

M.Sc. Sem.-3 Examination

504

Bio-Informatics

November-2025

Time : 2-30 Hours]

[Max. Marks : 70

Question 1: A. Discuss the role of computational ADMET (Absorption, Distribution, Metabolism, Excretion, and Toxicity) profiling in improving the drug development process. (7)

B. Describe the primary stages that constitute the in-silico drug discovery pipeline. (7)

OR

A. What are the key differences between structure-based and ligand-based drug design approaches in CADD? (7)

B. Explain virtual screening of lead compounds in detail (7)

Question 2: A. Discuss the concept of de novo drug design and elaborate on its methodology. (7)

B. Give note on molecular docking and steps involved in it. (7)

OR

A. Summarize the QSAR (Quantitative Structure-Activity Relationship) technique. (7)

B. Explain MHC class I and class II antigen presentation pathways. (7)

Question 3: A. Differentiate between pharmacogenomics and pharmacogenetics. (7)

B. Write a note on personalized medicine & explain its importance with an example. (7)

OR

A. Explain in detail about Biomarkers and its applications. (7)

B. Provide an overview of drug-metabolizing enzymes, using warfarin and CYP2C9 as examples. (7)

Question 4: A. Write a note on functional annotation and explain GO: Molecular function and GO: Biological process. (7)

B. Explain microarray technique with diagram. (7)

OR

A. Write a note on classification of microarray and its applications. (7)

B. Explain DNA methylation, Histone Modifications (7)

Question 5: Attempt any seven out of twelve. (14)

1. State Lipinski's Rule of Five and briefly explain its significance for evaluating potential orally active drug candidates.

2. Name two major online databases that are essential for retrieving information about protein drug targets and their associated pathways.

3. Differentiate between Virtual Screening (VS) and conventional High-Throughput Screening (HTS) in the context of identifying hit compounds.

4. Define force field.

5. Define Molecular Descriptors.

6. What is a pharmacophore.?

7. Define Molecular Docking.

8. What is the full form of ADMET and its importance in drug development

9. Define what is genotype and phenotype.

10. Define RNA interference or Post translational gene silencing (PTGS)

11. Write a short note on epigenetics and functional genomics.

12. Explain factors affecting differential gene expression.

