

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. END SEMESTER EXAMINATION APRIL/NOV - 2021

SEMESTER - III

20USTCT3005 - Distribution Theory-II

<b>Total Duration : 3 Hrs</b>	<b>Total Marks : 75</b>
MCQ : 30 Mins	MCQ : 15
Descriptive : 2 Hrs.30 Mins	Descriptive : 60

Section B

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

1. Show that  $K_1 = \frac{\lambda}{\alpha}$  for gamma distribution( $\lambda, \alpha$ ).
2. If  $X \sim N(\mu, \sigma^2)$  obtain the PDF of  $U = \frac{1}{2} \left[ \frac{x-\mu}{\sigma} \right]^2$
3. Compute MGF of Exponential distribution ( $\theta$ ) and Find its variance.
4. Derive the rth moment about origin for Laplace distribution( $\alpha, \beta$ ).
5. Compute variance of standard Weibull distribution( $\alpha$ ).
6. Compute Mode and Skewness of  $\chi^2$  distribution.
7. Show that relation between t and F distributions.
8. Derive cumulative distribution function of a single order statistic.

Section C

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

9. If X and Y are independent gamma variates with parameters  $\alpha$  and  $\beta$  respectively. Show that the variates  $U = X+Y$ ,  $Z = \frac{X}{X+Y}$  are independent and that U is *Gamma* ( $\alpha+\beta$ ) variate and Z is a  $\beta_1$  ( $\alpha, \beta$ ) variate.
10. Evaluate  $\beta_1=0$  &  $\beta_2=4.2$  when  $X \sim Logistic(\lambda)$
11. Derive the PDF of  $\chi^2$  distribution.
12. Derive the PDF of Student's t- distribution.
13. Derive the joint PDF of two order statistics.