

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

M.Sc. Biotechnology (Semester I)

(Assignment Question Paper Oct. 2024)

Paper-I: Cell Biology

Total Marks: 30

Instructions: Attempt any two questions from any unit.

UNIT-I

Q.1 Explain how bacteria and yeast are used to study fundamental cellular functions, particularly in molecular biology.

OR

Write short notes on the following:

- (a) Use of *Drosophila melanogaster* in signal transduction studies
- (b) Importance of mice in studying human diseases

UNIT-II

Q.2 Describe the structure of the plasma membrane and the factors that affect membrane fluidity.

OR

Write short notes on the following:

- (a) Importance of the cytoskeleton in maintaining cell shape and membrane integrity
- (b) The significance of gated and non-gated channels in membrane transport

UNIT-III

Q.3 Explain the mechanism of signal transduction from extracellular signals to intracellular responses, highlighting the role of GPCRs.

OR

Write short notes on the following:

- (a) The role of secondary messengers in signal amplification
- (b) The role of GTP-binding proteins as molecular switches

UNIT-IV

Q.4 Explain the process of fertilization and the cellular mechanisms involved in the early development of multicellular organisms.

OR

Write short notes on the following:

- (a) Morphogenetic movements during early embryonic development
- (b) The significance of developmental control genes in *C. elegans*

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

Affiliated to University of Rajasthan, Jaipur

M.Sc. Biotechnology (Semester I)

Assignment

Paper-II (Genetics)

Attempt any two questions from any unit

UNIT-I

Q.1 Define Natural selection with examples and describe types of Natural selection.

OR

Q.2 Write short note on the following:

- (a) Assortative mating
- (b) Reproductive isolation

UNIT-II

Q.3 What is mutation. Explain in detail about Autosomal and X-linked recessive gene mutation inheritance.

OR

Q.4 Write short note on the following:

- (a) Molecular clock
- (b) Multiple allele

UNIT-III

Q.5 Explain Johannsen pure line theory with suitable diagram.

OR

Q.6 Write short note on the following:

- (a) Multiple factor hypothesis
- (b) RAPD

UNIT-IV

Q.7 Explain concept and organization of Genetic material in Animal (Coenorhabditis elegans).

OR

Q.8 Write short note on the following:

- (a) Pseudoalleles
- (b) Pedigree analysis

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Assignment Q. Paper Exam Oct. 2024

M.Sc. Biotechnology (Semester I)

Paper-III (Microbiology)

Attempt any two questions from any unit

UNIT-I

Q.1 Define microbiology? Discuss various structure and classification of Archaea cell.

OR

Q.2 Write short note on the following:

- (a) Viruses.
- (b) Prokaryotic metabolism

UNIT-II

Q.3 Write detail note on Metagenomics for non-cultivable microbes.

OR

Q.4 Write short note on the following:

- (a) Chemotherapeutics agents
- (b) Microbial Growth and its kinetics

UNIT-III

Q.5 Define Bioprocessing and Fermentation Technology? Write detail note about upstream processing.

OR

Q.6 Write short note on the following:

- (a) Methods of cell separation, disruption, product recovery and purification
- (b) Flocculation and conditioning of broth

UNIT-IV

Q.7 Define Non-fermentation processes. How will you enhance Microbial oil recovery, Explain? in detail.

OR

Q.8 Write short note on the following:

- (a) Antibiotic production and modification,
- (b) Bioleaching

S.S. Jain Subodh P.G. (Autonomous) College
M.Sc. Biotechnology (I Semester) Oct. 2024
Elective Paper I of Group A (Analytical Techniques)
Attempt any Two questions from any unit

UNIT-I

Q.1 Explain in detail the various steps involved in sample preparation for electron microscopy.

OR

Write short notes on the following:

- a. Dark field Microscopy
- b. Confocal Microscopy

UNIT-II

Q.2.What is the principle of chromatographic separation? Explain the principle, instrumentation and applications of gas chromatography.

OR

Write short notes on the following

- a. Types of centrifuges
- b. Affinity Chromatography

UNIT-III

Q.3. Explain the principle, procedure and applications of agarose gel electrophoresis and Polyacrylamide Gel Electrophoresis (PAGE).

OR

Write short notes on the following:

- a. Two-dimensional electrophoresis
- b. Isoelectric focussing

UNIT-IV

Q.4. Describe the basic principles of Nuclear Magnetic Resonance (NMR) and Electron Spin Resonance (ESR) spectroscopy.

OR

Write short notes on the following:

- a. Flame Photometry
- b. X-ray Crystallography

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M.Sc. Biotechnology III Semester Oct. 2024
Paper I (Genetic Engineering and System Biology)

Attempt any TWO questions from any unit

UNIT-I

Q.1 Explain in detail the basic steps involved in PCR. Discuss different types of PCR techniques in detail.

OR

Write short notes on the following

- a. DNA Sequencing
- b. Gene Construct

UNIT-II

Q.2. Describe the steps involved in the construction of a genomic DNA library and a c-DNA library. How do these two differ in terms of their composition and applications in molecular biology?

OR

Write short notes on the following

- a. Methods of recombinant selection and screening
- b. BAC and YAC

UNIT-III

Q.3. Explain the process of cloning in *Saccharomyces cerevisiae*. Discuss the tools and vectors commonly used for gene manipulation in *S. cerevisiae*.

OR

Explain the various techniques used for gene transfer into animal cells. What are the advantages and limitations of each method?

UNIT-IV

Q.4. Write detailed notes on metabolic control analysis (MCA) and explain its significance in understanding the control of metabolic pathways.

OR

Write short notes on the following

- a. Properties of biological systems
- b. Metabolic Network

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M.Sc. Biotechnology (Semester III). Oct.2024

(Assignment Question Paper)

Paper-II (Animal Biotechnology)

Attempt any two questions

MM= 30

UNIT-I

Q.1 Write a detailed note on history, equipment's and terminology used in animal cell culture and its advantages. 15

OR

Write short note on the following: (7.5 x 2=15)

- (a) Biology of cultured cell
- (b) Applications of animal cell culture

UNIT-II

Q.2 Write a detailed note on types of culture media used in animal cell culture. 15

OR

Write short note on the following: (7.5x2=15)

- (a) Evolution and development of continuous cell line
- (b) Cryopreservation and banking

UNIT-III

Q.3 Write a detailed note on cell line characterization, authentication and validation of cell line. 15

OR

Write short note on the following: (7.5x2=15)

- (a) Proliferation and differentiation
- (b) Three- dimensional culture

UNIT-IV

Q.4 Write a detailed note on Embryo transfer technologies in cattle and its applications. 15

OR

Write short note on the following: (7.5x2=15)

- (a) Methods of production of transgenic animals
- (b) Applications of Transgenic animals

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

M.Sc. Biotechnology (Semester III)

(Assignment Question Paper Oct. 2024)

Paper-III: Seminar, Scientific Writing & PowerPoint Presentation

Total Marks: 30

Instructions: Attempt any two questions from each unit.

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 short notes on the following:

- a) The importance of understanding scientific literature.
- b) 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) Differences between research articles, review papers, and a thesis.
- b) The importance of presenting data clearly using tables, graphs, and figures in scientific writing.

Unit-III

Q.3 What are the key principles of designing an effective PowerPoint presentation in science? 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.
- b) Strategies for maintaining audience engagement during a scientific 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) Techniques for handling audience questions confidently during a seminar.
- b) The role of feedback in improving scientific writing and presentation skills.

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

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M.Sc. Biotechnology (Semester III)

Assignment

Paper-IV Elective (Bioinformatics and Biostatistics)

Attempt any two questions from any unit

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) Pubmed
- (b) NCBI

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) PDB
- (b) Functional genomics

UNIT-III

Q.5 Define Pharmacognosy? Explain protein drug interaction with it's mechanism and suitable diagram.

OR

Q.6 Write short note on the following:

- (a) Molecular phylogeny and evaluation
- (b) Homology Modelling

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
- (b) Systematic and random sampling