

GROUP CODE: BT

BIOTECHNOLOGY

Max: 100 Marks

UNIT 1 - CHEMISTRY

Atomic structure, Modern periodic table, types of chemical bonds, hybridization and types. Chemical kinetics- Rate studies, order of a reaction, chemical equilibrium, concepts of electrolyte, electrolysis, theories of acids & bases, pH, buffers and catalyst. Organic chemistry: classification and nomenclature. Aliphatic, aromatic hydrocarbons and alcohols - Properties, preparation, uses **1X5=5Marks**

UNIT 2 - BIOCHEMISTRY

Isomerism, Structure, classification and properties of carbohydrates, amino acids peptides, lipids and nucleic acids. Metabolism of carbohydrates and proteins. Bioenergetics - Energy flow cycle, Energy conversion, High energy compounds. **1X6=6Marks**

UNIT 3-CELLBIOLOGY

Prokaryotes and eukaryotes- Cell structure and organelles, cell cycle, cell division, chromosomes, Mendelian Laws, mutation, karyotype, inherited disorders. **1X5=5Marks**

UNIT 4 - UNIT OPERATION

Unit systems, Sedimentation, Settling, Mixing, Conduction, Convection, radiation, Evaporation, Diffusion, Drying, Absorption, Adsorption & Desorption, properties of fluid, pressure measurements, loss of energy, valves, pumps, Industrial and Production management **1X5=5Marks**

UNIT 5 - MOLECULAR BIOLOGY & GENETIC ENGINEERING

Roles of Enzymes in genetic engineering, DNA Replication & Repair, transcription and translation in prokaryotes and eukaryotes. Gene Regulation, recombinant DNA technology, Gene transfer techniques **1X8=8Marks**

UNIT 6 - BIO-PHYSICAL TECHNIQUES

Electrical quantities & units, pH meter, Colorimeters & Spectrophotometers, chromatographic techniques, electrophoretic techniques **1X5=5Marks**

UNIT 7 – MICROBIOLOGY

Microscopy, Bacteria, Fungus, Viruses, Sterilization and Disinfectants, Stains and Staining techniques, Antibiotics, Microbial genetics **1X7=7Marks**

UNIT 8 – AGRICULTURAL AND ENVIRONMENTAL BIOTECHNOLOGY

Interactions among microorganisms & plants, Biological Nitrogen Fixation, Biofertilizers and Biopesticides, Antisense RNA technology, Termination gene technology, Pollution of air, water & soil. Waste water treatment technology, Bioremediation

1X7=7Marks

UNIT 9 – IMMUNOLOGY

Types of immunity, immune response, antigens, Antibodies, Antigen - Antibody reaction, Vaccines

1X6=6Marks

UNIT 10 - FERMENTATION TECHNOLOGY

Market Potential of Fermentation Products, Recovery Cost, Design of Fermentor – aseptic operation and containment, body construction, parameters to be monitored and controlled in fermentation process, microbial growth, Reaction kinetics, Control of bioreactor. Antibiotic Fermentation, Anaerobic Fermentation, production of Enzymes, Monoclonal antibodies, Insulin, Erythropoietin, Interferon.

1X7=7Marks

UNIT 11 - FOOD AND DAIRY TECHNOLOGY

Microbiological analysis milk, Food chemistry, Food spoilage and Food poisoning, Preservation techniques, Production & applications of Yogurt, Cheese, SCP, Probiotics, Nutraceuticals

1X7=7Marks

UNIT 12 - BIOPHARMACY

Drug of natural origin, pharmaceutical aids, Extraction of drug, pharmacological classification of drugs and its mode of action, Routes of administration of drugs , ADME mechanism, pharmaceutical dosage forms, Quality control, storage and stability of pharmaceutical, biotech and herbal products, Analysis of pharmaceuticals, Manufacturing process of Oral Liquids, Tablets, Capsules, sera and toxoids, Ointments & Injectables

1X8=8Marks

UNIT 13 - BIOPROCESS PRINCIPLES AND CALCULATIONS

Recommendations for use of units, Concept and problems on Atomic mass, molar mass and Mole, composition of mixtures and Solutions, concentrations, Distillation, Evaporation, absorption, Extraction, Drying, Filtration, Mixing/Blending and Crystallization. Problems on Material Balances involving chemical reactions, heat of reaction, formation and combustion.

1X5=5Marks

UNIT 14 - UPSTREAM AND DOWNSTREAM PROCESS TECHNOLOGY

Plant Cell, Animal Cell & Microbial Cell culture techniques, Primary Separation Techniques, Product Separation Techniques, Product Recovery

1X8=8Marks

UNIT 15 – ENZYMOLOGY

Characteristics of enzymes, Classification and nomenclature of enzyme, Concept of holo-enzyme, apo-enzyme, coenzyme & cofactor , Isozymes, Ribozymes, Abzymes, Enzyme specificity , Lock and key, Induced fit theory and Transition state, Isolation of enzymes , Purification of enzymes - Separation based on Solubility, Separation based on molecular size, Separation based on charge, Separation based on specific interaction with other bio molecules, Separation based on Hydrophobic interaction, HPLC, Assay of enzyme activity- Colorimetric, Spectrophotometric, Fluorimetric, Chemiluminescent, Radiometric assays. Immobilization of enzyme. Industrial Applications of Enzymes used in food, dairy, leather, wool industry & in Medical fields, Biosensors.

1X8=8Marks

UNIT 16 – BIOINFORMATICS

Bioinformatics Definition & concept, Sequence retrieval from Nucleotide databases Sequence retrieval from Protein databases, FASTA, BLAST, Sequence alignment: Single sequence alignments, multiple sequence alignments, Restriction analysis using tool Protein Interaction studies & Visualization of 3D Structure of Protein – Rasmol.

1X3=3Marks