2111N774

Candidate's Seat No :________

B.Sc. (NEP) Sem.-3 Examination

DSC-C-231

Statistics

Time : 2-00 Hours] **November-2025** **[Max. Marks : 50**

Q.1(A) If a random variable X~Bn(n, p), in usual notations; show the cumulant generating function of X is $M(t) = (q + pe^t)^n$. **05**

(B) Define Hyper Geometric distribution. Also, derive the mean and variation of Hyper Geometric distribution. **05**

OR

(A) State and prove the additive property of Poisson distribution. **05**

(B) State probability mass function of binomial distribution. In usual notations, show that $E(X) = np$, $V(X) = npq$, where $X\sim Bn(n, p)$ **05**

Q.2 (A) State one practical application of the exponential distribution. If a random variable X follows an exponential distribution with parameter α, derive the first two raw moments of X using standard notation **05**

(B) State one application each of the rectangular distribution and the exponential distribution. **05**

OR

(A) Define Rectangular distribution. Derive its distribution function. **05**

(B) Define Beta distribution of second kind and find its mean, variance, and also obtain moment generating function. **05**

Q.3 (A) Let. X~ N(μ, σ^2). Show that all the odd order central moments of X are zero. Also find the expression for even order central moment. 05

(B) State probability density function of Normal distribution with parameters μ and σ^2. Derive median and mode of N (μ, σ^2). **05**

OR

(A) Obtain the MGF of normal distribution also find it's mean and variance. **05**

(B) Define a normal distribution. Derive the mode of normal distribution. **05**

Q.4 (A) Derive the probability density function of truncated normal distribution at X = 0. Also find its variance. **05**

(B) What is truncation? Derive truncated binomial distribution. **05**

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OR

(A) In usual notation, derive recurrent relation for central moments of Poisson distribution with parameter m. 05

(B) What do you mean by truncation? Define truncated distribution as a conditional distribution. 05

Q.5 Attempt any ten out of twelve. **10**

1. State the moment generating function of Poisson distribution with parameter θ.
2. Define independence of random variables (X, Y) if they follow bivariate normal distribution.
3. State two important properties of exponential distribution.
4. State the mean and variance of Bernoulli distribution.
5. Give the two application of passion distribution.
6. State the conditions under which hypergeometric distribution tends to binomial distribution.
7. State the application of Hyper Geometric distribution.
8. If $X \sim B(4, 0.5)$ then write mode and variance.
9. State the MGF of Uniform distribution.
10. State the CGF of exponential distribution.
11. What is the MGF of Poisson distribution?
12. State the condition for mode of Poisson distribution.

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