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 - NOV'2024
SEMESTER - III
20UMAAT3003 - Mathematical Statistics - I

Total Duration : 2 Hrs.30 Mins. Total Marks : 60

Section B

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

1. Prove that if A and B are independent events then $\overline{A}$ and $\overline{B}$ are also independent events.
2. $f(x,y) = 8xy$, $0 < x < y < 1$; $f(x,y) = 0$ elsewhere. Compute $E(Y/X = x)$.
3. X is a Poisson variates such that $P(X = 2) = 9p(X = 4) + 90P(X = 6)$ Compute (i) mean of X and Variance of X.
4. Derive the mgf of Gamma distribution and hence compute its mean.
5. A random variable X has the following probability distribution

x	0	1	2	3	4	5	6	7
p(x)	0	k	2k	2k	3k	k^2	$2k^2$	$7k^2+k$

   Compute k, Evaluate $P(X < 6)$, $P(X \geq 6)$ and distribution function of the X.
6. State and prove addition theorem on expectation.
7. Sketch any five chief characteristics of normal distribution.
8. Obtain the mean and variance of Beta distribution of first kind.

Section C

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

9. State and Prove Bayes theorem in Probability.
10. If X and Y are two random variables having joint density function

$$f(x,y) = \begin{cases} \frac{1}{8}(6-x-y); & 0 < x < 2; 2 < y < 4 \\ 0, & otherwise \end{cases}$$

    Compute (i) $P(X < 1 \cap Y < 3)$ (ii) $P(X+Y < 3)$ (iii) $P(X < 1|Y < 3)$.
11. State and prove Chebychev's Inequality.
12. Derive Mgf, Mean and variance of poisson distribution.
13. Derive mean and variance of beta distribution of II kind.

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