

15P447

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Name.....

Reg.No.....

FOURTH SEMESTER M.Sc. DEGREE EXAMINATION, MARCH 2017

(CUCSS - PG)

(Statistics)

CC15P ST4 C13–MULTIVARIATE ANALYSIS

(2015 Admission)

Time: 3 Hours

Maximum: 36 Weightage

Part A

Answer all questions

1. Define singular multivariate normal distribution.
2. What do you mean by generalized variance?
3. Define multiple correlation coefficient
4. Show that every linear combination of a set of random variables is normal, then their joint distribution is also normal.
5. What is Fisher-Behren problem?
6. Define partial correlation coefficient.
7. Describe multivariate classification problem
8. Explain sphericity test.
9. Discuss the relationship connecting T^2 and D^2
10. What are canonical correlation coefficient and canonical variables?
11. What is factor analysis?
12. Justify the statement Principal Component Analysis is a data reduction technique.

(12x1=12 Weightage)

Part B

Answer any eight questions

13. Obtain the characteristic function of a multivariate normal distribution.
14. Obtain the MLE of μ and Σ in $N(\mu, \Sigma)$.
15. Derive the density of a p -variate normal distribution.
16. Prove that for a p -variate normal distribution, the sample mean vector and variance covariance matrix are independently distributed

17. If $X \sim N(\mu, \Sigma)$, State and prove the necessary and sufficient condition for the independence of two quadratic forms $X'AX$ and $X'BX$.
18. If $X = [X^{(1)}, X^{(2)}]' \sim N(\mu, \Sigma)$. Derive the conditional distribution of $X^{(1)}$ given $X^{(2)}$.
19. Obtain the null distribution of sample correlation.
20. Explain the testing procedure for independence of sets of variates of p -variate normal distribution
21. Discuss any two properties of Wishart distribution.
22. If $X \sim N(\mu, \Sigma)$ and Σ is non-singular then derive the distribution of $(X-\mu)' \Sigma^{-1}(X-\mu)$.
23. How will you test for the population mean of a p -variate normal distribution when the dispersion matrix is known?
24. Discuss Baye's classification problem

(8x2=16 Weightage)

Part C

Answer any two questions

25. Derive the distribution of Hotelling's T^2 -Statistic in the null case
26. Establish that T^2 is invariant under linear transformation. Also derive the use of T^2 statistic in testing equality of means of two multivariate normal populations having equal covariance matrices.
27. Describe the classification problem into one of several populations
28. Establish the relationship between principal component & eigen structure of the variance. correlation matrices.

(2x4=8 Weightage)
