

CLASS XII (2017-18)
(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, Tools of Recombinant DNA technology, Making Recombinant DNA, 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 culture techniques, Measurement and kinetics of microbial growth, Scale-up of microbial process, Isolation of microbial products, Strain isolation, improvement and Preservation, 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, 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

30 Marks 60 Periods

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

List of Experiments

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 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

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 XII : Published by CBSE, New Delhi
2. A Laboratory Manual of Biotechnology - Class XII : Published by CBSE, New Delhi

BIOTECHNOLOGY (CODE - 045)
QUESTION PAPER DESIGN
Class - XII (2017-18)

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

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