PG (CBCS) EVEN SEMESTER EXAMINATION, 2024

STATISTICS

4th Semester

Course No. : STSCC - 401

(Multivariate Analysis)

Full Marks : 70

Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

(Answer five questions taking one from each unit)

Unit - I

1. (a) Define multivariate normal distribution. Deduce the density function of the multivariate normal distribution starting from the univariate normal distribution. 7

   (b) Deduce the moment generating function of the multivariate normal distribution. 7

2. (a) Write a brief note on the graphical representation of multivariate data. 7

   (b) Give a brief account of the application of multivariate analysis. 7

Unit - II

3. (a) Define the Wishart distribution and deduce the characteristic function of the distribution. 2+5=7

   (b) Deduce the probability generating function of the multinomial distribution. 7

4. (a) If $(x_1, x_2, \ldots, x_i, \ldots, x_j, \ldots, x_p)$ follows multinomial distribution, then deduce an expression for the regression of x_i and x_j. 7

   (b) State and prove the additive property of Wishart distribution. 7

Unit - III

5. (a) What is discriminent analysis? Explain with examples. 3+47

   (b) Explain the method of estimating factor scores. 7

6. (a) Show that the Canonical correlation are invarient under non-singular linear transformation. 7

   (b) Show that the multiple correlation is a particular case of canonical correlation. 7

Unit - IV

7. (a) Define Mahalonobis D^2 and deduce a relation betwen Mahalonobis D^2 and Hotelling's T^2. 7

   (b) Starting from the student's t-distribution establish the expression of the generalized T^2 - statistic. 7

8. (a) Derive an expression for the multiple correlation coefficient between x_i and $\beta\hat{x}^{(2)}$ where x_i and $\beta x^{(2)}$ have usual meanings. 7

   (b) State and prove the multivariate central limit theorem. 7

Unit - V

9. Explain the one-way MANOVA stating clearly the assumptions on which it is based. 14

10. (a) State some applications of cluster analysis. 7

    (b) Explain the statistical test comparing several multivariate population mean vectors and variance-covariance matrices. 7

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