

Seat No. : _____

DH-106
December-2022
B.Sc., Sem.-III
CC-201 : Statistics
(Distribution Theory-1)
(New)

Time : 2.30 Hours]

[Max. Marks : 70

1. (A) Derive mean and variance of discrete Uniform distribution. 7
(B) The mean and variance of Binomial distribution are 4 and $\frac{4}{3}$ respectively. Find $p(X \geq 1)$. 7

OR

- (A) Derive mean and variance of Poisson distribution. 7
(B) Derive mean and variance of truncated Binomial distribution. 7

2. (A) Derive cumulant density function, moment generating function and characteristic function of Exponential distribution. 7
(B) Derive any two properties of Rectangular distribution for continuous variable. 7

OR

- (A) Derive mean and variance of Beta type-2 distribution. 7
(B) State and prove additive property of Gamma distribution. 7

3. (A) Define probability distribution function of a random variable. State and prove the properties of distribution function. 7
(B) Define Discrete random variable, probability mass function and continuous distribution function. 7

OR

- (A) Define Jacobian of transformation. State its uses in probability distribution theory. 7
(B) Define marginal probability function, conditional probability function and independent random variable. 7

4. (A) Let X_1, X_2, \dots, X_n be a random sample of size n from Uniform distribution with parameter a and b . obtain the pdf of first order statistic and n^{th} order statistic. 7
- (B) Let X_1, X_2, \dots, X_n be order statistics then obtain the distribution of $\min X(i)$, where $1 \leq i \leq n$ and $\max X(i)$, where $1 \leq i \leq n$. 7

OR

4. (A) Prove that Negative Binomial as compound distribution of Poisson and Gamma distribution. 7
- (B) Prove that Poisson as compound distribution of Binomial and Poisson distribution. 7

5. Attempt any **seven** out of twelve :

- (1) Give second name of Uniform distribution and write probability mass function of it. 14
- (2) Define Bernoulli trials.
- (3) Write cumulants of Poisson distribution.
- (4) State mean and variance of truncated Poisson distribution.
- (5) Define Jacobian of transformation.
- (6) Define conditional probability function.
- (7) Define marginal probability function.
- (8) Define Joint probability mass function. When two random variables are said to be independent ?
- (9) Compute the following ratio : $\Gamma(16/3) / \Gamma(10/3)$
- (10) Write any two uses of Order statistics.
- (11) Write any two differences between discrete distribution function and continuous distribution function.
- (12) Write mean and variance of Beta type-1 distribution.