

**Ph. D. IN LIFE SCIENCES
(PHDLS)**

Term-End Examination

June, 2026

**RLS-103 : BIOSTATISTICS AND COMPUTER
APPLICATIONS IN BIOLOGICAL RESEARCH**

Time : 3 Hours

Maximum Marks : 100

Note : Attempt any *five* questions. All questions carry equal marks. Simple calculator is allowed.

1. (a) Enumerate the conditions in which
 - (i) paired and unpaired t-tests
 - (ii) parametric and non-parametric tests
 - (iii) one way and two way ANOVA tests should be selected.

6

- (b) Calculate coefficient of variation from the following data : 10

x	f
5	3
9	12
14	24
18	38
20	21
24	12
30	5

- (c) Write about scatter plots. 4

2. (a) Find correlation coefficient between X and Y : 5

X	Y
0	1
2	5
3	7
5	11

- (b) Find line of regression of X on Y : 5

X	Y
1	2
2	3
3	5
4	4
5	6

- (c) Differentiate between the following : 10

- (i) One-tailed and two-tailed test
- (ii) Chi-square test and F-test
- (iii) Histogram and Pie-Diagram
- (iv) Correlation and Regression

3. (a) Explain the following : 10

- (i) Level of Significance
- (ii) Kurtosis

- (b) Discuss the ANOVA of Randomised Block Design (RBD). 10

4. The data related to the knowledge score for 10 students is given here :

16, 14, 12, 18, 21, 22, 13, 15, 16, 18

Calculate the mean, mode, median, standard deviation and variance for the data. 20

5. (a) A sample of 20 items has mean of 42 units and standard deviation of 5 units. Test the hypothesis that it is a random sample from a normal population with mean of 45 units. 10

Given : $t_{(19)} (0.05) = 2.093$ (Test at 5% level of significance)

- (b) Discuss Wilcoxon Rank Sum test and Mann Whitney U test. 10

6. (a) Discuss the following : 10

(i) Null hypothesis

(ii) Type I and Type II errors

- (b) Enumerate the various methods of sampling and describe in detail about any *two* methods with suitable examples. 10

7. (a) Blood serum cholesterol levels of 20 patients are as follows :

250, 245, 280, 260, 240, 255, 285, 270,
263, 277, 258, 288, 290, 275, 247, 253,
265, 245, 270, 240

Find the quartiles Q_1 and Q_3 . 5

- (b) If random variable X follows normal distribution with mean 25 and standard deviation 2, then find : 10

(i) $P(X < 22)$

(ii) $P(X > 23)$

- (c) If three coins are tossed simultaneously, then find the probability of getting exactly three heads. 5

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