SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN (AUTONOMOUS)

(affiliated to the University of Madras and accredited with 'A+' Grade by NAAC) Chromepet, Chennai — 600 044.

B.Sc.END SEMESTER EXAMINATION APRIL/NOV - 2021

SEMESTER - III

20UMAAT3003 - Mathematical Statistics – I

Total Duration : 3 Hrs		**Total Marks**	**: 75**
MCQ	: 30 Mins	MCQ	: 15
Descriptive	: 2 Hrs.30 Mins	Descriptive	: 60

Section B

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

1. State and prove the addition law of probability.
2. If X and Y are random Variables then prove that
   (i) E(X+Y): E(X) + E(Y) provided all the expectations exist
3. Derive mean and variance of Binomial Distribution.
4. State and prove any two properties of moment generating function.
5. Derive mean and variance of uniform distribution.
6. If X and Y are gamma variables, find the distribution of X/Y.
7. Find the recurrence formula for binomial distribution.
8. If f(x,y)=8xy, 0<x<y<1: f(x,y)=0 elsewhere. Find the Marginal density of X and Y.

Section C

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

9. State and prove Bayes' theorem.
10. The joint probability distribution of two random variables X and Y is given by: P(X=0,Y=1)=1/3, P(X=1,Y= -1)=1/3 and P(X=1,Y=1)=1/3. Find the following:
    (i) Marginal distribution of X and Y.
    (ii) Conditional Probability distribution of X given Y=1.
11. State and establish Chebychev's inquality.
12. Derive the mean, variance and Moment Generating Function (MGF) of poisson distribution.
13. Derive the mean and variance of Beta distribution of first kind.