25047472

QP CODE: 25047472

Reg No : .....

Name : .....

M.Sc DEGREE (CSS) EXAMINATION, NOVEMBER 2025

Third Semester

Core Course - ST500303 - MULTIVARIATE ANALYSIS

M.Sc STATISTICS,M.Sc STATISTICS(Applied)

2019 ADMISSION ONWARDS

26BEBF2D

Time: 3 Hours Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. Establish the invariance property of Hotelling's $T^{2.}$
2. How we can find the confidence region for a multivariate mean vector from Normal Population.
3. Define problem of classification with an example
4. Describe the problem of linear discriminant analysis with an example
5. Discuss the use of eigen values in discriminant analysis.
6. What are the canonical variates and canonical correlation
7. What are principal components give an example.
8. Explain the complete linkage in cluster analysis
9. Offer your comments on the asymptotic distribution of the likelihood ratio criterion
10. What are the goals of discriminant analysis.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. Explain how principal components are used in factor anarysis.
12. Explain the Profile analysis with an example.

13. Bring out the advantages of divisive methods over agglomerative procedures.

14. Discuss the features of an orthogonal factor model.

15. What is scree plot in PCA? give an example. what are its uses?

16. Explain PCA. How we can find the proportion of variance explained by principal components.

17. Explain how we can find the number of principal components required for a dataset.

18. Establish the relationship between Hotelling's T^2 and Likelihood ratio statistic.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. Explain in detail with suitable justification, how will you test the equality of mean vectors of two multivariate normal populations with a common dispersion matrix, using a likelihood ratio criterion.

20. Define principal components; Explain the procedure to construct principal components. And Show that the variance of the ith principal component is λ_i (ith eigen value of the covariance matrix).

21. Set up a classification procedure if the q_i (i = 1,2) is the priori probability of drawing an observation from the population π_i with density $P_i(x)$ and if the cost of misclasification of an observation from π_i as from π_j is $c_{j,i}$.

22. Carryout the MANOVA for a one-way classified data from multivariate normal populations, assuming a fixed effect linear model. state the assumptions clearly.

(2×5=10 weightage)