

M.Sc. DEGREE EXAMINATION NOVEMBER 2022
BIOINFORMATICS
FIRST SEMESTER

COURSE : ELECTIVE
PAPER : BIOMATHEMATICS AND BIOSTATISTICS
TIME : 3 HOURS

MAX. MARKS: 100
(20x1=20)

SECTION A

ANSWER ALL QUESTIONS.

1. What are the different types of Set operations?
2. Define Set Theory.
3. Write the Cartesian Product of A and B; if $A = \{1, 2\}$ and $B = \{3, 4, 5\}$.
4. Find $\begin{bmatrix} 6 & 8 \\ 8 & 5 \end{bmatrix} - \begin{bmatrix} 4 & 9 \\ 3 & 8 \end{bmatrix}$
5. Define domain and range.
6. Comment on Linear Functions.
7. What is student t test?
8. Is $A \times B = B \times A$? if $A = \{1, 2, 3, 4\}$ and $B = \{5, 7, 9\}$.
9. Define frequency.
10. What is binomial distribution explain with an example?
11. Write the formula for permutation?
12. Find $P(A \cup B)$. If $P(A) = \frac{1}{2}$ and $P(B) = \frac{1}{3}$.
13. What are the three important diagrammatic presentation of data?
14. Define categorical data.
15. Compare Discrete and Continuous Data.
16. Find mode $\{12, 4, 2, 4, 3, 5, 2, 12, 10, 12, 10, 20, 15\}$
17. Write the types of cluster sampling?
18. Comment on goals of null hypothesis tests.
19. Define Multiple linear regression.
20. Write the Hardy–Weinberg principle?

SECTION B

ANSWER ANY FOUR QUESTIONS

(4x10=40)

21. In a survey of university students, 64 had taken mathematics course, 94 had taken chemistry course, 58 had taken physics course, 28 had taken mathematics and physics, 26 had taken mathematics and chemistry, 22 had taken chemistry and physics course, and 14 had taken all the three courses. Find how many had taken one course only by VENN Diagram method.
22. Discuss about different types and properties of Set operations.
23. Find the inverse of the matrix $M = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 4 \\ 5 & 6 & 0 \end{bmatrix}$
24. Compare Nonlinear Function and Linear function. Also write the characteristics, graph, formula and table of Linear function $y=3x-2$.
25. State and prove Addition Theorem of probability.

26. (a) Consider the following grouped frequency distribution and calculate the mean and standard deviation.

Daily wages (in ₹)	Number of workers
150-160	5
160-170	8
170-180	15
180-190	10
190-200	2

27. Elaborate the step-by-step procedure to perform One-way analysis of Variance

SECTION C

ANSWER ANY TWO QUESTIONS

(2x20=40)

28. (a) Write down the matrix AB and BA. State whether AB Equal to or not equal to BA?

$$\text{If } A = \begin{bmatrix} 1 & -2 & 1 \\ 2 & 1 & 3 \end{bmatrix} \text{ and } B = \begin{bmatrix} 2 & 1 \\ 3 & 2 \\ 1 & 1 \end{bmatrix}$$

- (b) If $A = \{ 1, 3, 5 \}$ and $B = \{ 2, 3 \}$, then Find cartesian products: (i) $A \times B$ (ii) $B \times A$ (iii) $A \times A$ (iv) $B \times B$
29. Elaborate in detail about the various types of probability distributions and its characteristics.
30. Discuss in detail about collection, classification and tabulation of data.
31. (a) Find the value of the correlation coefficient from the following table:

SUBJECT	AGE X	GLUCOSE LEVEL Y
1	43	99
2	21	65
3	25	79
4	42	75
5	57	87
6	59	81

- (b) List out the Types of Regression.
