

**S. S. JAIN SUBODH P. G. (AUTONOMOUS) COLLEGE, JAIPUR**

**Assignment October-2025**

**M.Sc. Biotechnology Semester I**

**Paper-I (Cell Biology)**

**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 DNA and RNA as genetic material.

OR

Write detail note on the following:

(a) Role of viruses in understanding molecular cell biology.

**UNIT-II**

Q.2 Explain the structure and functions of plasma membrane. Describe in detail the  $F_0$ - $F_1$  ATP synthase complex and its role in ATP production.

OR

Write Detail note on the following:

(a) ABC proteins and their role in lipid transport.

**UNIT-III**

Q.3 Write detail note on signal transduction process and role of signaling molecules.

OR

Explain the following:

(a) G-protein coupled receptors (GPCR)

**UNIT-IV**

Q.4 Write in detail about genesis of body plan in *C. elegans*.

OR

Write short note on the following:

a. Cell diversification in the early embryo

**S. S. Jain Subodh P. G. College, Jaipur (Autonomous)**  
**Assignment Oct 2025**  
**M.Sc. Biotechnology (Semester I)**  
**Paper-II (Genetics)**

**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 Define Gene frequency. Discuss various factors affecting gene frequency.

OR

Q.2 Write short note on the following:

- (a) Artificial Selection

**Unit -II**

Q.3 What is Multiple allele. Explain in detail about multiple allele with example.

OR

Q.4 Write short note on the following:

- (a) Random mating population

**Unit -III**

Q.5 What are Molecular Markers? Explain RFLP in detail with suitable diagram.

OR

Q.6 Write short note on the following:

- (a) AFLP

**Unit -IV**

Q.7 Explain concept and organization of Genetic material in plant (*Arabidopsis thaliana*).

OR

Q.8 Write short note on the following:

- (a) Banding techniques

**S.S. Jain Subodh P.G. College, Jaipur (Autonomous)**  
**M.Sc. Biotechnology Semester I**  
**Paper III (Microbiology)**  
**Assignment October-2025**

**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 in detail structure of Archaea cell with the help of diagram.

**OR**

Write the detail note on various types of virus capsid.

**UNIT-II**

**Q.2.** Explain the Microbial Growth and its kinetics

**OR**

Write the detail note on chemotherapeutics.

**UNIT-III**

**Q.3.** Explain the Methods of cell separation, disruption, product recovery and purification.

**OR**

Give a detailed explanation of upstream processing.

**UNIT-IV**

**Q.4.** Explain the Antibiotic production and its modification.

**OR**

Write an essay on MEOR

**S.S. Jain Subodh P.G. College, Jaipur (Autonomous)**  
**M.Sc. Biotechnology Semester I**  
**Paper IV of Group A (Analytical Techniques)**  
**Assignment October-2025**

**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 in detail the various steps involved in sample preparation for electron microscopy.

**OR**

Name and draw well labelled ray diagrams for the 5 optical microscopic techniques.

**UNIT-II**

**Q.2.** Explain the principle, instrumentation and applications of density gradient centrifugation.

**OR**

Discuss the principle, instrumentation and applications of ion exchange chromatography with well labelled diagrams.

**UNIT-III**

**Q.3.** Explain the principle, procedure and applications of SDS-PAGE with suitable diagrams. List down the key differences between Agarose gel electrophoresis and PAGE.

**OR**

Give a detailed explanation for Isoelectric Focusing technique and give its applications.

**UNIT-IV**

**Q.4.** Explain the Beer-Lambert law with mathematical derivation. Discuss in detail the limitations of the law in real experimental conditions.

**OR**

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

**S.S. Jain Subodh P.G. College, Jaipur (Autonomous)**  
**M.Sc. Biotechnology Semester III**  
**Paper I (Genetic Engineering and System Biology)**  
**Assignment October-2025**

**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 principle and method of Sanger's dideoxy chain termination method of DNA sequencing. How does it compare with automated DNA sequencing method?

**OR**

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

**UNIT-II**

**Q.2.** Outline the steps involved in the construction of genomic and cDNA libraries. Compare their differences, advantages, and limitations.

**OR**

Explain the principle, construction, and applications of specialized vectors BACs, and YACs.

**UNIT-III**

**Q.3.** Describe the various methods of gene transfer in plants. Discuss advantages and limitations.

**OR**

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

**UNIT-IV**

**Q.4.** What are metabolic networks? Explain their components, characteristics and methods of metabolic characterization with the help of example.

**OR**

Explain the importance of metabolic engineering in biotechnology. Discuss methods for metabolic characterization at the cellular and molecular levels.

**S. S. JAIN SUBODH P. G. (AUTONOMOUS) COLLEGE, JAIPUR**

Affiliated to University of Rajasthan, Jaipur

**M.Sc. Biotechnology (Semester III)**

**(Assignment)**

**Paper-II (Animal Biotechnology)**

**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 Define animal tissue culture. Write a detailed note on the advantages and limitations of animal tissue culture. 7.5

OR

Write a note on origin and instability of animal cells

**UNIT-II**

Q.2 Write detail note on various types of media used in animal cell culture. 7.5

OR

Write detail note on Cryopreservation method and its applications

**UNIT-III**

Q.3 Explain three-dimensional cell culture and its applications in drug discovery. 7.5

OR

Write detail note on differentiation and malignancy.

**UNIT-IV**

Q.4 Describe the methods for production of transgenic animal and its applications. 7.5

OR

Write short notes on transgenic animals as models of human diseases.

**S. S. JAIN SUBODH P. G. COLLEGE, JAIPUR**  
**M.Sc. Biotechnology (Semester III)**  
**(Assignment Question Paper Oct. 2025)**

**Paper-III: Seminar, Scientific Writing & PowerPoint Presentation**

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 importance of scientific communication in research. Discuss the structure of a scientific paper, emphasizing the role of each section in conveying scientific findings clearly.

OR

Write a notes on the following:

a) Key components of writing an effective abstract.

**Unit-II**

Q.2 Describe the differences between formal and informal scientific writing. How can one avoid common grammatical errors and improve sentence structure in scientific writing?

OR

Write short notes on the following:

a) The importance of presenting data clearly using tables, graphs, and figures in scientific writing.

**Unit-III**

Q.3 Discuss how visual aids can enhance the clarity and effectiveness of a presentation.

OR

Write short notes on the following:

a) The importance of structure, clarity, and flow in a PowerPoint presentation.

**Unit-IV**

Q.4 Explain the process of preparing and delivering a seminar, focusing on how to structure content and manage time during a presentation.

OR

Write short notes on the following:

a) The role of feedback in improving scientific writing and presentation skills.

**S. S. Jain Subodh P. G. College, Jaipur (Autonomous)**  
**Assignment Oct 2025**  
**M.Sc. Biotechnology (Semester III)**  
**Paper-IV Elective paper I of Group C (Bioinformatics and Biostatistics)**

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

OR

Q.2 Write short note on the following:

(a) NCBI

**Unit -II**

Q.3 Define protein? Write detail note on protein structure prediction.

OR

Q.4 Write short note on the following:

(a) Comparison of bacterial genome with tools

**Unit -III**

Q.5 Define gene expression? Explain understanding the genetic basis of variation in gene expression with suitable diagram.

OR

Q.6 Write short note on the following:

(a) Protein microarray

**Unit -IV**

Q.7 Define central tendency? Write detail note on types of central tendency with suitable examples.

OR

Q.8 Write short note on the following:

(a) Regression