THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[AHS 1022]   **OCTOBER 2022**   **Sub. Code: 2861**

M.Sc. BIOSTATISTICS
FIRST YEAR (From 2011-2012 onwards)
PAPER I – PROBABILITY AND DISTRIBUTION THEORY

Q.P. Code : 282861

Time: Three hours   **Answer ALL Questions**   **Maximum: 100 Marks**

I. Elaborate notes on: **(2 x 20 = 40)**

   1. (a). Define expectation. State and prove all properties of expectation.

   (b). The joint p.d.f of (X,Y)is given by

   'f(X,Y)= K(4-x-y)   , $0 \leq X, Y \leq 2$,   'f (X,Y) = 0 elsewhere

   Find the constant k. Also Var(X), Var(Y) and Cov(X,Y)

   2. a) State and prove Jenison's and Minkowski's inequality.

   b) Explain Almost sure Convergence with an example.

II. Write Short Notes on: **(10x6 = 60)**

1. Mean and variance of Poisson Distribution.
2. Memory less property of Geometric Distribution.
3. Brief Partial and multiple correlation coefficients.
4. State Cochran's theorem and its application
5. Conditional and marginal distribution
6. Properties of Chi-square distribution.
7. Write a Lindeberg-Levy central limit theorem and its importance.
8. Application of Binomial probability distribution in Health research give examples.
9. If a random variable X possesses the following function.

X	3	2	1	0	-1	-2	-3
P(X)	0.1	0.2	3k	K	2k	0	0.1

   Then determine the value of k, mean and variance.

10. Give properties of conditional expectations.

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