



QP CODE: 25047360



25047360

Reg No :

Name :

M.Sc DEGREE (CSS) EXAMINATION, NOVEMBER 2025

Third Semester

M Sc BIOSTATISTICS

Core Course - ST020303 - APPLIED MULTIVARIATE ANALYSIS

2019 ADMISSION ONWARDS

649DB663

Time: 3 Hours

Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

Weight 1 each.

1. Define Multivariate data.
2. Write the formulae suggested for (i) regression line of X_1 on X_2 (ii) regression line of X_2 on X_1 . Briefly explain the notations.
3. Define the characteristic function of multivariate normal distribution.
4. Define Hotellings T^2 statistics . How is it related to students t statistic?
5. Discuss the test for mean vector when Σ is unknown.
6. Discuss the problem on several independent multivariate normal population.
7. What do you mean by dimension reduction techniques? Briefly explain any one of these techniques.
8. Write a short note on two way MANOVA.
9. Check whether an assigned discriminant function is sufficient or not for discriminating a population. Justify.
10. Define cluster analysis.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

Weight 2 each.

11. Discuss covariance matrix and correlation matrix. Derive the relationship between covariance matrix and correlation matrix.
12. Let $l^1 X$ follows univariate normal distribution. Find the distribution of X .
13. Explain test for symmetry.
14. Derive the characteristic function of Wishart distribution.





15. Discuss the sampling distribution of sum of squares and product matrix.
16. Illustrate Hotellings iterative method for finding Principal components.
17. Describe Fishers discriminant function for classification.
18. Briefly explain agglomerative clustering methods.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

Weight 5 each.

19. Construct MLE for the parameters μ and Σ of multivariate normal distribution $N_p(\mu, \Sigma)$.
20. Show that the one and two sample Hotellings T^2 statistic is invariant under non singular linear transformation.
21. Derive first canonical correlation and variabes.
22. Explain divisive technique of cluster analysis with suitable examples.

(2×5=10 weightage)

