

PH 501.2

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**St Aloysius College (Autonomous)  
Mangaluru**

**Semester II – P.G. Examination - M.Sc. Biotechnology**

**May/June - 2023**

**GENETIC ENGINEERING**

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**Time: 3 Hours**

**Max. Marks: 70**

**Note: Draw neat labeled diagrams/schematic sketches/structures wherever Necessary.**

**I. Write short notes on any FIVE of the following.**

**(5x3=15)**

1. Colony hybridization
2. Calcium phosphate co-precipitation
3. Primer design
4. Small non-coding RNAs
5. Ti plasmid
6. M13 vectors
7. Alkaline phosphatase
8. Linkers

**II. Write explanatory notes on any FIVE of the following**

**(5x5=25)**

9. List out the differences between cDNA library and genomic DNA library.
10. Describe the various steps involved in rDNA technology.
11. His-tag in protein purification
12. Bacterial Artificial Chromosomes
13. Radioactive gene probes and its applications
14. Principle and process of electroporation as a mode of gene transfer
15. Site specific mutagenesis
16. PacBio

**III. Answer any THREE of the following:**

**(3x10=30)**

17. Define restriction enzymes. Discuss its classifications and applications with appropriate examples.
18. With suitable illustrations, discuss the construction, screening and applications of YAC.
19. Give a detailed account on physical modes of gene transfer.
20. Describe any two methods of transcriptome analysis.
21. Discuss the working principle of PCR. Give a brief account of any two variants of PCR with their application.

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May/June - 2023

**ENZYMOLOGY**

Time: 3 Hours

Max. Marks: 70

Note: Draw neat labeled diagrams/schematic sketches/structures wherever Necessary.

**I. Write short notes on any FIVE of the following.**

**(5x3=15)**

1. Enzyme activity units
2. Classification of enzymes with example
3. Hanes plot
4. Cleland notation for Ordered Sequential mechanism
5. Sequential model of ATCase
6. Schematic representation of Chymotrypsinogen activation
7. Abzyme
8. Isozymes

**II. Write explanatory notes on any FIVE of the following**

**(5x5=25)**

9. Extraction of membrane bound enzymes
10. Acid-base catalysis
11. LB Plot
12. Ping pong reaction
13. Penicillin as suicide inhibitor
14. Blood clotting cascade – Intrinsic pathway
15. Ribozyme
16. Enzyme based biosensors

**III. Answer any THREE of the following:**

**(3x10=30)**

17. Explain the different factors affecting enzyme activity.
18. Derive Michaelis Menten equation.
19. What is a co-enzyme? Explain any two vitamin derived and two non-vitamin derived co-enzymes.
20. Give a detailed account on Uncompetitive inhibition and its kinetics.
21. Explain various enzyme immobilization methods employed.

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**Semester II – P.G. Examination - M.Sc. Biotechnology**

**May/June - 2023**

**Research Methodology, Ethics And Scientific Communication**

**Time: 3 Hours**

**Max. Marks: 70**

**Note: Draw neat labeled diagrams/schematic sketches/structures wherever Necessary.**

**I. Write short notes on any FIVE of the following. (5x3=15)**

1. Lab notebook
2. g-index
3. Primary data
4. SNIP
5. Fabrication of scientific data
6. Conflict of interest
7. Web of Science
8. Complex random sampling design

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**II. Write explanatory notes on any FIVE of the following (5x5=25)**

9. Plagiarism and its impact on scientific discoveries
10. Significant difference between basic and applied research
11. How to choose a good mentor for scientific research?
12. Importance of experimental design
13. Nonprobability sampling design and its applications
14. Different styles of citing references in scientific journals
15. What is the impact factor of the journal? How is it calculated?
16. What is open access journal?

**III. Answer any THREE of the following: (3x10=30)**

17. Explain different types of scientific reports and their importance.
18. Discuss different types of scientific databases? What is the significant impact of these databases on scientific output?
19. How to design a research problem in a scientific study?
20. Discuss the different types of data collection methods.
21. What scientific ethics need to be followed during experiments? How can it be implemented successfully?

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**May/June – 2023**

**ANALYTICAL TECHNIQUES IN BIOTECHNOLOGY**

Time: 3 Hours

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Max. Marks: 70

Note: Draw neat labeled diagrams/schematic sketches/structures wherever Necessary.

**I. Write short notes on any FIVE of the following. (5x3=15)**

1. Define the term, Curie.
2. State Beer-Lambert's law. What are its limitations?
3. Define Svedberg constant. What is its importance?
4. Give the principle for TLC
5. Define the term resolving power.
6. Give the principle for 2D electrophoresis.
7. Define partition coefficient.
8. Write a note on specimen preparation for autoradiography.

**II. Write explanatory notes on any FIVE of the following (5x5=25)**

9. Explain the principle and applications of gas chromatography.
10. Explain the working and applications of fluorescence microscope.
11. Explain the principle and working of Isoelectric focusing.
12. Write a note on the principle and applications of ion exchange chromatography.
13. Describe the working of Pulsed-field gel electrophoresis.
14. Explain the principle and working of GM Counter.
15. Explain the principle and working of UV-Visible spectroscopy.
16. Write a note on density gradient centrifugation and its applications.

**III. Answer any THREE of the following: (3x10=30)**

17. Describe the working and applications of SDS PAGE.
18. Discuss the principle and method for the separation of macromolecules using gel permeation chromatography.
19. Describe the principle, working and applications of HPLC.
20. Mention different factors affecting centrifugation and elaborate on isopycnic centrifugation.
21. Describe the instrumentation and applications of Scanning electron microscope.

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