

SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)

(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai - 600 044.

B.Sc.Mathematics - END SEMESTER EXAMINATIONS - APRIL 2025
SEMESTER - IV

20UMAAT4004 - Mathematical Statistics - II

Total Duration : 2 Hrs.30 Mins.

Total Marks : 60

Section B

Answer any **SIX** questions ($6 \times 5 = 30$ Marks)

1. If X is chi-square variate with n degrees of freedom, then show that for large n , $\sqrt{2X} \sim N(\sqrt{2n}, 1)$.
2. Build the student's t distribution.
3. Examine the steps involved in large sample test for equality of proportions.
4. Identify sufficient estimators for μ and σ^2 when x_1, x_2, \dots, x_n be a random sample from $N(\mu, \sigma^2)$.
5. Obtain the maximum likelihood estimate of θ in $f(x, \theta) = (1 + \theta)x^\theta$, $0 < x < 1$, based on an independent sample of size n . Interpret whether this estimate is sufficient for θ .
6. Examine the steps involved in method of moments.
7. Describe Z-test for two sample means.
8. Explain about Chi-Square test for goodness of fit.

Section C

Answer any **THREE** questions ($3 \times 10 = 30$ Marks)

9. Build Snedecor's F-distribution.
10. State and prove Cramer's Rao inequality.
11. Interpret $100(1 - \alpha)\%$ confidence intervals for the parameters θ and σ^2 of the normal distribution.
12. Examine the following
 - (i) Null and Alternative hypothesis
 - (ii) Type I error and Type II error
 - (iii) Level of significance
 - (iv) Power of the test
 - (v) Critical Region.
13. Explain about the chi-square independence of attributes.
