Biotechnology

CLASS XII (2018-19)

(THEORY)

COURSE STRUCTURE

One Paper **Max. Marks 70+30**

Time: 3 hrs.

Units		No. of Periods	Marks
Unit V	Protein and Gene Manipulation	**100**	**40**
Unit VI	Cell Culture and Genetic Manipulation	**80**	**30**
	Practicals	**60**	**30**
	Total	**240**	**100**

One paper **Time: 3 hrs.**

Total Marks : 70 **180 Periods**

Unit-V Protein and Gene Manipulation **40 Marks** **100 Periods**

Chapter-1: Recombinant DNA Technology

Introduction, Tool of rDNA technology, Making rDNA, Introduction of recombinant DNA into host cells, Identification of Recombinants, Polymerase Chain Reaction (PCR), Hybridization Techniques, DNA Library, DNA Sequencing, 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, Proteomics 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 **30 Marks** **80 Periods**

Chapter-1: Microbial Cell Culture and its Applications

Introduction, Microbial Nutrition and 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 of Transgenic Plants

Chapter-3: Animal Cell Culture and Applications

Introduction, Animal Cell Culture Techniques, Characterization 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 **30 Marks** **60 Periods**

Note: Every student will be required to do the following experiments during the academic session.

1. Use of special equipment in biotechnology experiments
2. Isolation of bacterial plasmid DNA
3. Detection of DNA by gel electrophoreses
4. Isolation 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 electrophoresis
8. Isolation of bacteria from 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, analyze it and comment on it
11. Reading of a DNA sequencing gel to arrive at the sequence
12. Project work

Scheme of Evaluation :

Time: 3 Hours **Max. Marks 30**

The scheme of evaluation at the end of the session will be as under:

A	Two experiments	6+6 (only one computer based practical)
	Practical record	04
	Viva on Practicals	04
B	Project work	
	Write up	05
	Viva on project	05
	Total	30

Prescribed Books:

1. **A Text Book of Biotechnology -** Class XI : Published by CBSE, New Delhi
2. **A Laboratory Manual of Biotechnology -** Class XI : Published by CBSE, New Delhi
3. **A Text Book of Biotechnology -** Class XII : Published by CBSE, New Delhi
4. **A Laboratory Manual of Biotechnology -** Class XII : Published by CBSE, New Delhi

BIO TECHNOLOGY (CODE - 045)
QUESTION PAPER DESIGN
CLASS –XI & XII (2018–19)

Time 3 Hours **Max. Marks: 70**

S. No.	Typology of Questions	Very Short Answer (VSA) (1 mark)	Short Answer-I (SA-I) (2 marks)	Short Answer-II (SA-II) (3 marks)	Long Answer (L.A.) (5 marks)	Total Marks	% Weightage
01	Knowledge Based	2	**1**	**2**	**1**	**15**	**22%**
02	Conceptual Understanding (Application and Reasoning based)	**3**	**4**	**8**	**1**	**40**	**57%**
03	Higher Order Thinking Skills (HOTS)	**1**	**2**	**--**	**--**	**05**	**07%**
04	Skill Based	**--**	**1**	**1**	**1**	**10**	**14%**
	Total	**6**	**8**	**11**	**3**	**70**	**100%**

Total No. of questions = 28

1. No chapter wise weightage. Care to be taken to cover all the chapters.

2. *The above template is only a sample. Suitable internal variations may be made for generating similar templates keeping the overall weightage to different form of questions and typology of questions same.*