November 2025
M.Sc.
Third Semester
DISCIPLINE SPECIFIC ELECTIVE – 02
BOTANY
Course Code: MBOD 3.21 (A)
(Research Methodology & Biostatistics)

Total Mark: 70   *Pass Mark: 28*
Time: 3 hours

Answer <u>five</u> *questions, taking* <u>one</u> *from each unit.*

UNIT–I

1. Write a note on each of the following: 7×2=14
    (a) Objectives of research
    (b) Criteria for good research

2. Why is research fundamental in addressing issues? Discuss the types of research in detail.   5+9=14

UNIT–II

3. Write a note on each of the following: 7×2=14
    (a) PPVFR
    (b) Copyrights

4. What is India's stand on TRIPS? Discuss the merits and demerits of TRIPS.   6+9=14

UNIT–III

5. Construct an experimental design to test if providing special tutorial has an influence on performance of students in examinations. Propose null and alternative hypotheses. Explain your design with justification. What possible extraneous variables could influence the outcome and how can it be controlled?   2+2+7+3=14

6. Differentiate between probability and non-probability sampling. What are the characteristics of a good sample design? Explain any

two probability sampling methods using appropriate examples.

$$3+3+8=14$$

UNIT–IV

7. Explain the principle of the unpaired t-test mentioning when it is applied and how it differs from paired t-test. Apply t-test if a researcher measured the chlorophyll content (mg/g fresh weight) of leaves in two species of shade-tolerant plants to test whether they differ significantly in chlorophyll content. The results are given below:

    Species A ($n = 6$): 3.1, 2.8, 3.4, 3.0, 3.2, 2.9
    Species B ($n = 6$): 2.6, 2.4, 2.8, 2.5, 2.7, 2.3

(Given, critical t-value at alpha level of 0.05 is 2.228.) $6+8=14$

8. What is standard deviation and explain its importance in biological research. How does it differ from standard error? Solve the problem if a botanist measured the leaf lengths (in cm) of two species of a medicinal plant to study variability. The data are given below:

    Species X ($n = 8$): 12.1, 11.8, 12.4, 11.9, 12.2, 12.0, 11.7, 12.3
    Species Y ($n = 8$): 10.5, 11.2, 10.8, 10.7, 10.9, 11.0, 10.6, 10.8

Compute the mean and standard deviation for each species. Comment on which species shows greater variability in leaf length.

$$6+8=14$$

UNIT–V

9. Write a note on each of the following: $7×2=14$
   (a) Bibliography
   (b) Research proposal structure

10. What is a synopsis? Describe the characteristic features of a synopsis. $3+11=14$

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