

Reg. No. :

Name :

Third Semester B.Sc. Degree Examination, October 2019

First Degree Programme under CBCSS

Complementary Course for Mathematics

ST 1331.1 – STATISTICAL DISTRIBUTIONS

(2018 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions. Each question carries **1** mark.

1. If the standard deviation of a Poisson random variable X is 3, write the probability mass function of X .
2. Moment generating function of a random variable Y is $(0.65 + 0.35e^t)^5$. Identify the statistical distribution and its parameters.
3. Write the mean and variance of geometric distribution.
4. Write the mode for the Poisson distribution with mean 7.5.
5. Let X follows discrete uniform with parameter n . Compute the coefficient of variation of X .
6. What is odd order moment about mean of normal distribution?
7. Define statistic.
8. Define t statistic.

9. Let Y be a random variable and Y follows exponential distribution with mean 3. Compute $P(Y=3)$.
10. Write the variance of random variable follows Chi square distribution with 10 degrees of freedom.

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions. Each question carries **2** marks.

11. Define Bernoulli distribution. What is its mean?
12. If X follows Binomial (n, p) , derive the distribution of $n-X$.
13. Define hyper geometric distribution.
14. Derive the MGF of a discrete uniform random variable.
15. Let X be a continuous uniform random variable with mean 1 and variance $4/3$. Find $P(X < 0)$.
16. State the additive property of gamma distribution.
17. Write the relationship between Beta I and Beta II random variables.
18. Let X be standard Normal random variable, compute $P(1 < X < 2)$.
19. Define convergence in probability.
20. State central limit theorem for i.i.d random variables.
21. Justify the statement "every statistic is a random variable".
22. Write probability density functions of t and F distributions.

(8 × 2 = 16 Marks)

34. (a) Derive Chebyshev's inequality.
- (b) Suppose that the lifetime of an electronic device follows exponential distribution with mean 1. Determine the upper bound of $P(|X-1| \geq 2)$ using Chebyshev's inequality.
35. (a) Let X_1 and X_2 be two independent random variables follow Chi square distribution with 1 degrees of freedom. Determine the value of k if $P(X_1 + X_2 > k) = 0.5$.
- (b) Establish the sampling distribution of the sample variance of random sample drawn from Normal distribution.

(2 × 15 = 30 Marks)