

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.

M.Sc.Biostatistics - END SEMESTER EXAMINATIONS - NOV' 2024  
SEMESTER - I

**20PBSCT1001 - Probability and Distribution Theory**

Total Duration : 2 Hrs. 30 Mins.

Total Marks : 60

**Section B**

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

1. A number is selected randomly from 11 through 19. Consider the events  
 $A = \{ 11, 14, 16, 18, 19 \}$      $B = \{ 12, 14, 18, 19 \}$      $C = \{ 13, 15, 18, 19 \}$ .  
Find (i)  $P(A/B)$     (ii)  $P(A/C)$     (iii)  $P(B/C)$     (iv)  $P(B/A)$ .
2. Define Random Variable. Write down the properties of distribution functions.
3. Let  $X$  be a continuous random variable with pdf  
$$f(x) = \begin{cases} \frac{x}{12}, & 0 < x < 5 \\ 0, & \text{otherwise} \end{cases}$$
 Find the pdf of  $Y = 2X - 3$ .
4. Obtain the mean of Hyper geometric distribution.
5. Derive the mean of zero truncated Binomial distribution.
6. Obtain the moment generating function of multinomial distribution.
7. State and prove any one property of Bivariate exponential distribution of Gumbel.
8. Let  $X$  (with  $p$ - components) be distributed according to  $N(\mu, \Sigma)$ . Then prove  
 $Y = CX$  is distributed according to  $N(C\mu, C\Sigma C')$  for  $C$  is non-singular.

**Section C**

I - Answer any **TWO** questions ( $2 \times 10 = 20$  Marks)

9. State and Prove Bayes theorem of probability.
10. State and prove Levy - Lindeberg central limit theorem.
11. State and establish the additive property satisfied by bivariate binomial distribution.
12. Derive the moment generating function of Bivariate Normal distribution.

II - Compulsory question ( $1 \times 10 = 10$  Marks)

13. Derive the mean and variance of Weibull distribution.

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