

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

[AHS 0222]

FEBRUARY 2022
(OCTOBER 2021 EXAM SESSION)

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)

- a) If X is a continuous r.v. with p.d.f. $f(x) = Ce^{-x/\sigma}$, $x \geq 0, \sigma > 0$. Find its mean, median and Quartile deviation.
b) List out properties of moment generating function.
- a) If X_1, X_2 be two independent poisson variates with parameters λ_1 and λ_2 respectively. Show that the conditional distribution of $X_1 | X_1 + X_2$ is binomial.
b) State and prove Cochran's theorem.

II. Write Short Notes on:

(10x6 = 60)

1. 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.

2. Define and discuss mathematical expectation.
3. If $(x_1, x_2, \dots, x_n), (y_1, y_2, \dots, y_n)$ be two sets of non-negative real numbers then prove
$$\left(\sum_{i=1}^n x_i^p\right)^{1/p} \cdot \left(\sum_{i=1}^n y_i^q\right)^{1/q} \geq \sum_{i=1}^n x_i y_i$$
4. Differentiate between moment generating function and characteristic function.
5. Give properties of conditional expectations.
6. What are important characteristics of normal distribution?
7. Explain relationship between normal and chi-square distribution.
8. Explain hypergeometric distribution and its properties.
9. If $f(x, y) = 1; -x < y < x, 0 < x < 1 = 0$; otherwise then, find the marginal density function.
10. Write properties of bivariate normal distribution.
