CLASS XII (2016-17)
(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
	Practical	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 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 Culture and 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 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 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. Restriction digestion of plasmid DNA and its analysis by gel electrophoresis
2. Bacterial transformation using any plasmid
3. Sterilization techniques
4. Preparation of bacterial growth medium
5. Isolation of bacteria from curd and staining of bacteria
6. Determination of bacterial growth curve
7. Cell viability assay
8. Data retrieval and data base search using internet site NCBI
9. Download a DNA and protein sequence from internet, analyse it and comment on it
10. Reading of DNA sequencing gel to arrive at the sequence
11. 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

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.

BIOTECHNOLOGY (CODE - 045)
QUESTION PAPER DESIGN
CLASS XII (2016-17)

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	2	2	--	12	17%
02	Conceptual Understanding	--	1	3	1	16	23%
03	Application Based and Inferential type	1	2	3	--	14	20%
04	Reasoning Based	2	2	1	1	14	20%
05	Skill Based	1	1	2	1	14	20%
	Total	**6**	**8**	**11**	**3**	**70**	**100%**

Total No. of questions = 28

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