QP CODE: 25022629

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Reg No : .....

Name : .....

M.Sc DEGREE (CSS) SPECIAL REAPPEARANCE EXAMINATION, APRIL 2025

Third Semester

M.Sc STATISTICS with DATA SCIENCE

CORE - ST040301 - MULTIVARIATE ANALYSIS AND STATISTICAL TECHNIQUES FOR DATA MINING

2020 ADMISSION ONWARDS

7480C811

Time: 3 Hours Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. What is frequent item set and a sequence? Give example.
2. What is noisy data?
3. How will you decide upon number of common factors in factor analysis?
4. Define factor loadings.
5. When will cannonical correlation reduces to bivariate correlation?
6. State the Bayesian approach in descriminant analysis.
7. Define quadriatic descriminant function.
8. State any drawback of k-means method.
9. What do you mean by contrasts?
10. Define Sphericity test.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. What are the different methods to derive class/concept descriptions?
12. Explain the procedure for testing whether mean values are parallel for a multivariate distribution.

13. Explain the term factor loading. State the factor model and obtain the maximum likelihood estimates of the factor loading.

14. Obtain the rule to assign an observation of unknown origin to one of two p-variate normal populations having the same dispersion matrix.

15. Outline single linkage and complete linkage clustering procedures with an example.

16. Explain how Analysis of Variance tests the equality of means.

17. Explain the test for testing whether the covanriance matrix has a specified form.

18. Define Pillai's trace statistic and Roy's maximum root Statistics.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. Let $\Sigma = \begin{bmatrix} 1 & 4 \\ 4 & 100 \end{bmatrix}$.

1. Determine the Principal components.
2. What is the proportion of variance explained by the first principal component.
3. Find the variance of first principal component
4. Find the correlation between the first observed variable and first principal component

4.Also find the specific variances

20. Obtain the minimum expected cost of misclassification rule with equal misclassification cost in the case with more than two populations.

21. Present the motivation, definition and derivation of Fisher's (multiple) discriminant functions.

22. Stating assumptions, describe a MANOVA model with two-way classified data. Explain how you will test the hypothesis

(2×5=10 weightage)