

BIO – TECHNOLOGY

1. **Basic Industrial Biotechnology:** Production Strains, Production media, Types of Media, Carbon, Nitrogen Sources, Biopesticides, Biofertilizers.
2. **Bio-Physics:** Bio-Physics and Cell doctrine, Cell theory and Atomic theory, types of microscopes, Biological membranes, Applications of Bio-Physics.
3. **Genetics and Cell Biology:** Mendelism and its variations, Linkage, Cell division, Chromosome Structure, Chromosome Aberrations, Genetic mechanism of Sex Determination, Sex-Linked genes, holandric genes.
4. **Microbiology:** Classification of Micro Organisms, Nutrition in Micro Organisms, Growth
- measurement of microbial growth, culture media, synthetic complex media, Importance and isolation of pure cultures and primary stock cultures, preservation of cultures, control of micro organisms, dis-infection and sterilization methods, chemical agents, physical agents, different classes of disinfections.
5. **Bio-Reactor Engineering:** Classification of bioreactors, Energy balance of bioreactors, selectivity and optimization of bioreactors, design and analysis of bioreactors, introduction to microprocessors and their applications in bioreactors control, safety regulations and decontamination procedures practiced in the operation of bioreactors.
6. **Molecular Biology - Genetic Engineering:** Nucleic acids - Structure of DNA, RNA, replication of DNA, Organisation of nuclear genome, gene numbers, essential and non-essential genes, charge ff rule, one gene, one enzyme hypothesis - Phenyl ketonuria, alkaptonuria and albinism, protein synthesis, applications of Genetic Engineering.
7. **Plant Bio-Technology:** Tissue culture, techniques, application of plant tissue culture, protoplast technology - isolation, culture of protoplasts, regeneration of cell wall and callus formation - protoplast fusion. Genetic engineering through plasmids, Ti Plasmid, gene transfer in plants - Symbiotic N₂ fixation, plant protection, applications - methods.
8. **Animal Bio- Technology:** Animal cell and tissue culture, Animal organ culture techniques
- Advantages - Limitations and applications, production of transgenic animals by microinjection, future prospects of transgenesis, Cell culture products.
9. **Bio-Informatics:** Bio-Informatics in biology and medicine, bio-molecules and bio-polymers, genome analysis.
10. **Enzyme Engineering:** Classification of Enzymes, Applications, Physical and Chemical techniques for enzyme immobilization - advantages and disadvantages of immobilization techniques. Structure of Enzymes - Primary and secondary structure and peptide bond.

MODEL QUESTIONS

1. Which of the following is not a source of inorganic nitrogen for industrial microbes
 2. Ammonium sulphate
 3. Diammonium hydrogen phosphate
 4. Ammonia
 5. Proteins

2. Sulphite waste liquor is a by-product of
 1. Sugar industry
 2. Dairy industry
 3. Leather industry
 4. Paper industry

3. Which of the following is used as an antifoaming agent in fermenters
 1. Methanol
 2. Silicone compounds
 3. Ethanol
 4. PEG

4. Which among the following is not a part of fermentation process
 1. Propagation step
 2. Downstream processing
 3. Pilot scale fermentation
 4. Main production fermentation

5. Which among the following is the cheapest source of carbon for industrial fermentations
 1. Sucrose
 2. Molasses
 3. Glucose
 4. Fructose

6. Peptones are prepared by acid or enzyme hydrolysis of
 1. High lipid material
 2. High carbohydrate material
 3. High sugar material
 4. High protein material