JBG-003-1171004 Seat No. _____

M. Sc. (Sem. I) (CBCS) Examination

December - 2019

Statistics : MS - 104

(Probability & Distribution Theory)

Faculty Code : 003

Subject Code : 1171004

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (1) Attempt all questions.

(2) Each question carries equal marks.

1 Answer the following questions : (any **seven**) **14**

(1) From Holder's inequality we can get which inequality ?

(2) Give a brief idea of convergence in r^{th} mean.

(3) What is the moment generating function of power series distribution ?

(4) What is the mean and variance of binomial distribution as a particular case of power series distribution?

(5) What is meant by probability ?

(6) Which continuous distribution contains equal mean and variance ?

(7) The density of non - central χ^2 distribution is a mixture of which distribution ?

(8) Give brief idea of Conditional probability.

(9) Write the p.d.f. of single order statistics.

(10) Define Weak Law of Large Number.

2 Answer the following questions : (any **two**) **14**

(1) Define Binomial distribution as a particular case of power series distribution.

(2) Find moment generating function and cumulative generating function of non - central χ^2 distribution.

(3) State and prove Holder's inequality.

3   Answer the following questions :   **14**
    (1)   For the joint probability distribution of two random variables x and y given below :

X/Y	1	2	3	4
1	4/36	3/36	2/36	1/36
2	1/36	3/36	3/36	2/36
3	5/36	1/36	1/36	1/36
4	1/36	2/36	1/36	5/36

    Find (i) The marginal distributions of X and Y.
    (ii) Conditional distribution of X given the value of Y = 1 and that of Y given the value of X = 2.
    (2)   State and prove Minkowski's inequality.

OR

3   Answer the following questions :   **14**
    (1)   State and prove the Uniqueness theorem.
    (2)   Recurrence relation between row moments, prove that

$$\mu'_{r+1} = \theta \frac{d\mu'_r}{d\theta} + \mu_1' \mu_r'.$$

4   Answer the following questions : (any **two**)   **14**
    (1)   Find the joint probability density function of two Order statistics.
    (2)   Define Power series distribution. Find its mean and variance.
    (3)   Show that zero Truncated Poisson distribution is a particular case of Power series distribution.

5   Answer the following questions : (any **two**)   **14**
    (1)   Define Characteristic function. Find characteristic function of Normal distribution.
    (2)   Explain Convergence in Probability with related example.
    (3)   If $X \sim X^2_{(m)}(\lambda)$ and $Y \sim X^2_{(n)}$ be independent, then

    show that $\dfrac{X/m}{Y/n}$ has non-central F - distribution.
    (4)   Define the moment generating function of any random variable X.