Biotechnology Class 12 Syllabus

Exam Structure

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| **Units** | **Topics** | **Marks** |
| Unit V | Protein and Gene Manipulation | 40 |
| Unit VI | Cell Culture and Genetic Manipulation | 30 |
|  | Practicals | 30 |
|  | **Total** | **100** |

Unit V: Protein and Gene Manipulation

**Chapter-1: Recombinant DNA Technology**

Introduction; Tool of rDNA Technology; Marketing Recombinant DNA; Introduction of Recombinant DNA into Host Cells; Identification of Recombinants; DNA Library; DNA Probes; Hybridization Techniques; Polymerase Chain Reaction (PCR); DNA Secquencing; Site-directed Mutagenesis

**Chapter-2: Protein Structure and Engineering**

Introduction to the World of Proteins; 3-D Shape of Proteins; Structure-Function Relationship in Proteins Purification of Proteins; Characterization of Proteins; Protein based Products; Designing Proteins (protein engineering)

**Chapter-3: Genomics and Bioinformatics**

Introduction; Genome Sequencing Projects; Gene Prediction and Counting; Genome Similarity, SNPs and Comparative Genomics; Functional Genomics; Proteomics; History of Bioinformatics; Sequences and Nomenclature; Information Sources; Analysis using Bioinformatics Tools

Unit VI: Cell Culture and Genetic Manipulation

**Chapter-1: Microbial Culture and Applications**

Introduction, Microbial culture techniques, Measurement and kinetics of microbial growth, Scale up of microbial process, Isolation of microbial products, Strain isolation and improvement, Applications of microbial culture technology, Biosafety issues in microbial technology

**Chapter-2: Plant Cell Culture and Applications**

Introduction; Cell and Tissue Culture Techniques; Applications of Cell and Tissue Culture; Gene Transfer Methods in Plants; Transgenic Plants with Beneficial Traits; Biosafety in Plant Genetic Engineering

**Chapter-3: Animal Cell Culture and Applications**

Introduction, Animal cell culture techniques, Characterisation of cell lines, Methods of gene delivery into cells, Scale-up of animal culture process, Applications of animal cell culture, Stem cell technology, Tissue engineering

Practicals

1. Use of special equipment in biotechnology experiments.
2. Isolation of bacterial plasmid DNA
3. Detection of DNA by gel electrophoreses
4. Isoloation of Genomic DNA (CTAB method)
5. Estimation of DNA
6. Bacterial transformation using any plasmid
7. Restriction digestion of plasmid DNA & its analysis by gel electrophoreses
8. Isolation of bacterial grom curd & staining of bacteria
9. Cell viability assay
10. Data retrieval and data base search using internet site NCBI and download a DNA and protein sequence from internet, analyse it and comment on it
11. Reading of a DNA sequencing gel to arrive at the sequence
12. Project work