Late Embryonic Development (implantation of embryo in humans, formation of human placenta and functions etc), Control of Development (Fundamental processes in development- gene activation, determination etc.)

PHYSIOLOGY AND BIOCHEMISTRY

Nerve and muscle, Digestion, Respiration, Excretion, Cardiovascular system, Reproduction and Endocrine Glands, Carbohydrate Metabolism, Lipid Metabolism, Protein metabolism, enzymes

GENETICS AND EVOLUTIONARY BIOLOGY

Introduction to Genetics, Mendelian Genetics and its Extension, Linkage, Crossing over and Chromosomal Mapping, Mutations, Sex Determination, History of Life, Introduction to Evolutionary Theories, Direct Evidences of Evolution, Processes of Evolutionary Change, Species concept, Macro evolution, Extinction

ANIMAL BIOTECHNOLOGY

Introduction (concept and scope of biotechnology), Molecular Techniques in Gene manipulation (cloning vectors, restriction enzymes, transformation techniques etc.), Genetically Modified Organisms (production of cloned and transgenic animals, applications of transgenic animals, production of transgenic plants, applications of transgenic plants), Culture Techniques and Applications

APPLIED ZOOLOGY

Introduction to Host-Parasite Relationship, Epidemiology of Diseases, Rickettsiae and Spirochaetes, Parasitic Protozoa, Parasitic Helminthes,

Insects of Economic Importance, Insects of Medical Importance, Animal Husbandry, Poultry Farming, Fish Technology

AQUATIC BIOLOGY

Aquatic Biomes (brief introduction of the aquatic biomes etc.), Freshwater Biology (Lakes: origin and classification etc., Streams: Different stages of stream development etc.), Marine Biology (salinity and density of sea water etc.), management of Aquatic Resources (causes of pollution, Water quality assessment-BOD and COD etc.)

IMMUNOLOGY

Overview of the Immune System, Cells and Organs of the Immune System, Antigens, antibodies, Working of the immune system, Immune system in health and disease, vaccines.

REPRODUCTIVE BIOLOGY

Reproductive endocrinology (gonadal hormones and mechanism of hormone action, steroids etc.), Functional anatomy of male reproduction (outline and histological of male reproductive system in rat and human, testis, germcell etc.), Functional anatomy of female reproduction (outline and histological of female reproductive system in rat and human, ovary, ovulation etc.), Reproductive Health (Infertility in male and female, Assisted reproductive technology, etc.)

INSECT, VECTORS AND DISEASES

Introduction to Insects, concept of vectors, Insects as vectors, dipteran as disease vectors, siphonaptera as disease vectors, Siphuculata as disease vectors, hemiptera as disease vectors

BOTANY

BIODIVERSITY

Microbes, Algae, Fungi and introduction to Archegoniate Bryophytes, pteridophytes, Gymnosperms

PLANT ECOLOGY AND TAXONOMY

Introduction, Ecological factors, Plant communities, Ecosystem, Phytogeography, Introduction to plant taxonomy, Identification, Taxonomic evidences from palynology, cytology, phytochemistry and molecular data, Taxonomic hierarchy, Botanical nomenclature, Classification, Biometrics, numerical taxonomy and cladistics

PLANT ANATOMY AND EMBRYOLOGY

Meristematic and permanent tissues, Organs, Secondary Growth, Adaptive and protective systems, Structural organization of flower, Pollination and fertilization, Embryo and endosperm, Apomixis and polyembryony

PLANT PHYSIOLOGY AND METABOLISM

Plant-water relations, Mineral nutrition, Translocation in phloem, Photosynthesis, Respiration, Enzymes, Nitrogen metabolism, Plant growth regulators, Plant response to light and temperature

CELL AND MOLECULAR BIOLOGY

Techniques in Biology (Principles of microscopy, Light Microscopy etc.), Cell as a unit of Life, Cell Organelles (Mitochondria, Chloroplast, ER, Golgi body & Lysosomes, Peroxisomes and Glyoxisomes, Nucleus), Cell Membrane and Cell Wall, Cell Cycle, Genetic Material (DNA, DNA replication (Prokaryotes and Eukaryotes), Transcription (Prokaryotes and Eukaryotes), Regulation of gene expression

ECONOMIC BOTANY AND BIOTECHNOLOGY

Origin of Cultivated Plants, Cereals, Legumes, Spices, Beverages, Oils and Fats, Fibre Yielding Plants, Introduction to Biotechnology, Plant tissue culture, Recombinant DNA Techniques

GENETICS AND PLANT BREEDING

Heredity (Brief life history of Mendel, terminologies, laws of inheritance etc.), Sex-determination and Sex-Linked Inheritance Linkage and Crossing over, Mutations and Chromosomal Aberrations, Plant Breeding, Methods of crop improvement, Quantitative inheritance, Inbreeding depression and heterosis, Crop improvement and breeding

ANALYTICAL TECHNIQUES IN PLANT SCIENCES

Imaging and related techniques (principles of microscopy, light microscopy, fluorescence microscopy etc.), Cell fractionation, Radioisotopes,

Spectrophotometry, Chromatography, Characterization of proteins and nucleic acids, Biostatistics

BIOINFORMATICS

Introduction to Bioinformatics, Databases in Bioinformatics, Biological Sequence Databases, Sequence Alignments, Molecular Phylogeny, Applications of Bioinformatics

RESEARCH METHODOLOGY

Basic concepts of research, General laboratory practices, Data collection and documentation of observations, Overview of biological problems, methods to study plant cell/tissue structure, plant microtechniques, the art of scientific writing and its presentation

Syllabus of Forestry

SILVICULTURE

General Silvicultural Principles -Ecological and physiological factors influencing vegetation, natural and artificial regeneration of forests; methods of propagation, grafting techniques; site factors; nursery and planting techniques nursery beds, containers and maintenance, grading and hardening of seedlings; establishment and tending. Silviculture of some of the economically important species in India. Silviculture systems (Clear felling, uniform shelter wood selection, coppice and conversion systems), Management of silviculture systems of temperate, subtropical, humid tropical, dry tropical and coastal tropical forests; Thinning.

AGROFORESTRY


Agroforestry- Scope and necessity; Agro forestry systems under different agroecological zones; selection of species and role of multipurpose trees and NTFPs, techniques, food, fodder and fuel security. Social/Urban Forestry: Objectives, scope and necessity. JFM- Principles, objectives, Methodology, scope and benefits, National agroforestry policy.

FOREST SOILS AND WATERSHED MANAGEMENT

Forests Soils: Classification, factors affecting soil formation; physical, chemical and biological properties. Soil conservation-definition, causes for erosion; types-wind and water erosion; conservation and management of eroded soils/areas, wind breaks, shelter belts; sand dunes; water logged and other waste lands. Role of forests in conserving soils. Role of micro-organisms in ameliorating soils; N and C cycles. Watershed Management-Concepts of water shed; forest hydrology, landslide controls, rehabilitation of degraded areas; water harvesting and conservation;ground water recharge and watershed management.

ENVIRONMENTAL CONSERVATION AND BIODIVERSITY

Environment- Components and importance, principles of conservation, impact of deforestation; forest fires and various human activities like mining, construction and developmental projects, population growth on environment. Pollution-Types, Global warming, green house effects, ozone layer depletion, acid rain, impact and control measures, environmental monitoring; concept of sustainable development. Control and prevention of air, water and noise pollution. Environmental impact Assessment.

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TREE IMPROVEMENT

General concept of tree improvement, methods and techniques, variation and its use, provenance. seed source, exotics; quantitative aspects of forest tree improvement, seed production and seed orchards, progeny tests, use of tree improvement in natural forest and stand improvement, forest genetic resources and gene conservation in situ and ex-situ, application of DNA technology in forestry.

FOREST MANAGEMENT AND MENSURATION

Objective and principles; techniques; stand structure and dynamics, sustained yield relation; rotation, normal forest, growing stock; regulation of yield; management of forest plantations, commercial forests, forest cover monitoring. Forest Divisional Working plans. Methods of measuring -diameter, girth, height and volume of trees; form-factor; volume estimation of stand, current annual increment; mean annual increment, Sampling methods and sample plots. Yield calculation; yield and stand tables, forest cover monitoring through remote sensing; Geographic information Systems for management and modeling. Forest Surveying different methods of surveying.

FOREST ECOLOGY

Biotic and abiotic components, forest eco-systems; forest community concepts; vegetation concepts, ecological succession and climax, primary productivity, nutrient cycling and water relations. Forest types in India, identification of species. composition and associations; dendrology, taxonomic classification, principles and establishment of herbaria and arboreta conservation of forest ecosystems.

FOREST RESOURCES AND UTILIZATION

Logging and extraction techniques and principles, transportation systems, storage and sale of Timber; Non-Timber Forest Products (NTFPs)- definition and scope; gums, resins. oleoresins, fibres, oil seeds nuts, rubbers, canes, bamboos, medicinal plants, charcoal, lac and shellac, katha and Bidi leaves, need and importance of wood seasoning and preservation general principles of seasoning, air and kiln seasoning, composite wood; plywood, fibre boards, particle boards, wood substitution.

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FOREST PROTECTION & WILDLIFE

Injuries to forest, insect-pests and disease, General forest protection against fire, equipment and methods, controlled use of fire. Rotational and controlled grazing, different methods of control against grazing and browsing animals; effect of wild animals on forest regeneration; encroachment, poaching, shifting cultivation and control.

FOREST ECONOMICS AND LEGISLATION

Fundamental principles, cost-benefit analyses; estimation of demand and supply: Socioeconomic analysis of forest productivity and attitudes; valuation of forest goods and service. National Forest Policy, Forest laws, necessity; general principles, Indian Forest Act 1927, Forest Conservation Act, 1980, Wildlife Protection Act 1972 and their amendments.

FORESTS AND PEOPLE

Forests and its importance, forest societies, interactions with people, social and cultural factors, afforestation programmes, forest conflicts, wildlife and human conflicts, important forest movements, gender dimension, tribal economy, pastoralists, management of commons and Common Property Resources (CRPS) and open access resources, sustainable livelihood, food security, eco-tourism, land use change. Forest rights, customary rights of people, community participation, biodiversity and ethnobotany, global environmental change and land use, resettlement, poverty alleviation and forests, role of NGOs and other CBOs community based organizations.

