

MSc Sem.-2 Examination

410

Toxicology

May-2025

Time : 2-30 Hours]

[Max. Marks : 70

Q1A	A Researcher is working on a protein from a eukaryotic organism. After checking the Physico-chemical property of the protein using computational tools, they got the following results. Interpret the result in detail and explain what parameters should be taken care of if they want to carry an <i>in-vitro</i> experiment: Aliphatic index:54.63, GRAVY: -1.345, pI: 8.5, Instability index: 59.63, Half-life in <i>E.coli</i>: >10	7 Marks
Q1B	What is Homology Modeling? Describe its purpose and list the basic steps involved in the process and its analysis.	7 Marks
OR		
Q1A	List out the tools for homology modelling and explain the scores given by the tools.	7 Marks
Q1B	What is Molecular Docking? Explain how it helps in predicting drug and protein interactions. Write its basic workflow.	7 Marks
Q2A	What is ADMET analysis in in silico drug design? Why is it important to predict these properties early?	7 Marks
Q2B	What is the role of Molecular Dynamics (MD) in drug discovery? Explain its basic workflow.	7 Marks
OR		
Q2A	From your practical experience, explain how Homology Modeling and Molecular Docking are connected in a drug discovery workflow.	7 Marks
Q2B	How are in silico methods useful in drug design compared to in vitro experiments? Explain with simple points.	7 Marks
Q3A	Explain the principles of Good Laboratory Practice (GLP) and its significance in toxicological studies.	7 Marks
Q3B	Describe how Standard Operating Procedures (SOPS) are written and implemented in a GLP-compliant laboratory. Give examples relevant to toxicology.	7 Marks
OR		
Q3A	Describe the essential components of a study protocol and explain its importance in maintaining quality assurance in toxicological research.	7 Marks
Q3B	What are GLP audits and inspections? Discuss how they contribute to maintaining the integrity of toxicology data.	7 Marks
Q4A	Discuss the significance of maintaining confidentiality in clinical trials. How does it impact the integrity of the trial and the trust of participants?	7 Marks
Q4B	What is ALCOA+? Explain Good Documentation Practices based on ALCOA+.	7 Marks
OR		
Q4A	Describe the criteria for study design and Investigational Product As. Per USFDA, EMA and ANVISA.	7 Marks
Q4B	Describe the principle of trial risk vs. trial benefit. How does this principle influence the decision to initiate or continue a clinical trial?	7 Marks
Q5	Answer the following questions (Any Seven)	14 Marks
I	Why is it important to predict ADMET properties in silico?	2 Marks
II	What does ADMET stand for?	2 Marks

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III	How does Molecular Dynamics help in studying protein-ligand interaction?	2 Marks
IV	Name any two commonly used MD simulation tools.	2 Marks
V	What is a grid box used for in Molecular Docking?	2 Marks
VI	Name any two tools used for visualizing docking results.	2 Marks
VII	What is a master schedule in GLP?	2 Marks
VIII	Name any two responsibilities of a Study Director.	2 Marks
IX	What is the purpose of record retention in GLP?	2 Marks
X	Who is responsible for the medical decisions in a clinical trial?	2 Marks
XI	What is Original & Contemporaneous in GDP?	2 Marks
XII	What are the parameters to prove Bioequivalence?	2 Marks

BEST OF LUCK