



Avinashilingam Institute for Home Science and Higher Education for Women

Deemed to be University Estd. u/s 3 of UGC Act 1956, Category A by MHRD (now MoE)

Re-accredited with A++ Grade by NAAC. CGPA 3.65/4, Category I by UGC

Coimbatore - 641 043, Tamil Nadu, India

Master's Degree Examination – May 2025

II Semester

Class : I P.G.
Major : Bioinformatics

Time: 3 Hours
Max. Marks: 100

23MBIC10 OMICs Technology

Course Outcomes:

CO1: Outline genomics and genome database and genome browsers.

CO2: Plan experiments with the knowledge gained.

CO3: Illustrate key technologies involved in metabolomics.

CO4: Explain key technologies in proteomics.

CO5: Apply omics data in understanding and the management of disease.

Part A

10 x 1 = 10

Choose the Correct Answer

- Which of the following best describes genomics? CO1K1
 - The study of individual genes and their functions
 - The study of an organism's entire DNA, including genes and non-coding regions
 - The process of creating genetically modified organisms
 - The study of protein structures and functions
- What is the primary purpose of genome sequencing? CO1K2
 - To determine the complete DNA sequence of an organism's genome
 - To modify the genetic code of an organism
 - To compare protein structures across species
 - To analyze gene expression levels in different tissues
- Which of the following techniques is commonly used in transcriptomics to analyze gene expression? CO2K3
 - PCR (Polymerase Chain Reaction)
 - Western Blotting
 - RNA Sequencing (RNA-Seq)
 - Chromatin Immunoprecipitation (ChIP)
- How does transcriptomics contribute to understanding disease mechanisms? CO2K4
 - It identifies mutations in DNA sequences associated with diseases
 - It determines the complete amino acid sequence of proteins involved in diseases
 - It analyzes changes in gene expression patterns that may indicate disease states
 - It modifies genes to prevent the occurrence of genetic diseases
- Which analytical technique is commonly used in metabolomics to identify and quantify metabolites? CO3K3
 - X-ray Crystallography
 - Nuclear Magnetic Resonance (NMR) Spectroscopy
 - ELISA (Enzyme-Linked Immunosorbent Assay)
 - Southern Blotting
- How does metabolomics help in understanding disease mechanisms? CO3K4
 - By identifying genetic mutations linked to diseases
 - By analyzing metabolic changes associated with disease progression
 - By determining the sequence of proteins involved in diseases
 - By modifying gene expression to alter metabolic pathways
- Which technique is commonly used in proteomics to separate and analyze proteins based on their mass? CO4K4
 - Polymerase Chain Reaction (PCR)
 - Western Blotting
 - Mass Spectrometry (MS)
 - Fluorescence Microscopy
- How does proteomics contribute to disease diagnosis and treatment? CO4K3
 - By identifying protein biomarkers associated with diseases
 - By sequencing DNA to detect genetic mutations
 - By altering the genome to prevent protein malfunction
 - By converting RNA into proteins in a controlled environment

9. Which of the following best describes the purpose of integrating multi-omics data? CO5K3
- To study only the genetic variations in an organism
 - To analyze and combine data from genomics, transcriptomics, proteomics, and metabolomics for a comprehensive biological understanding
 - To focus solely on protein interactions in disease pathways
 - To replace traditional diagnostic methods with a single omics approach
10. How can integrating omics approaches enhance personalized medicine? CO5K4
- By identifying specific molecular changes unique to an individual's disease
 - By using only genomic data to predict disease outcomes
 - By replacing clinical testing with multi-omics analysis
 - By focusing only on metabolomics to understand all aspects of health

Part B

5 x 6 = 30

Answer ALL questions

Each answer should not exceed 400 words or two pages

- 11.a. Describe in brief about Hapmap project. CO1K1
(or)
- 11.b. Illustrate about Metagenomics. CO1K4
- 12.a. Explain about GEO and Array Express. CO2K2
(or)
- 12.b. Write in brief about Types of Microarrays. CO2K3
- 13.a. Write in brief about Metabolites. CO3K3
(or)
- 13.b. Give an account of Metabolomic Data analysis tool. CO3K4
- 14.a. Illustrate the Principle, technique and applications Protein Sequencing. CO4K3
(or)
- 14.b. Explain in brief about PAGE. CO4K4
- 15.a. Describe about Evolutionary genomics in brief. CO5K1
(or)
- 15.b. Discuss about integration of cancer-omics data. CO5K2

Part C

5 x 12 = 60

Answer ALL questions

Each answer should not exceed 800 words or four pages

- 16.a. Describe in detail about Genome Sequencing Strategies. CO1K1
(or)
- 16.b. Summarize about Genome assembly and annotation in detail. CO1K2
- 17.a. Explain Microarray data analysis and explain in detail. CO2K3
(or)
- 17.b. Explain about: CO2K4
- EST
 - SAGE
 - Biocart
 - GMD
- 18.a. Illustrate the principle, technique and applications of NMR. CO3K3
(or)
- 18.b. Explain in detail about the Principle, technique and applications of GC/MS. CO3K3
- 19.a. Discuss in detail about Protein-Protein interactions and the method to identify. CO4K1
(or)
- 19.b. Explain about amino acid sequence analysis. CO4K2
- 20.a. Illustrate about CRISPR and its applications. CO5K3
(or)
- 20.b. Compare and Contrast: Comparative genomics and Personal genomics with example. CO5K3
