

**Instructions:**

All questions are compulsory.

Illustrate your answers with neat diagrams wherever necessary.

**Question - 1****Write the following**

- i) State differences between Parametric vs. Non-parametric Tests. [07]
- ii) Write a note on "ANOVA" tests. And describe one-way ANOVA in detail. [07]

**OR**

- i) State differences between Correlation vs. Regression Analysis. [07]
- ii) What is data visualization? Why is it important? Give a note on different data visualization methods. [07]

**Question - 2****Write the following**

- i) Write a note on molecular docking, its importance and methodology. [07]
- ii) What is the importance of Key word in research paper? How should a researcher select and utilize them? [07]

**OR**

- i) What is the difference between molecular docking and dynamics? Explain the role of RMSD and RMSF in molecular dynamics. [07]
- ii) Write a brief note on the structure of "Result & discussion section" [07]

**Question - 3****Write the following**

- i) Briefly outline the difference between Direct IF and Indirect IF. State two major reasons why the Indirect IF method is often preferred in research. [07]
- ii) Describe the process of specimen preparation for light microscopy. [07]

**OR**

- i) Describe the process of specimen preparation in electron microscopy. [07]
- ii) What is negative staining? How is it different from normal sample preparation for TEM? [07]

**Question - 4****Write the following**

- i) What do you mean by inoculum media and fermented media? Discuss various nitrogen sources used for preparing industrial fermentation media [07]
- ii) What is fermentation? Discuss range of fermentation products. [07]

**OR**

- i) Describe fermentation in brief and discuss any three range of fermentation product and process [07]
- ii) What do you mean by medium formulation? Discuss various Carbon sources used for preparing industrial fermentation media [07]

**Question - 5****Attempt any seven out of twelve****[14]**

- i What is IQR? In which data chart is IQR used?
- ii What is a p-value? What is the commonly used significance level for determining if a result is statistically significant?
- iii Briefly define skewness and kurtosis.
- iv What is theoretical pI? How it is important?
- v What is docking score?
- vi Give example of any two tools used in spell check process of research writing.
- vii What is the essential physical requirement for a specimen to be viewed under a TEM?
- viii What is vitrification in cryo-EM?
- ix What is the purpose of fixation (e.g., using formalin) in the preparation of tissue for light microscopy?
- x What are Secondary metabolites? Give two examples.
- xi Write the application of amylase enzyme.
- xii Give four examples of carbon sources used in industrial fermentation medium.

—X—