

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.Statistics - END SEMESTER EXAMINATIONS - APRIL 2025

SEMESTER - III

**20USTCT3005 - Distribution Theory - II**

Total Duration : 2 Hrs.30 Mins.

Total Marks : 60

**Section B**

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

1. State and prove the lack of memory property of exponential distribution.
2. Compute the mean and variance of standard Weibull distribution.
3. Compute the mode and skewness of chi-square distribution.
4. Explain the mode and points of inflexion of  $F$ - distribution.
5. State and prove the additive property of Chi-square distribution.
6. Obtain the relationship between  $t$  and  $F$ -distribution.
7. If  $X_1, X_2, \dots, X_n$  be a random sample from a population with continuous density. Show that  $Y_1 = \min(X_1, X_2, \dots, X_n)$  is exponential with parameter  $n\lambda$  if and only if each  $X_i$  is exponential with parameter  $\lambda$ .
8. Determine the  $r^{th}$  raw moment of Beta distribution of first kind.

**Section C**

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

9. Compute the moment generating function of Gamma distribution and hence find its mean and variance.
10. Derive the moment generating function of logistic distribution.
11. Derive the p.d.f of student's t-distribution.
12. Compute the cumulative distribution function of single order statistic.
13. If  $X_1, X_2, \dots, X_n$  be a random sample from a Normal population with mean and variance  $\sigma^2$  then evaluate  $\bar{X} \sim N(\mu, \sigma^2/n)$

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