

(FOR THE CANDIDATES ADMITTED

23UZY509

DURING THE ACADEMIC YEAR 2023-2026 ONLY)

REG.NO. :

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI

END-OF-SEMESTER EXAMINATIONS: NOVEMBER, 2025

B.Sc., ZOOLOGY(AIDED)

MAXIMUM MARKS: 75

SEMESTER - V

TIME : 3 HOURS

PART - III

23UZY509 - BIOPHYSICS AND BIOSTATISTICS

SECTION – A

(10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.

(K1)

1. The sampling method in which the whole population is divided in small clusters or groups are called_____
 - a) Purposive sampling
 - b) Quota sampling
 - c) Stratified random sampling
 - d) Systematic random sampling
2. If the standard deviation of a dataset is zero, what can you conclude about the data?
 - a) The mean is zero
 - b) All values are different
 - c) All values are equal
 - d) The variance is undefined
3. The Student's *t*-test is used to_____
 - a) Compare more than two means
 - b) Compare variances between two samples
 - c) Compare the means of two groups
 - d) Test correlation between variables
4. In all natural processes, the total entropy_____
 - a) Remains constant
 - b) Increases
 - c) Decreases
 - d) Is zero
5. The numerical aperture (NA) of a microscope objective determines_____
 - a) The focal length
 - b) The brightness of the image
 - c) The working distance
 - d) The resolving power

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES

(K2)

6. Define Caption.
7. What is called as 'Scatter diagram'?
8. What is student 't' test?
9. Define Bioluminescence.
10. Define Electrophoresis.

SECTION – B

(5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)

11. a) Differentiate between primary and secondary data.

(OR)

b) Compute mean for the following data.

Shoe size	1	2	3	4	5	6	7
No. of persons	10	10	12	8	6	4	6

12. a) Comment on the significance of measures of dispersion. Discuss the merits and demerits.

(OR)

- b) Compare and contrast correlation and regression.

13. a) List and describe the key components of hypothesis testing in statistical inference.

(OR)

- b) Explain the steps of Student's *t*-test and its uses.

14. a) Discuss the scope of biophysics in medicine and healthcare with suitable examples.

(OR)

- b) Explore the applications of bioluminescence in the field of biophysics.

15. a) State and explain the components of Compound microscope.

(OR)

- b) Elucidate the working mechanism of Polyacrylamide Gel Electrophoresis.

SECTION – C

(5 X 8 = 40 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.

16. a) With examples, illustrate the various bar diagrams of data and describe their uses. **(OR)**

- b) Calculate Mode for the following data.

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of students	4	13	15	6	8	10

17. a) Calculate the Pearson's correlation coefficient for the following data and interpret the result.

X	10	12	18	20	24
Y	30	25	45	40	50

(OR)

- b) Explain the types of regression analysis with appropriate illustrations.

18. a) In a genetic cross involving two traits, the following phenotypic data were observed in the F_2 generation:

Phenotype	Observed (O)
Round Yellow	90
Round Green	30
Wrinkled Yellow	34
Wrinkled Green	6

Use the Chi-square test to determine whether the observed data fit the expected Mendelian ratio of 9:3:3:1. At 5% level of significance, does the observed data fit the expected ratio? (table value for $df = 3$ at 5% level of significance = 7.815).

(OR)

- b) Analyze the steps involved in one-way ANOVA and explain how it is used to compare means

across multiple groups.

19. a) Explore the various types of bioluminescence. Describe them with an example of each. **(OR)**

- b) Discuss the Laws of Thermodynamics and its implications in biological energy.

20. a) Compare and contrast Scanning and Transmission electron microscope. **(OR)**

- b) Illustrate the principle and working mechanism of RT-PCR.