

S. S. JAIN SUBODH P. G. (AUTONOMOUS) COLLEGE, JAIPUR
Assignment October-2026
Programme-M.Sc. Biotechnology Semester I
Paper-I (Cell Biology)

Max Marks 30

Instructions for Students: Assignment consists of 8 questions. Students are required to attempt **4 Questions** (1 from each unit). Write answers in at least 500 words with good presentation. **Each question carries 7.5 marks.**

UNIT-I

Q.1 Write a detailed note on prokaryotic versus Eukaryotic cell organization and evolution of cells 7.5

OR

Write detail note on the following:

- (a) Yeast for cell cycle study

UNIT-II

Q.2 Explain the role of membrane in Electron Transport Chain. 7.5

OR

Write Detail note on the following:

- (a) Gated and non-gated channels

UNIT-III

Q.3 Write detail note on G-protein coupled receptors-structure and mechanism. 7.5

OR

Explain the following:

- (a) Role of signaling in cell growth and proliferation

UNIT-IV

Q.4 Differentiated cells and maintenance of tissues. 7.5

OR

Write short note on the following:

- a. Apoptosis and Programmed Cell Death in development

S. S. Jain Subodh P.G. College, Jaipur (Autonomous)
Assignment Oct. 2026
Programme-M.Sc. Biotechnology (Semester I)
Paper-II (Genetics)

M.M. 30

Instructions for students: Attempt any four questions, selecting at least one question from each unit. Write answers in at least 500 words with good presentation. Each question carries 7.5 marks.

UNIT-I

Q.1 Define Gene frequency. Discuss various factors affecting gene frequency.

OR

Q.2 Write short note on the following:

- (a) Artificial Selection
- (b) Assortative mating

UNIT-II

Q.2 Define the Hardy Weinberg Principle and explain it with suitable example?

OR

Write short note on the following:

- (a) Molecular Evolution
- (b) Evolution of Genomes

UNIT-III

Q.3 Define the component of phenotypic variation and genetic models for quantitative traits.

OR

Write short note on the following:

- (a) Johanssen pure line theory
- (b) RAPD

UNIT-IV

Q.7 Explain concept and organization of Genetic material in Animal (*Coenorhabditiselegans*).

OR

Q.8 Write short note on the following:

- (a) Pseudoalleles
- (b) Pedigree analysis

S.S.JAIN SUBODH P.G.COLLEGE, JAIPUR

Assignment Oct. 2026

Programme: M.Sc. Biotechnology Sem. I

Paper: III (Microbiology)

Total Marks: 30

Instructions: **Instructions for Students:** Assignment consists of 8 questions. Students are required to attempt **4 Questions** (1 from each unit). Write answers in at least 500 words with good presentation. Each question carries 7.5 marks.

Unit-I

Q.1 Explain the general characteristics and various morphology of Virus. 7.5

OR

Q.2 Write a detail notes on the Archaea cell and composition.

Unit-II

Q.3 Describe the various methods of Microbial cultivation? 7.5

OR

Q.4 Write notes on the metagenomics of non-cultivated microorganisms

Unit-III

Q.5 Discuss the transposable phages of mu and their genetic organization. 7.5

OR

Q.6 Explain the bacterial recombination?

Unit-IV

Q.7 Explain the carbon and electron pathway of Bacterial photosynthesis? 7.5

OR

Q.8 Write a notes on energy conservation of chemolithotrophic bacteria.

S.S. Jain Subodh P.G. College, Jaipur (Autonomous)
Assignment October-2026
Programme: M.Sc. Biotechnology Semester I
Paper IV-Elective Paper of Group A (Analytical Techniques)

M.M. 30

Instructions for Students: Assignment consists of 8 questions. Students are required to attempt **4 Questions** (1 from each unit). Write answers in at least 500 words with good presentation. Each question carries 7.5 marks.

UNIT-I

Q.1 What is Optical microscopy and its types? Draw well labelled ray diagrams for the 5 optical microscopic techniques.

OR

Differentiate Transmission electron microscopy (TEM) and Scanning Electron Microscopy (SEM) in terms of their principle, mechanism, components, and applications with suitable diagrams.

UNIT-II

Q.2. Explain the principle of chromatography. Discuss the principle, instrumentation and applications of HPLC with well labelled diagrams.

OR

Discuss the principle, instrumentation and applications of density gradient centrifugation.

UNIT-III

Q.3. What is Isoelectric Focusing? Explain its principle, mechanism and applications with suitable diagrams.

OR

What is electrophoretic mobility? Discuss the various factors affecting electrophoretic mobility.

UNIT-IV

Q.4. Differentiate colorimeter and spectrophotometer in terms of their principle, instrumentation and applications with well labelled diagrams.

OR

Explain the principle, instrumentation, and applications of X-ray crystallography in studying macromolecular structures.

S.S. Jain Subodh P.G. College, Jaipur(Autonomous)
Assignment October-2026
Programme: M.Sc. Biotechnology Semester III
Paper I (Genetic Engineering and System Biology)

Instructions for Students: Assignment consists of 8 questions. Students are required to attempt 4 Questions (1 from each unit). Write answers in atleast 500 words with good presentation. Each question carries 7.5 marks.

M.M. 30

UNIT-I

Q.1 Why are forward and reverse primers required for exponential amplification in PCR? Give a detailed explanation with suitable diagrams.

OR

What is recombinant DNA technology? Outline the essential steps involved in gene cloning, with suitable diagrams.

UNIT-II

Q.2. Differentiate the construction of genomic and cDNA libraries. Which would you use to obtain a protein coding sequence from a eukaryotic organism and why?

OR

Discuss the factors affecting expression of cloned gene in *E. coli* in reference to promoter strength, inducible promoters and codon usage.

UNIT-III

Q.3. Explain targeted gene replacement and different methods. Describe how homologous recombination can be used to replace a specific gene with a desired DNA sequence.

OR

Explain why *Saccharomyces cerevisiae* is a preferred host for cloning. Describe yeast vectors and their applications.

UNIT-IV

Q.4. Describe Systems Biology. Explain the measurements for systems biology and system behaviour analysis.

OR

What is metabolic engineering? Explain their components, characteristics and methods of metabolic characterization with the help of example.

S. S. JAIN SUBODH P. G. (AUTONOMOUS) COLLEGE, JAIPUR
Assignment Oct. 2026
Programme- M.Sc. Biotechnology (Semester III)
Paper-II (Animal Biotechnology)

Max Marks 30

Instructions for Students: Assignment consists of 8 questions. Students are required to attempt 4 Questions (1 from each unit). Write answers in atleast 500 words with good presentation. Each question carries 7.5 marks.

UNIT-I

Q.1 Application of animal cell culture in biotechnology and vaccine production.7.5

OR

Write a note on origin and instability of animal cells

UNIT-II

Q.2 Write detail note on transformation and development of continuous cell line.7.5

OR

Write detail note on standardization of culture conditions.

UNIT-III

Q.3 Write a detailed note on induced pluripotent stem cells and their application in regenerative medicines. 7.5

OR

Write detail note on phenotype stages of differentiation.

UNIT-IV

Q.4 Describe the methods for production of recombinant protein by animal bioreactors. 7.5

OR

Write short note on CRISPER Cas9.

S.S.JAIN SUBODH P.G.COLLEGE, JAIPUR
Assignment Oct.2026
Programme: M.Sc. Biotechnology Sem. III
Paper: III (Seminar, Scientific Writing & PowerPoint Presentation)

Max Marks: 30

Instructions: **Instructions for Students:** Assignment consists of 8 questions. Students are required to attempt **4 Questions** (1 from each unit). Write answers in at least 500 words with good presentation. Each question carries 7.5 marks.

Unit-I

Q.1 Explain the importance of scientific communication in research. Discuss the structure of a Abstract, emphasizing the importance in scientific communication.

OR

Q.2 Write a detail notes on the following:

a) Key components of writing scientific paper.

Unit-II

Q.3 Describe the differences between research articles, review papers. How can one avoid common grammatical errors and improve sentence structure in scientific papers?

OR

Q.4 Write notes on the importance of presenting data clearly using tables, graphs, and figures in scientific writing.

Unit-III

Q.5 Discuss Principles of Effective Presentation.

OR

Q.6 How to complement data presentation?

Unit-IV

Q.7 How to refine both scientific writing and presentation skills on the basis of feedback of audiences?

OR

Q.8 Write a notes on preparing content according to time constraints and prioritizing key messages.

S. S. Jain Subodh P.G. College, Jaipur(Autonomous)
Assignment Oct. 2026
Programme-M.Sc. Biotechnology (Semester III)
Paper-IV Elective 3 (Bioinformatics and Biostatistics)

Max Marks 30

Instructions for students: Attempt any **four** questions, selecting at least one question from each unit. Write answers in at least 500 words with good presentation. Each question carries **7.5** marks.

UNIT-I

Q.1 Define Bioinformatics? Discuss various applications of Bioinformatics in relation to Biotechnology.

OR

Q.2 Write short note on the following:

(a) BLAST

UNIT-II

Q.3 Define Databases? Write detail note on primary, secondary and composite databases.

OR

Q.4 Write short note on the following:

(a) Comparison of bacterial genome

UNIT-III

Q.5 Define pharmacognosy? Explain protein drug interaction with its mechanism and suitable diagram.

OR

Q.6 Write short note on the following:

(a) Molecular phylogeny and evaluation

UNIT-IV

Q.7 Define frequency distribution? Write detail note on graphical representation of data.

OR

Q.8 Write short note on the following:

(a) Correlation