

सी एस आई आर-उत्तर-पूर्व विज्ञानतथा प्रौद्योगिकी संस्थान
CSIR-NORTH-EAST INSTITUTE OF SCIENCE AND TECHNOLOGY, JORHAT: ASSAM
(वैज्ञानिकतथा औद्योगिक अनुसंधान परिषद Council of Scientific & Industrial Research)

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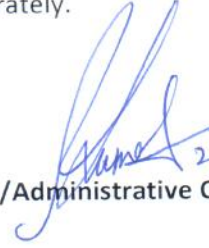
तारिख Date: 21.10.2021

SYLLABUS FOR TECHNICAL ASSISTANT POSTS - Advt. No. 03/2019-REC

The syllabus for the Technical Assistant posts is hereby notified as below.

The schedule for trade test/written examination shall be notified in the Institute's website. Call letters/Admit cards to the shortlisted candidates will be sent to candidates separately.

प्रशासनिकअधिकारी /Administrative Officer



21/10/21

*****समाप्त/ CONCLUDED*****



**CSIR-NORTH EAST INSTITUTE OF SCIENCE
AND TECHNOLOGY**

[Council of Scientific & Industrial Research]

Jorhat-785006, Assam



Syllabus of Pharmacy for the post of Technical Assistant

1. Human Anatomy and Physiology: Human body, Cellular level of organization, Tissue level of organization, Integumentary system, Skeletal system, Joints, Body fluids and blood, Lymphatic system, Peripheral nervous system, Special senses, Cardiovascular system, Nervous system, Digestive system, Energetics, Respiratory system, Urinary system, Endocrine system, Reproductive system, Introduction to genetics.
2. Pharmaceutical Analysis: Pharmaceutical analysis, Errors, Acid base titration, Non aqueous titration, Precipitation titrations, Complexometric titration, Gravimetry, Redox titrations, Electrochemical methods of analysis, Conductometry, Potentiometry, Polarography, UV Visible spectroscopy, Fluorimetry, Chromatography, Gas chromatography, High performance liquid chromatography (HPLC), Ion exchange chromatography, Gel chromatography, Affinity chromatography.
3. Pharmaceutics: Dosage forms, Prescription, Posology, Pharmaceutical calculations, Powders, Liquid dosage forms, Monophasic liquids, Biphasic liquids, Suspensions, Emulsions, Suppositories, Pharmaceutical incompatibilities, Semisolid dosage forms.
4. Pharmaceutical Inorganic Chemistry: Impurities in pharmaceutical substances, General methods of preparation, Acids, Bases and Buffers, Major extra and intracellular electrolytes, Dental products, Gastrointestinal agents, Acidifiers, Antacid, Cathartics, Antimicrobials, Miscellaneous compounds, Expectorants, Emetics, Haematinics, Poison and Antidote, Astringents, Radiopharmaceuticals.
5. Pharmaceutical Organic chemistry: Classification, nomenclature and isomerism, Alkanes, Alkenes and Conjugated dienes, Alkyl halides, Alcohols, Carbonyl compounds (Aldehydes and ketones), Carboxylic acids, Aliphatic amines, Benzene and its derivatives, Phenols, Aromatic Amines, Aromatic Acids, Fats and Oils, Polynuclear hydrocarbons, Cyclo alkanes. Stereo isomerism, Geometrical isomerism, Heterocyclic compounds, Synthesis, reactions and medicinal uses of following compounds/derivatives -Pyrazole, Imidazole, Oxazole and Thiazole. Pyridine, Quinoline, Isoquinoline, Acridine and Indole. Basicity of pyridine, Reactions of synthetic importance
6. Biochemistry: Biomolecules, Bioenergetics, Carbohydrate metabolism, Biological oxidation, Lipid metabolism, Amino acid metabolism, Nucleic acid metabolism and genetic information transfer, Enzymes.
7. Physical Pharmaceutics: Physicochemical properties of drug molecules, Surface and interfacial phenomenon, Complexation and protein binding, pH, buffers and Isotonic solutions, Colloidal dispersions, Rheology, Deformation of solids, Coarse dispersion, Micromeritics, Drug stability.

8. Medicinal Chemistry: Medicinal Chemistry, Physicochemical properties in relation to biological action, Drug metabolism, Drugs acting on Autonomic Nervous System, Sympathomimetic agents, Parasympathomimetic agents, Cholinergic Blocking agents, Drugs acting on Central Nervous System, General anesthetics, Narcotic antagonists, Anti-inflammatory agents. Antihistaminic agents, Anti-anginal agents, Anti-arrhythmic Drugs, Drugs acting on Endocrine system, Antidiabetic agents. Antibiotics, Stereochemistry, Structure activity relationship, Anti-tubercular Agents, Antifungal agents, Antifungal antibiotics, Drug Design -Various approaches used in drug design, Physicochemical parameters used in quantitative structure activity, Combinatorial Chemistry.
9. Pharmacology: General Pharmacology, essential drugs concept and routes of drug administration, Pharmacokinetics, Pharmacodynamics, Drug discovery and clinical evaluation of new drugs -Drug discovery phases, Pharmacology of drugs acting on peripheral nervous system, Pharmacology of drugs acting on central nervous system, Pharmacology of drugs acting on cardio vascular system, Pharmacology of drugs acting on urinary system, Autocoids and related drugs, Pharmacology of drugs acting on endocrine system, Bioassay, Pharmacology of drugs acting on Respiratory system, Pharmacology of drugs acting on the Gastrointestinal Tract, Chemotherapy, Immunopharmacology, Principles of toxicology, Chronopharmacology.
10. Pharmacognosy and Phytochemistry: Pharmacognosy, Classification of drugs, Quality control of Drugs of Natural Origin, Cultivation, Collection, Processing and storage of drugs of natural origin, Conservation of medicinal plants, Plant tissue culture, Pharmacognosy in various systems of medicine, Introduction to secondary metabolites, Study of biological source, chemical nature and uses of drugs of natural origin, Plant Products, Primary metabolites, Carbohydrates, Proteins and Enzymes, Lipids (Waxes, fats, fixed oils), Marine Drugs. Metabolic pathways in higher plants and their determination, Isolation, Identification and Analysis of Phyto constituents, Industrial production, estimation and utilization of the following phyto constituents, Basics of Phytochemistry.

Syllabus of Library & Information Science for the post of Technical Assistant

1. Foundations of Library & Information Science: Development of libraries, Role of Libraries in Society, Laws of Library Science, Types of libraries.
2. Library Organization: Document Selection & Collection Development, Technical Services–Acquisition of books & periodicals, Circulation- Work & Methods, Reporting.
3. Reference Service & Information Sources: Reference Service, Types of Reference Service, Organization & Management of Reference Department, reference sources.
4. Information Science: Documentation and Information Science, Sources of Information, Information & information needs of users, Information Transfer: Communication of Information.
5. Knowledge Organization: Classification, Library Classification, Universe of Knowledge-Structure and attribute, Normative Principles of Classification & their application.
6. Document Description: Parts of a book, Library catalogue and its forms, Catalogue Entries, Normative Principles of Cataloguing.
7. Information Technology: Information Technology, Introduction to computer system, Computer Application to Libraries & Information Centers, Networking and Internet.
8. Librarianship as a Profession: Librarianship as a Profession, Library Legislation, Library co-operation & Resource sharing, Professional Associations: National & International Associations.
9. Library Management: Management, Collection maintenance, HRM & Financial management, Reporting.
10. Reference Sources: Study and evaluation of other categories of reference sources, Reference Questions, User Education, Bibliographic control.
11. Organization of Information & Services: Information storage and retrieval, Indexing (Pre and Post Co-ordinate), Information services, Information Systems & Information Centers.
12. Knowledge Organization: Species of classification schemes, Standard schemes of classification and their features, Introduction to Colon Classification and Universal Decimal Classification, Trends in library classification.
13. Document Description: Principles and practices of document description, Standardization in description and bibliographic exchange, Subject cataloguing, Co-operation and Centralization in Cataloguing.

Syllabus of Agriculture/ Agronomy/ Plant Taxonomy for the post of Technical Assistant

1. Agronomy: Introductory Agriculture and Principles of Agronomy, Field Crops-I (Kharif), Field Crops- II (Rabi), Practical Crop Production-I (Kharif Crops), Weed Management, Practical Crop Production II (Rabi Crops), Water Management Including Micro Irrigation, Organic Farming, Farming Systems and Sustainable Agriculture.
2. Plant Breeding and Genetics: Economic Botany, Principles of Genetics, Principles of Plant Breeding, Breeding of Field/Horticulture Crops, Principles of Seed Technology, Principles of Plant Biotechnology.
3. Soil Science and Agricultural Chemistry: Introduction to Soil Science, Soil Chemistry, Soil Fertility and Nutrient Management, Manures, Fertilizers and Agro-Chemicals.
4. Entomology: Insect Morphology and Systematics, Insect Ecology and Integrated Pest Management including Beneficial Insects, Pests of Field Crops and Stored Grain and their Management, Pests of Horticultural Crops and their Management.
5. Agricultural Economics: Principles of Agricultural Economics, Agricultural Marketing, Trade and Prices, Agricultural Finance and Co-Operation, Fundamentals of Agribusiness Business Management (Including Project Development, Appraisal and Monitoring), Production Economics and Farm Management.
6. Agricultural Engineering: Fundamentals of Soil, Water and Conservation Engineering, Farm Power and Machinery, Protected Cultivation and Post Harvest Technology, Renewable Energy.
7. Agricultural Meteorology: Earth's atmosphere, Composition, division of atmosphere. Sun-earth relationship, season, weather and climate. Pressure and wind systems, cyclone and anticyclone. Condensation, precipitation, clouds, Indian monsoon. Meaning and scope of Agricultural meteorology. Importance of weather and climate in agricultural production. Microclimate, crop-weather-pest disease relationship. Climatic hazards in crop production- Droughts and frost. Heat unit concept and its application in India. Potential evapotranspiration and its estimation. Weather forecasting. Agro-climatic zones of India.
8. Plant Pathology: Introductory Plant Pathology, Principles of Plant Pathology, Diseases of Field Crops and their Management, Introductory Nematology, Diseases of Horticultural Crops and their Management.
9. Horticulture: Production Technology of Fruit Crops, Production Technology of Vegetables and Flowers, Production Technology of Spices, Aromatic, Medicinal and Plantation Crops, Post Harvest Management and Value Addition of Fruits and Vegetables.
10. Agricultural Extension: Dimensions of Agricultural Extension, Fundamentals of Rural Sociology and Educational Psychology, Fundamentals of Rural Sociology and Educational Psychology, Entrepreneurship Development.
11. Biochemistry/Physiology Microbiology/Environmental Sciences/ Bio-Mathematics: Bio-Mathematics, Agricultural Microbiology, Crop Physiology-I, Crop Physiology-II, Biochemistry, Environmental Science.
12. Statistics and Computer Application: Introduction to Computer Applications, Agricultural Statistics.
13. Animal Production: Livestock Production and Management, Dairy Cattle & Buffalo Production & Management.

Syllabus of Biochemistry for the post of Technical Assistant

1. Molecules of Life: Foundations of biochemistry - Cellular and chemical foundations of life, water unique properties - weak interactions in aqueous systems, Carbohydrates and Glycobiology, Lipids, Amino acids, Nucleic acids, Vitamins.
2. Cell Biology: Introduction to cell biology - Prokaryotic (archaea and eubacteria) and eukaryotic cell, Tools of cell biology, Structure of different cell organelles, Cytoskeletal proteins, Cell wall and extracellular matrix, Cell cycle, cell death and cell renewal.
3. Proteins: Introduction to amino acids, peptides and proteins, Extraction of proteins for downstream processing, Separation techniques, Characterization of proteins, Three dimensional structures of proteins, Protein folding.
4. Enzymes: Introduction to enzymes, Features of enzyme catalysis, Enzyme kinetics, Bisubstrate reactions, Enzyme inhibition, Mechanism of action of enzymes, Applications of enzymes.
5. Metabolism of Carbohydrates and Lipids: Basic design of metabolism, Glycolysis, Gluconeogenesis and pentose phosphate pathway, Glycogen metabolism, Citric acid cycle, Synthesis of carbohydrates, Fatty acid oxidation, Fatty acid synthesis.
6. Membrane Biology and Bioenergetics: Introduction to biomembranes - Composition of biomembranes, Membrane structures, Membrane dynamics, Membrane transport, Vesicular transport and membrane fusion, bioenergetics, Oxidative phosphorylation, Photophosphorylation.
7. Hormone: Biochemistry and Function: Introduction to endocrinology - Functions of hormones and their regulation.
8. Human Physiology: Homeostasis and the organization of body fluid compartments, Cardiovascular physiology, Respiration, Renal physiology, Gastrointestinal and hepatic physiology, Musculoskeletal system, Reproductive physiology.
9. Gene Organization, Replication and Repair: Structure of DNA, Genes and genomic organization, Replication of DNA, Recombination and transposition of DNA, Molecular basis of mutations, Various modes of DNA repair.
10. Metabolism of Amino Acids and Nucleotides: Overview of amino acid metabolism, Catabolism of amino acids, Biosynthesis of amino acids, Precursor functions of amino acids, Biosynthesis of purine and pyrimidine nucleotides.
11. Concepts in Genetics: Introduction to model organisms and Mendelism, Applications of Mendel's principles & chromosomal basis of heredity, Extensions of Mendelism, Genetic definition of a gene, Genetics of bacteria and viruses, Linkage, crossing over and mapping techniques, Human pedigree analysis, The genetic control of development and sex determination, Organelle heredity and epigenetics, Chromosomal aberrations, Inheritance of complex traits & population genetics, Evolutionary genetics.
12. Gene Expression and Regulation: Biosynthesis of RNA in prokaryotes, Biosynthesis of RNA in eukaryotes, RNA splicing, The genetic code, Biosynthesis of proteins, Protein targeting and degradation, Regulation of gene expression in prokaryotes, Regulation of gene expression in eukaryotes.
13. Genetic Engineering and Biotechnology: Introduction to recombinant DNA technology, Cloning vectors for prokaryotes and eukaryotes, Joining of DNA fragments, Introduction of DNA into cells and selection for recombinants, Methods for clone

identification, Polymerase chain reaction, DNA sequencing, Expression of cloned genes,
Applications of genetic engineering in Biotechnology.

Syllabus of Biotechnology for the post of Technical Assistant

1. Biochemistry & Metabolism: Introduction to Biochemistry, Lipids: Structure and functions–Classification, Carbohydrates Metabolism, Bioenergetics and thermodynamics.
2. Cell Biology: Cell, Introduction and classification of organisms by cell structure, Membrane Vacuolar system, Lysosomes: Vacuoles and microbodies, Nucleus: Structure and function, chromosomes and their structure, Extracellular Matrix: Composition.
3. Plant Anatomy & Physiology: Anatomy, Plant water relations and micro & macro nutrients, Carbon and nitrogen metabolism, Growth and development.
4. Genetics: Introduction: Historical developments in the field of genetics, Non allelic interactions, Chromosome and gene mutations, Genetic linkage.
5. General Microbiology: Functional morphology of the microbial cell, Microbial nutrition, Microbial growth, Physical and chemical control of microorganisms.
6. Biophysical Chemistry: Structure of proteins, DNA, RNA and enzymes.
7. Molecular Biology: DNA structure and replication, DNA damage, repair and homologous recombination, Transcription and RNA processing, Regulation of gene expression and translation.
8. Bioprocess Technology: Introduction to bioprocess technology -Techniques and basic principle components, Introduction to oxygen requirement in bioprocess, Introduction to downstream processing.
9. Recombinant DNA Technology: Molecular tools and applications- restriction enzymes, ligases, polymerases, alkaline phosphatase, Restriction and modification system, restriction mapping, Random and site-directed mutagenesis, Genetic engineering in plants.
10. Bio-Analytical Tools: Microscopy, Spectroscopy, Chromatography, Electrophoresis, Molecular Techniques.
11. Genomics & Proteomics: Introduction to Genomics, DNA sequencing methods, Managing and Distributing Genome Data, Introduction to protein structure, Chemical properties of proteins, Introduction to Proteomics, Analysis of proteomes.

Syllabus of Botany for the post of Technical Assistant

1. Phycology and Microbiology: Introduction to microbial world, Viruses, Bacteria, Algae, Cyanophyta and Xanthophyta, Chlorophyta, Phaeophyta and Rhodophyta.
2. Biomolecules and Cell Biology: Biomolecules, Bioenergetics, Enzymes, The cell, Cell wall and plasma membrane, Cell organelles, Cell division.
3. Mycology and Phytopathology: Introduction to Fungi, Mastigomycotina (Chytridiomycetes and Oomycetes), Zygomycotina, Ascomycotina, Basidiomycotina, Deuteromycotina (Fungi Imperfecti), Allied Fungi- Myxomycota, Symbiotic associations, Applied Mycology, Phytopathology.
5. Morphology and Anatomy of Angiosperm: Morphology, Introduction and scope of plant Anatomy, Structure and Development of Plant Body, Tissues, Apical meristems, Vascular Cambium and Wood, Adaptive and Protective Systems.
7. Genetics: Mendelian genetics and its extension, Extrachromosomal Inheritance, Linkage, crossing over and chromosome mapping, Variation in chromosome number and structure, Gene mutations, Fine structure of gene, Population and Evolutionary Genetics.
8. Molecular Biology: Nucleic acids : Carriers of genetic information, The Structures of DNA and RNA / Genetic Material, The replication of DNA, Central dogma and genetic code, Transcription, Processing and modification of RNA, Translation,
9. Plant Ecology and Phytogeography: Introduction Basic concepts; Levels of organization, Soil -Importance; Origin; Formation; Composition, Water, Adoption of plants to various environmental factors, Biotic interactions, Population ecology, Plant communities, Ecosystems, Functional aspects of ecosystem, Phytogeography.
10. Plant Systematics: Significance of Plant systematic, Botanical nomenclature, Systems of classification, Numerical taxonomy and cladistics, Phylogeny of Angiosperms, Angiospermic Families.
11. Reproductive Biology of Angiosperms: Reproductive development - Induction of flowering, Anther and pollen biology, Ovule, Pollination and fertilization, Self incompatibility, Embryo, Endosperm and Seed, Polyembryony and apomixes.
12. Plant Physiology: Plant-water relations, Mineral nutrition, Nutrient Uptake, Translocation in the phloem, Plant growth regulators, Physiology of flowering, Phytochrome, cryptochromes and phototropins.
13. Plant Metabolism: Concept of metabolism, Carbon assimilation, Carbohydrate metabolism, Carbon Oxidation, ATP-Synthesis, Lipid metabolism, Nitrogen metabolism, Mechanisms of signal transduction.
14. Plant Biotechnology: Plant Tissue Culture, Recombinant DNA technology, Gene Cloning, Methods of gene transfer, Applications of Biotechnology.

Syllabus of Chemistry for the post of Technical Assistant

1. Inorganic Chemistry: Atomic Structure, Periodicity of Elements, Chemical Bonding, Oxidation-Reduction, General Principles of Metallurgy, Acids and Bases, Chemistry of s and p Block Elements, Noble gases, Inorganic Polymers, Coordination Chemistry, Transition Elements, Bioinorganic Chemistry, Coordination Chemistry, Transition Elements, Bioinorganic Chemistry, Theoretical Principles in Qualitative Analysis (H₂S Scheme), Organometallic compounds.
2. Physical Chemistry: Gaseous state, Liquid state, Solid state, Ionic equilibria, Chemical Thermodynamics, Systems of Variable Composition, Chemical Equilibrium, Solutions and Colligative Properties, Phase Equilibria, Chemical Kinetics, Catalysis, Surface chemistry, Conductance, Electrochemistry, Electrical & Magnetic Properties of Atoms and Molecules, Quantum Chemistry, Molecular Spectroscopy and Fundamentals of Magnetic Resonance Spectroscopy.
3. Organic Chemistry: Basic Organic Chemistry, Stereochemistry, Chemistry of Aliphatic Hydrocarbons, Cycloalkanes and Conformational analysis, Aromatic Hydrocarbons, Chemistry of Halogenated Hydrocarbons, Alcohols, Phenols, Ethers and Epoxides, Carbonyl Compounds, Carboxylic Acids and their Derivatives, Nitrogen Containing Functional Groups, Polynuclear Aromatic Hydrocarbons, Nucleic Acids, Amino Acids, Peptides and Proteins, Enzymes, Lipids.

Syllabus of Geology for the post of Technical Assistant

1. Earth System Science: Earth as a planet, Earth's magnetic field, Plate Tectonics, Hydrosphere and Atmosphere, Soil, Understanding the past from stratigraphic records, cosmic abundance of elements.
2. Mineral Science: Crystallography, Crystal symmetry and projections, Rock forming minerals, Properties of light and optical microscopy.
3. Elements of Geochemistry: Concepts of geochemistry, Layered structure of Earth and geochemistry, Element transport, Geochemistry of solid Earth, Geochemical behavior of selected elements - Si, Al, K, Na etc.
4. Structural Geology: Structure and Topography, Stress and strain in rocks, Folds, Foliation and lineation, Fractures and faults.
5. Igneous Petrology: Concepts of Igneous petrology, Forms, Phase diagrams and petrogenesis, Magmatism in different tectonic settings, Petrogenesis of Igneous rocks.
6. Sedimentary Petrology: Origin of sediments, Sediment granulometry, Sedimentary textures, structures and environment, Varieties of sedimentary rocks, Diagenesis.
7. Paleontology: Fossilization and fossil record, Taxonomy and Species concept, Invertebrates, Vertebrates, Application of fossils in Stratigraphy.
8. Metamorphic Petrology: Metamorphism: controls and types, Metamorphic facies and grades, Metamorphism and Tectonism, Migmatites and their origin, Metamorphic rock associations.
9. Stratigraphic Principles and Indian Stratigraphy: Principles of stratigraphy, Code of stratigraphic nomenclature, Physiographic and tectonic subdivisions of India, Phanerozoic Stratigraphy of India, Volcanic provinces of India, Stratigraphic boundaries.
10. Hydrogeology: Introduction and basic concepts, Groundwater flow, Well hydraulics and Groundwater exploration, Groundwater management.
11. Economic Geology: Ores and gangues, Mineral deposits and Classical concepts of Ore formation, Mineral exploration, Structure and texture of ore deposits, Metallic and Nonmetallic ores.
12. Geomorphology:
Introduction to Geomorphology, Endogenic and Exogenic processes. Geoid, Topography, Hypsometry, Global Hypsometry, Major Morphological features Large Scale Topography - Ocean basins, Plate tectonics overview, Large scale mountain ranges (with emphasis on Himalaya). Surficial Processes and geomorphology, Weathering and associated landforms, Hill slopes Glacial, Periglacial processes and landforms, Fluvial processes and landforms, Aeolian Processes and landforms, Coastal Processes and landforms, Landforms associated with igneous activities. Endogenic- Exogenic interactions, Rates of uplift and denudation, Tectonics and drainage development, Sea-level change, Long-term landscape development. Overview of Indian Geomorphology, Extraterrestrial landforms.
13. Engineering Geology: Geology vs. Engineering, Role of Engineering geologists in planning, design and construction of major man-made structural features.

Site investigation and Geological, Geotechnical and Environmental characterization for Dams and Reservoirs, Tunnels. Types of Dam and tunnels. Foundation treatment: Grouting, Rock Bolting and other support mechanisms. Intact Rock and Rock Mass properties, Rock aggregates; Significance as Construction Material. Concept, Mechanism and Significance of: Rock Quality Designation (RQD), Rock Structure Rating (RSR), Rock Mass Rating (RMR), Tunneling Quality Index (Q). Causes, Factors and corrective/Preventive measures of Landslides and Earthquakes.

14. Remote Sensing and GIS: Photogeology, Remote Sensing, Digital Image Processing, GIS, GPS.

Syllabus of Life Sciences for the post of Technical Assistant

1. Chemistry: Atomic Structure, Chemical Bonding and Molecular Structure, Ionic Bonding, Covalent bonding, hydrogen bonding, fundamentals of Organic Chemistry (Aliphatic & Aromatic hydrocarbons, Alkyl and Aryl Halides, Alcohols, Phenols and Ethers, Aldehydes and ketones.), Physical Chemistry, (Chemical Thermodynamics, Chemical Equilibrium, Ionic Equilibria), Basic principles of spectroscopy.
2. Biology: Biological systems, evolution and biodiversity, Chemical context of living systems. Techniques in Biology: Principles of microscopy, Cell as a unit of Life, Cell Organelles, Cell Membrane and Cell Wall, Cell Cycle: Interphase, Mitosis and Meiosis.
3. Food, Nutrition and Health: Basic concept of food and nutrition, Functions of food Components of food, Nutritional Biochemistry, Health, Food hygiene.
4. Plant Ecology and Phytogeography: Introduction Basic concepts; Levels of organization, Soil -Importance; Origin; Formation; Composition, Water, Adoption of plants to various environmental factors, Biotic interactions, Population ecology, Plant communities, Ecosystems, Functional aspects of ecosystem, Phytogeography.
5. Plant Physiology: Plant-water relations, Mineral nutrition, Nutrient Uptake, Translocation in the phloem, Plant growth regulators, Physiology of flowering, Phytochrome, cryptochromes and phototropins.
6. Plant Biotechnology: Plant Tissue Culture, Recombinant DNA technology, Gene Cloning, Methods of gene transfer, Applications of Biotechnology.
7. Animal Physiology: Controlling and Coordinating Systems: Tissues, Bone and Cartilage, Nervous System, Muscle, Reproductive System, Endocrine System.
8. Biodiversity: Introduction to microbial world and to study its diversity, Viruses Prokaryotes, Algae, Fungi and their allies, Protista, Porifera, Radiata, Aceolomates, Pseudocoelomates, Coelomate Protostomes, Arthropoda, Mollusca, Coelomate Deuterostomes, Protochordata, Pisces, Amphibia, Reptilia, Aves, Mammalia, Introduction Different types of tissue, Bryophytes, Pteridophytes, Gymnosperms, Angiosperms.
9. Introduction to Medical Diagnostics: Biomedical basis of Disease, Statistical Analysis and Interpretation, Analytical Technology, Diagnostic Methods.
10. Basic Biochemistry: Central dogma, Structure of proteins, DNA, RNA, enzymes, protein synthesis, protein determination, fats and lipids.
11. Molecular Biology: Genetic material, Transcription (Prokaryotes and Eukaryotes), Regulation of gene expression, Apoptosis (Cell Death) & Cell Renewal, Cancer.
12. Bioinformatics: Introduction to Bioinformatics, Databases in Bioinformatics, Biological Sequence Databases, Sequence Alignments, Molecular Phylogeny, Applications of Bioinformatics.

Syllabus of Mathematics for the post of Technical Assistant

1. **Calculus:** Higher order derivatives, Leibnitz rule and its applications to problems of type $e^{ax+bsinx}$, $e^{ax+b\cos x}$, $(ax+b)^n \sin x$, $(ax+b)^n \cos x$, concavity and inflection points, asymptotes, curve tracing in Cartesian coordinates, tracing in polar coordinates of standard curves, L'Hopital's rule, applications in business, economics and life sciences. Applications of differential calculus, Reduction formulae, derivations and illustrations of reduction formulae of the type $\int \sin n x \, dx$, $\int \cos n x \, dx$, $\int \tan n x \, dx$, $\int \sec n x \, dx$, $\int (\log x)^n \, dx$, $\int \sin n x \cos m x \, dx$, volumes by slicing, disks and washers methods, volumes by cylindrical shells, parametric equations, parameterizing a curve, arc length, arc length of parametric curves, area of surface of revolution. Multiple integrals, Theorems of integration and applications.

2. **Vectors:** Triple product, introduction to vector functions, operations with vector-valued functions, limits and continuity of vector functions, differentiation and integration of vector functions, tangent and normal components of acceleration, modelling ballistics and planetary motion, Kepler's second law.

3. **Complex Numbers:** Polar representation of complex numbers, n th roots of unity, De Moivre's theorem for rational indices and its applications. Complex differentiation, Residues, complex integration.

4. **Mathematical Logical, Functions, Sets, Fields, Rings and group theory:** Statements and logic, statements with quantifier, compound statements, implications, proofs in Mathematic; Sets, operations on sets, family of sets, power sets, Cartesian product; Functions, one-one, onto functions and bijections, Composition of functions, Inverse of a function, Image and Inverse image of subsets; Relation, Equivalence relations, Equivalence classes and partitions of a set, congruence modulo n in integers; Induction Principles, the well-ordering principle, greatest common divisor of integers. Definition of fields, groups, rings and representations and related lemma and theorems.

5. **Matrices & Determinants:** Systems of Linear Equations, row reduction and echelon forms, vector equations, the matrix equation $Ax = b$, solution sets of linear systems, linear independence, introduction to linear transformations, the matrix of a linear transformation; Matrix operations, inverse of a matrix, characterizations of invertible matrices; Determinants, Cramer's rule.

6. **Real Analysis:** Algebraic and order properties of \mathbb{R} , absolute value and real line, bounded sets, supremum and infimum, completeness property of \mathbb{R} , the Archimedean property, the density theorem, intervals, nested interval theorem.

Real sequences, limit of a sequence, convergent sequence, bounded sequence, limit theorems, monotone sequences, monotone convergence theorem, subsequences, monotone subsequence theorem, Bolzano Weierstrass theorem for sequences, Cauchy sequences, Cauchy's convergence criterion, properly divergence sequences.

Infinite series, convergence and divergence of infinite series, Cauchy criterion, Tests for convergence: comparison test, limit comparison test, ratio test, root test, integral test, Absolute convergence, rearrangement theorem, alternating series, Leibniz test, conditional (nonabsolute) convergence.

5. **Differential Equations:** Differential equations and mathematical models. General, particular, explicit, implicit and singular solutions of a differential equation. Exact differential equations and integrating factors, separable equations and equations reducible

to this form, linear equation and Bernoulli equations, special integrating factors and transformations.

6. Analytical Geometry: Transformation of coordinates, pair of straight lines. Parabola, parametric coordinates, tangent and normal, ellipse and its conjugate diameters with properties, hyperbola and its asymptotes, general conics: tangent, condition of tangency, pole and polar, centre of a conic, equation of pair of tangents, reduction to standard forms, central conics, equation of the axes, and length of the axes, polar equation of a conic, tangent and normal and properties, Plane, straight lines and shortest distance. Sphere, cone and cylinder, central conicoids, ellipsoid, hyperboloid of one and two sheets, diametral planes, tangent lines, director sphere, polar plane, section with a given centre

7. Linear Algebra: Vector spaces and subspaces, null space and column space of a matrix, linear transformations, kernel and range, linearly independent sets, bases, coordinate systems, dimension of a vector space, rank, change of basis.

Eigenvectors and eigenvalues of a matrix, the characteristic equation, diagonalization, eigenvectors of a linear transformation, complex eigenvalues, Invariant subspaces and Cayley-Hamilton theorem.

Inner product, length, and orthogonality, orthogonal sets, orthogonal projections, the Gram-Schmidt process, inner product spaces; Diagonalization of symmetric matrices, the Spectral Theorem.

8. Partial Differential Equations:

Introduction, Classification, Construction of first order partial differential equations (PDE). Cauchy's problem for first order equations, linear equations of the first order, Integral surfaces passing through a given curve, Nonlinear partial differential equations of the first order, Cauchy's method of characteristics, Charpit's method. Solutions satisfying given conditions, Jacobi's method. Canonical form of first order PDE, Method of separation of variables for first order PDE. Reduction to canonical forms, Equations with constant coefficients, General solution.

Syllabus of Microbiology for the post of Technical Assistant

1. Introduction to Microbiology and Microbial Diversity: Diversity of Microbial World- Systems of classification & General characteristics, An overview of Scope of Microbiology.
2. Bacteriology: Cell organization, Bacteriological techniques, Microscopy, Growth and nutrition, Reproduction in Bacteria, Bacterial Systematics, Important archaeal and eubacterial groups.
3. Biochemistry: Bioenergetics, Proteins, DNA, RNA, Carbohydrates, Lipids, Enzymes, Vitamins.
4. Virology: Nature and Properties of Viruses, Bacteriophages, Viral Transmission, Salient features of viral nucleic acids and Replication.
5. Microbial Physiology and Metabolism: Microbial Growth and Effect of Environment on Microbial Growth, Nutrient uptake and Transport, Chemoheterotrophic Metabolism - Aerobic Respiration, Chemoheterotrophic Metabolism- Anaerobic respiration and fermentation, Chemolithotrophic and Phototrophic Metabolism, Nitrogen Metabolism - an overview.
6. Cell Biology: Structure and organization of Cell, Nucleus, Protein Sorting and Transport, Cell Signalling, Cell Cycle, Cell Death and Cell Renewal.
7. Molecular Biology: Structures of DNA and RNA / Genetic Material, Replication of DNA (Prokaryotes and Eukaryotes), Transcription in Prokaryotes and Eukaryotes, Post-Transcriptional Processing, Translation (Prokaryotes and Eukaryotes), Regulation of gene Expression in Prokaryotes and Eukaryotes.
8. Microbial Genetics: Genome Organization and Mutations, Plasmids, Mechanisms of Genetic Exchange, Phage Genetics, Transposable elements.
9. Environmental Microbiology: Microorganisms and their habitats, Microbial Interactions, Biogeochemical Cycling, Waste Management, Microbial Bioremediation, Water Potability.
10. Food and Dairy Microbiology: Foods as a substrate for microorganisms, Microbial spoilage of various foods, Principles and methods of food preservation, Fermented foods, Food borne diseases.
11. Industrial Microbiology: Introduction to industrial microbiology, Isolation of industrially important microbial strains and fermentation media, Types of fermentation processes, bioreactors and measurement of fermentation parameters, Down-stream processing, Microbial production of industrial products (micro-organisms involved, media, fermentation conditions, downstream processing and uses), Enzyme immobilization.
12. Recombinant DNA Technology and Cloning Vectors: Definition and Properties of Plasmid vectors, Transformation of DNA, DNA Amplification and DNA sequencing, PCR: Basics of PCR, RT-PCR, Real-Time qPCR, Sanger's method of DNA Sequencing: traditional and automated sequencing, Southern - and Northern - blotting techniques, dot blot, DNA microarray, SDS-PAGE and Western blotting, Construction and Screening of Genomic and cDNA libraries.

Syllabus of Physics for the post of Technical Assistant

1. Mechanics: Fundamentals of Dynamics, Work and Energy, Collisions, Rotational Dynamics, Elasticity, Fluid Motion, Gravitation and Central Force Motion, Oscillations, Non-Inertial Systems, Special Theory of Relativity.
2. Electricity & Magnetism: Electric Field and Electric Potential, Dielectric Properties of Matter, Magnetic Field, Magnetic Properties of Matter, Electromagnetic Induction, Electrical Circuits, Network Theorems, Ballistic Galvanometer.
3. Waves & Optics: Superposition of Collinear Harmonic Oscillations, Superposition of Two Perpendicular Harmonic Oscillations, Wave Motion, Velocity of Waves, Superposition of Two Harmonic Waves, Wave Optics, Interference, Interferometer
Diffraction, Fraunhofer Diffraction, Holography.
4. Thermal Physics: Zeroth and First Law of Thermodynamics, Second Law of Thermodynamics, Entropy, Thermodynamic Potentials, Maxwell's Thermodynamic Relations, Kinetic Theory of Gases, Distribution of Velocities, Molecular Collisions, Real Gases.
5. Digital Systems & Applications: Introduction to CRO, Integrated Circuits (qualitative treatment only), Digital Circuits, Boolean Algebra, Data Processing Circuits, Arithmetic Circuits, Sequential Circuits, Timers: IC 555, Shift Registers Counters (4 bits), Computer Organization, Intel 8085 Microprocessor Architecture, Introduction to Assembly Language.
6. Elements of Modern Physics: Quantum Theory and Blackbody Radiation, Uncertainty and Wave-Particle Duality, Schrödinger Equation, One-dimensional Box and Step Barrier, Structure of the Atomic Nucleus, Radioactivity, Detection of nuclear radiation, Fission and Fusion, Lasers.
7. Analog Systems & Applications: Semiconductor Diodes, Two-terminal Devices and their Applications, Bipolar Junction Transistors, Amplifiers, Coupled Amplifier, Feedback in Amplifiers, Sinusoidal Oscillators, Operational Amplifiers (Black Box approach), Applications of Op-Amps, Conversion.
8. Quantum Mechanics & Applications: Time Dependent Schrödinger Equation, Time Independent Schrödinger Equation, Bound States, Hydrogen-like Atoms, Atoms in Electric & Magnetic Fields, Many Electron Atoms.
9. Solid State Physics: Crystal Structure, Elementary Lattice Dynamics, Magnetic Properties of Matter, Dielectric Properties of Materials, Ferroelectric Properties of Materials, Free Electron Theory of Metals, Superconductivity.
10. Electromagnetic Theory: Maxwell Equations, EM Wave Propagation in Unbounded Media, EM Wave in Bounded Media, Polarization of Electromagnetic Waves, Rotatory Polarization, Optical Fibres.
11. Statistical Mechanics: Classical Statistics, Classical Theory of Radiation, Quantum Theory of Radiation, Bose-Einstein Statistics, Fermi-Dirac Statistics.

Syllabus of Zoology for the post of Technical Assistant

1. Non-Chordates: Protista to Pseudocoelomates: Protista, Parazoa and Metazoa, Porifera, Cnidaria, Ctenophora, Platyhelminthes, Nematelminthes, Introduction to Coelomates, Annelida, Arthropoda, Onychophora, Mollusca, Echinodermata
2. Principles of Ecology: Introduction to Ecology, Population, Community, Ecosystem, Applied Ecology.
3. Cell Biology: Overview of Cells, Plasma Membrane, Endomembrane System, Mitochondria and Peroxisomes, Cytoskeleton, Nucleus, Cell Division, Cell Signaling.
4. Diversity of Chordates: Introduction to Chordates, Protochordata, Origin of Chordata, Agnatha, Pisces, Amphibia, Reptilia, Aves, Mammalia.
5. Animal Physiology: Controlling And Coordinating Systems: Tissues, Bone and Cartilage, Nervous System, Muscle, Reproductive System, Endocrine System.
6. Fundamentals of Biochemistry: Carbohydrates, Lipids, Proteins, Nucleic Acids, Enzymes. Overview of Metabolism, Carbohydrate Metabolism, Lipid Metabolism, Protein Metabolism, Oxidative Phosphorylation.
7. Comparative Anatomy of Vertebrates: Integumentary System, Skeletal System, Digestive System, Respiratory System, Circulatory System, Urinogenital System, Nervous System, Sense Organs.
8. Animal Physiology: Life Sustaining Systems: Physiology of Digestion, Physiology of Respiration, Renal Physiology, Components of blood and their functions, Physiology of Heart.
9. Molecular Biology: Nucleic Acids, DNA Replication, Transcription, Translation, Post Transcriptional Modifications and Processing of Eukaryotic RNA, Gene Regulation, DNA Repair Mechanisms, Regulatory RNAs.
10. Principles of Genetics: Mendelian Genetics and its Extension, Linkage, Crossing Over and Chromosomal Mapping, Mutations, Sex Determination, Extra-chromosomal Inheritance, Polygenic Inheritance, Recombination in Bacteria and Viruses, Transposable Genetic Elements.
11. Developmental Biology: Introduction-Historical perspective and basic concepts, Early Embryonic Development, Late Embryonic Development, Post Embryonic Development, Implications of Developmental Biology.
12. Evolutionary Biology: Life's Beginnings-Chemogeny, RNA world, Biogeny, Historical review of evolutionary concept- Lamarckism, Darwinism, Neo-Darwinism, Evidences of Evolution, Sources of variations- Heritable variations, Population genetics, Product of evolution, Extinctions, Origin and evolution of man, Phylogenetic trees.

Syllabus of Computer Engineering for the post of Technical Assistant

1. Computer Architecture and Organization: Computer Architecture Stored program concept, Number Representation, Basic Computer Organization and Design, Central Processing Unit, Memory Organization, Input-Output Organization.
2. Computer Application & Programming: Computer Architecture, Number System and codes, Operating System, Computer Network and the Internet, C & C++ programming.
3. Computer Hardware and Networking: Computer System Layout, Installation and configuration of Secondary memory and BIOS, Installation of different devices, Trouble shooting basics, OS installation, Basics of Networking, LAN Configuration, Security fundamentals.
4. Data Structure: Elementary Data Organization, Preliminaries:Mathematical notation and function, String Processing, Arrays, Records and Pointers, Linked Lists, Stacks, Queues, Recursion, Trees, Graphs and Their Application, Sorting and searching, File Organization.
5. Digital Electronics: Boolean Algebra and Logic Gates, Combinational Digital System, Flip Flops, Registers &Counters, Memory Devices, Display Device.
6. Microprocessor and Interfacing:Specific features of Microprocessor, Internal architecture of a microprocessor, Addressing modes and Instruction execution, Interfacing of Memory and I/O devices, Assembly language Programming, Peripheral chips and their interfacing, PC interfacing and Intel 386 and 486 processors.
7. System Programming: Assembly Language, Macros, Assemblers, Macro Assembler, Loaders, Compiler Construction.
8. Computer Communication & Networking: Uses of Computer Network, The Physical Layer, The Medium Access Sub layer, The Data Link Layer, The Network Layer, The Transport Layer, The Session Layer, The Presentation Layer, The Application Layer, Concepts of Internet and www, HTML, TCP/IP.
9. Database Management Systems: Database System Environment, Database system concept and Application, E-R diagram, SQL, Functional Dependencies and Normalization for Relational Database, Transaction processing concepts, Concurrency Control Techniques, Security and Integrity, Distributed databases.
10. Internet & Web Technology: Internet Fundamentals, TCP/IP internet layering model, Internet Application and Services, E-Commerce, Web Publishing and Browsing, Interactivity Tools.
11. JAVA Programming: Object oriented methodology, Java, Implementation of java features, Package, Java I/O, Exception Handling, Multi-Threaded Programming, Network Programming, GUI Programming, Database connectivity with JDBC.
12. Operating System: Processes, Process Scheduling Algorithm, Memory Management, File System, Input/output Principles of I/O Hardware& Software, Device Management, Deadlocks, Distributed OS.

13. Visual Programming: .NET framework, MSIL, CLR, CLS, Name Spaces, Assemblies, Common Language, VB, NET Language features, Introduction to Windows Forms, Introduction to ADO.NET, Data types and Base Class Libraries, Object Oriented Programming with VB.NET, Visual Inheritance Apply Inheritance Techniques to Forms, ASP.NET.

Syllabus of Electrical Engineering for the post of Technical Assistant

1. Principle of Electrical Engineering: Concept of current, voltage, resistance; Magnetism and Electromagnetism, Electromagnetic Induction, Energy Conversion Principle, Electrostatic, AC Fundamentals, Phasor Algebra.
2. Elements of Electronic and Devices: Semiconductors, Electronic devices, Transistor, Transistor amplifier, Feedback circuit and oscillator, Special semiconducting devices, Integrated circuits.
3. Element of Mechanical Engineering: Sources of power, prime movers, Properties and laws of gases, Properties of steam, Generation of steam, Steam engine, Internal combustion engine, Steam Turbines, Gas Turbines, Transmission of motion and power.
4. Electrical Circuit & Network: D. C Network Theorem(With independent Source), D. C Network Theorem(With dependent Source), A. C Network Theorem, Single phase AC parallel circuit, Three phase circuit, Transients, Application of Mat lab.
5. Electrical measurement and measuring instruments: Unit, dimensions and Standards, Measurement and instrumentation system, Electromechanical instruments, Measurement of resistance, Potentiometer, A.C. Bridge, Measurement of current and voltage, Measurement of power, Measurement of energy, Instruments for special purpose, Electronics Instrument, Primary sensing, Element and transducer, Data transmission and telemetry, Microprocessor based Instrumentation system.
6. Electrical machine :D.C. Generator, D.C. Motor, Single Phase Transformer, Three Phase Transformer, Special D.C. machine, Special Transformer, Poly phase induction motor, Single phase of induction motor, Alternators Synchronous motor, Commutator motor Special, Commutator motor, Special A.C. machine.
7. Electrical Engineering Materials: Conducting Materials, Semiconducting Material, Insulating Materials, Dielectric Material, Magnetic Material, Electric Hardware, Constructional Materials.
8. Electrical& Electronics Drawing and Design: Symbols and Notation, Electrical Machine Drawing, Winding, Electrical Wiring, Sub-Station, Electronic Drafting, Transformer Design.
9. Digital Electronics: Number System, Logic gates, Boolean algebra, Combinational logic, Flip-Flops, Register and Counters, Data Converter &Memory Devices, Display Construction.
10. Control system: Automatic control system, Laplace Transform, Transfer function, Block diagram, Control system component, Time Domain analysis, Stability analysis.
11. Electrical Power: Generation of Electrical Power, Economics of Generation and Economic Load Dispatch, Transmission of Electrical Power, Mechanical Design of Transmission Line, HVDC Transmission, Substation, Power System Stability, PLC.

12. Non-conventional energy: Non-Conventional Energy Sources, Solar Energy Engineering, Wind Energy Engineering, Ocean Energy Engineering, Geothermal Energy Engineering, Bio Energy Engineering, Direct Energy Conversion Systems, Chemical Energy Sources.
13. AC Distribution and Utilization: AC Distribution, SCADA System for Electrical Distribution, Power Factor Improvement, Electrical Tariff, Cables, Electric Heating and Welding, Electric Drives, Illumination, Electro Chemical Power.
14. Switchgear and Protection: Elements of Protection, Relays, Neutral Earthing, Circuit Interrupting Devices, Arc Formation Process, Circuit Breaker, Protection Scheme, Over Voltage Protection.
15. Installation and maintenance of electrical equipments: Tools and Accessories, Installation, Commissioning Test, Earthing Necessity, Testing and maintenance of insulation, Types of maintenance, Trouble shooting, Electrical accidents and safety measures.

Syllabus of Electronics & Instrumentation Engineering for the post of Technical Assistant

1. Computer Architecture and Organization: Computer Architecture Stored program concept, Number Representation, Basic Computer Organization and Design, Central Processing Unit, Memory Organization, Input-Output Organization.
2. Elements of Electrical Engineering: Concept of current, voltage, resistance; Work, Power, Energy and DC Circuit, D. C. Generator, D. C. Motor, Magnetism and Electromagnetism, Electromagnetic Induction, Energy Conversion Principle, Electrostatic, AC Fundamentals, Phasor Algebra.
3. Elements of Electronic and Devices: Semiconductors, Electronic devices, Transistor, Transistor amplifier, Feedback circuit and oscillator, Special semiconducting devices, Integrated circuits.
4. Analog Electronics: Semiconductor Devices, Rectifier and Power Supply, Bipolar Junction Transistor, Transistor Biasing, JFET, MOSFET AND UJT, Signal Stage Transistor Amplifiers, Multistage Amplifier, Power Amplifier, Tuned Amplifier, Feedback Amplifier, Operational Amplifier, Oscillator, Relaxation Oscillator, Sweep Circuits, Microelectronics Technology.
5. Electrical Circuit & Network: D. C Network Theorem(With independent Source), D. C Network Theorem(With dependent Source), A. C Network Theorem, Single phase AC parallel circuit, Three phase circuit, Transients, Application of Mat lab.
6. Communication Engineering: Introduction to communication systems, Modulation, Radiation and Propagation of Waves, Transmission Lines, Antennas, Microwave Devices and Systems, Demodulation, Transmitting Systems, Receiving Systems, Digital Communication, Mobile Communication, RADAR and Navigation.
7. Electronic test & measurements: measurement fundamentals, electronic voltmeter & multi meter, cathode ray oscilloscope (cro), signal generators, signal analysis, time and frequency measurement, af and rf power measurement, automated measurement and data acquisition system.
8. Digital Electronics: Logic Levels, Logic Gates, Boolean algebra, Combinational Logic Systems, Flip-flops, Registers and Counters, Memory Devices, Converters.
9. Microprocessors: Introduction to microprocessor, 8-bit Microprocessor Architecture, Instructions and Programming, 16 bit Microprocessor 8086, Interfacing.
10. Power electronics: power semiconductor devices, protection of power semiconductor devices, controlled rectifiers, inverters, dc regulated power supplies, power conditioners and ups, stepper motor.
11. Electronic instrumentation: concept of instrumentation system, measurement of physical quantities, signal conditioning.

12. Printed Circuit Board (PCB) Technology: Requirement of a PCB, Copper Clad Laminates (CCL), Layout Planning, Artwork, Design Rules, Film Master preparation, Pattern transfer, Screen Printing, Etching, Chemical process and electroplating, Drilling, Computer in PCB Technology.
13. Control Systems: Elementary forms of control system, transfer function, servo elements, and stability analysis.
14. Data Communication and Networking: Fundamentals of data communication system, Serial Data Communication, Computer Networks, Local Area Networks, Internetworking, ISDN and ATM.
15. Industrial Electronics: Power devices, Thyristors, Rectifiers, Inverters, Choppers, Cycloconverters, Power supply, Motor speed control, Uninterruptible power supply, Electrical heating.
16. Digital Signal Processing: To discrete Time signals and Systems, Discrete Fourier Transform & Fast fourier Transform, Fir Digital Filter Realizations, Iir Digital Filters Realization, DSP Processors.
17. Electrical Measurement And Measuring Instruments: Unit, dimensions and Standards, Measurement and instrumentation system, Electromechanical instruments, Measurement of resistance, Potentiometer, A.C. Bridge, Measurement of current and voltage, Measurement of power, Measurement of energy, Instruments for special purpose, Electronics Instrument, Primary sensing, Element and transducer, Data transmission and telemetry Microprocessor based Instrumentation system.
18. Instrumentation System: Measurements, Performance characteristics of measuring instruments, Signals and response of measurement systems, Sensors and transducers, Pneumatic transducer, Signal conversion, Temperature measurements, Pressure measurements, Level measurements, Flow measurements, Telemetering.

Syllabus of Mechanical Engineering for the post of Technical Assistant

1. Engineering Drawing: Geometrical constructions, lettering, scales, projection of points, projection of lines, orthographic projection, rivet heads and joints, isometric projection, screwed fastenings.
2. Engineering mechanics: coplanar concurrent forces, moments, coplanar non-concurrent forces, center of gravity, moment of inertia, friction, motion, work, power and energy, simple lifting machines.
3. Fluid Mechanics & Fluid Machines: Definition & classification of fluid, physical properties of fluids, fluid statics, fluid kinematics, fluid measurements, pipe & open channel flow, fluid machines, hydraulic turbines, pumps.
4. Manufacturing Technology: Basic of Machine Tools, Metal Casting Process, Advanced Welding Processes, Press Work, Powder Metallurgy, Cutting Fluids and Coolants, Lathe, Drilling machine, Shaper, Planer & Slotter, Grinding & Surface finishing, Milling machine, Non-Traditional machining methods, Jigs and Fixtures.
5. Thermodynamics: Fundamentals and laws of Thermodynamics, Laws of perfect gases, Thermodynamic processes on gases, Fuels and Combustion, Air standard cycles, Properties of steam, Vapour Power cycle, Heat Transfer.
6. Engineering Materials: Mechanical properties of materials, structure of solids crystal structure, ferrous metals and it's alloys, non-ferrous metals and it's alloys, plastic, testing of materials, heat treatment, corrosion & surface engineering.
7. Theory of Machines: Theory Of Machine, Basic kinematics of Machines, Friction, Transmission of Power, Cams, Mechanical Vibrations, Balancing, Governors.
8. Strength of Materials: Simple Stresses and strains, Shear force and bending moments, Theory of simple bending and Deflection of beam, Stresses in beams, Torsion in circular shafts and springs, Columns and Struts, Rivets and riveted joints.
9. Machine Drawing: Cutting Geometric Solids with Planes, Keys, Cotter joints and Pin Joints, Pipe drawings, Welded Joints, Shaft Coupling, Shaft bearings and brackets, Pulleys, Valves, Engine Parts, Auto Cad.
10. Thermal Engineering: Steam generators, Steam nozzles, Steam turbine, Steam condensers and Cooling towers, Nuclear power plant, Heat transfer, Internal Combustion Engine, Air compressors, Gas turbine and propulsion, Refrigeration Cycle.
11. Advance Workshop Practice & CNC Machine: Safety and security measures inside the tool room, fundamentals of cam, manual part programming.
12. Mechatronics: Systems, Measurement systems, Sensors and transducers, Signal Conditioning, Digital Logic, Microprocessors, Input/Output Devices, Programmable Logic Controllers (PLC), Communication systems, Design of Mechatronics Systems.
13. Drawing, Estimating & Costing: Jigs and Fixtures, Assembly Drawing, Elements of costs, Indirect expenses and depreciation, Mensuration and Estimation of material cost, Estimation of Machining Time, Estimation of Welding & Fabrication Time Sheet metal.

Syllabus of Medical Laboratory Technology for the post of Technical Assistant

1. General Pathology & General Microbiology: General Pathology: Cell Injury and Cellular Adaptations, Inflammation, Haemodynamic Disorders, Neoplasia, Healing. General Microbiology: General characters and classification of Bacteria, Characteristics of Bacteria Morphology, Growth and Maintenance of Microbes, Sterilization and Disinfection, Culture Media Definition, Staining Methods, Collection and Transportation of Specimen, Care and Handling of Laboratory Animals, Disposal of Laboratory/Hospital Waste.
2. Fundamentals of Anatomy & Physiology: General Anatomy, Systemic Basic Features. Cell, Blood, Cardiovascular system, Respiratory System, Gastrointestinal System, Endocrinology, Excretion system, Central Nervous System, Skin, Muscular System, Special Senses.
3. Human Anatomy: Regional, Systemic, Surface and Microscopic anatomy, Bones and Skeletal Tissues, Human Skeleton, Joints, Muscles, Fundamental of Nervous system, Surface and Gross Anatomy.
4. Human Physiology: Physiology, Cells and Tissues, Digestive System, Cardiovascular System, Respiratory System, Physiology of Skeletal Muscle fiber, Nervous System, Urinary System, Endocrine System, Special Senses.
5. Basics of Biochemistry, Clinical Pathology, Instruments & Reagents: Chemistry of carbohydrates & their related metabolism, Amino acids, Chemistry of Proteins & their related metabolism, Chemistry of Lipids & their related metabolism, Enzymes, Acid base balance concepts & disorders, Hyperglycemia & hypoglycemia.
6. Hematology&Body Fluids: Blood Grouping, Blood Transfusion, Blood Donation, Blood Collection, Testing Donor Blood, Blood Donor Records, Storage & Transport, Maintenance of Blood Bank Records, Compatibility Testing, Blood Components, Blood Transfusion Reactions. Body fluids, Blood, Erythrocytes, Leucocytes And Platelets, Overview of Body Fluids, CSF: Transudata& Exudate, Urine, Semen Analysis.
7. Endocrinology, Tumor & Cancer Markers: Hormones and enzymes, Carcinogens, Oncogene, Characteristics of growing tumor cells-general and morphological changes, Clinical applications of tumor markers, Enzymes as tumor markers, Biomarkers.
8. Clinical Biochemistry: Photometry, Water & Mineral Metabolism, Liver Functions & their Assessment, Renal Function Tests, Immunodiffusion Techniques, Electrophoresis, Polymerase Chain Reaction, Autoanalysers, Vitamins, Fat- & water-soluble vitamins, Cardiac Profile, Different methods of Glucose Estimation, Different methods of Cholesterol Estimation. Principle, advantage and disadvantage of different methods.
9. Parasitology, Immunology & Serology, Immunity, Immune Response, Antigen, Antibodies/Immunoglobulins, Antigen/Ab Reaction/Serological Refractions, Structure and functions of Immune System, Hyper sensitivity Reactions, ELISA, Vaccination - Schedule & Vaccines. Parasitology, Parasitism, HOST, Vectors etc., Classification of Parasites, Lab diagnosis of parasitic infections.
10. Histopathology & Cytology Techniques: Tissue Processing, Laboratory requirements for Histopathology & Cytology, Equipments - Microscope, Microtome, Staining Methods,

Museum Techniques. Coagulation Studies, Hemostasis, Coagulation, Testing of blood coagulation, Quality Assurance for routine Hemostasis.

11. Systemic Bacteriology, Mycology & Virology: Systemic Bacteriology: Morphology, cultural characteristics, biochemical reaction, pathogenesis/disease caused & lab diagnosis. Mycology - Morphology and Structure of fungi, Lab diagnosis of fungal Infections - Opportunistic fungal infections. Virology - General characters of viruses, Lab diagnosis of viral infections.
12. Quality Laboratory Management & Automation: Continuous flow analyzers, Multi channel flow analyzers, Discrete auto analyzers, Batch analyzers, Random access analyzers (RAA). Total quality management framework, Quality laboratory processes, Quality assurance, Quality assessment, Quality control, Quality planning and Quality improvement, External quality control. Current trends in laboratory accreditation, ISO certificate, West guard Rules.
13. Biomedical Instrumentation: Fundamental of Medical Instrumentation, Bioelectric Potential and Electrodes, Bio-Transducer, Sensors.