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. Maths - END SEMESTER EXAMINATIONS APRIL - 2024
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. Derive student's t-distribution.
2. State and prove the additive property of Chi-square distribution.
3. Define estimator and what are the characteristics of estimators?
4. What are the properties of maximum likelihood estimators?
5. Define the following:
   a) Null and Alternative hypothesis
   b) Type I and Type II errors.
6. Write a note on critical region and Level of significance.
7. Write a note on Goodness of fit tests based on Chi-square.
8. Explain Test of independence of attributes on contingency table.

Section C

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

9. Define F-distribution and derive its PDF.
10. State and prove Cramer-Rao inequality.
11. Derive confidence Interval for the variance of two independent normal distribution with unknown means.
12. Explain test of significance for difference of proportions.
13. For the 2x2 table $\begin{array}{|c|c|}\hline a & b \\ \hline c & d \\ \hline \end{array}$ Prove that Chi-square test of independence gives

$$\chi^2 = \frac{N(ad-bc)^2}{(a+c)(b+d)(a+b)(c+d)}, \text{N=a+b+c+d.}$$

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