

**M.Sc. DEGREE EXAMINATIONS – APRIL, 2016**

SECOND SEMESTER

STATISTICS

**PAPER –I MULTIVARIATE ANALYSIS**

**25151**

Time: 3 Hours

Max. Marks: 75

(No additional sheet will be supplied)

**PART – A (5x3=15 marks)**

Answer Any FIVE Questions

Each question carries 3 marks

Each answer should not exceed One page

1. Define Wishart matrix and give its properties.
2. Derive the distribution of Hotelling's  $T^2$  statistic
3. Define sample discriminant function.
4. Explain the Probability of misclassification.
5. Describe about Maximum likelihood estimation.
6. Define canonical correlation.
7. Write a short note on clustering.
8. Explain Centroid method?

**PART – B (4x15=60 marks)**

Answer All Questions

Each question carries 15 marks

Each answer should not exceed Six pages

9. Define Hotelling's  $T^2$  statistic and mention its applications.  
(OR)
10. Explain the test for testing the hypothesis that the mean vector is a given vector.
11. Explain the problem of classification. Explain the procedure of classification into one of two known multivariate populations.  
(OR)
12. Let  $f_k(x) \sim N_p(\mu_k, \Sigma)$ ,  $k=1,2$ . Derive the optimal classification rule, when  $\Sigma$  is known. Also, obtain the probabilities of misclassification.
13. Explain the Orthogonal factor model, estimate factor loading using principal compounding model.  
(OR)
14. Let  $X$  be a random vector of  $p$  - components with the covariance matrix  $\Sigma$ . Obtain the Principal components when  $\Sigma$ .  
i) is positive semi definite and ii) has multiple roots.
15. Describe the basic concept and scope of cluster analysis and its importance. Explain the similarity measures.  
(OR)
16. Explain K-means algorithm. What are the advantages of non hierarchical methods?