

U.G. 3rd Semester Examination - 2024**ZOOLOGY****[Skill Enhancement Course (SEC)]****Course Code : ZOO-SEC-T-3****(Statistical and Computational Biology)****[NEP-2020]****Full Marks : 35****Time : 1½ Hours***The figures in the right-hand margin indicate marks.**Candidates are required to give their answers in their own words as far as practicable.*

1. Answer any five of the following: 1×5=5
- a) Define DATA in statistics?
 - b) Write down two advantages of random sampling.
 - c) What is standard deviation (SD)?
 - d) Define level of significance.
 - e) What is Yates correction in statistics?
 - f) What is the function of a biological database?
 - g) Mention names of two protein databases.
 - h) Write full name of DDBJ.

[Turn Over]

2. Answer any two of the following: $5 \times 2 = 10$

- a) Calculate the arithmetic mean and mode from the given data:

2.3, 3.5, 5.1, 2.4, 5.4, 3.5, 5.7, 3.5, 1.8.

- b) Enumerate the conditions in which paired and unpaired t-test and goodness of fit test should be selected.

- c) What is BLAST? Write down the aims and scope of Bioinformatics. $2+3$

- d) i) What is the difference between sample and population?

- ii) The table below shows the marks obtained by a student in three subjects:

Subject	Marks obtained
Biology	75
Mathematics	85
Language	65

Construct a bar diagram to represent the marks obtained in three subjects. $2+3$

3. Answer any two of the following: $10 \times 2 = 20$

- a) What is PubMed? Compare Gen Bank and EMBL as sequence submission tools. How does Entrez help in data retrieval? Explain with examples the difference between positive, negative, and zero correlation. $2+2+2+4$

- b) i) Calculate the correlation coefficient between the heights of fathers in inches (X) and their sons (Y). 5

X	57	67	70	72	65	66	69	68
Y	65	68	69	71	67	56	72	72

- ii) Find the regression equation of X on Y from the following data: 5

X	10	12	16	11	15	14	20	22
Y	15	18	23	14	20	17	25	28

- c) In a cross between black and white coat-colored mice, the F_2 individual segregated into 787 black and 277 white coat-colored individuals. If you have to test that these results agree with the expected ratio 3:1. Then apply chi-square $P = 50\%$.

- d) A clinical trial was conducted to evaluate the effectiveness of two cancer drugs. Group 1 received Drug A, and Group 2 received Drug B. After a month of treatment, the following data was collected on the reduction in tumor size (in centimeters) for each patient in both groups.

Group A (drug A)	2.4	1.8	2.0	2.6	2.2
Group B (drug B)	1.6	1.5	1.7	1.9	1.4

Perform a two-sample t-test to determine if there is a significant difference in the reduction of tumor size between the two drugs, (at a significance level 0.05, df-8, critical value 2.31).