

21U308

(Pages: 2)

Name:

Reg.No:

THIRD SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2022

(CBCSS - UG)

(Regular/Supplementary/Improvement)

CC19U STA3 C03 - PROBABILITY DISTRIBUTIONS AND SAMPLING THEORY

(Statistics - Complementary Course)

(2019 Admission onwards)

Time : 2.00 Hours

Maximum : 60 Marks

Credit : 3

Part A (Short answer questions)

Answer *all* questions. Each question carries 2 marks.

1. Find the m.g.f. of a geometric distribution.
2. Define Negative binomial distribution.
3. Define Exponential distribution.
4. What are the mean and variance of Lognormal distribution?
5. Describe Cauchy distribution.
6. Explain weak law of large numbers.
7. State Central limit theorem
8. What do you mean by sampling error.
9. Define sampling distribution.
10. A random sample of size 64 are drawn from a normal population with mean 32 and standard deviation 5. Find the mean and variance of sample mean .
11. Define student-t statistic.
12. Define F statistic.

(Ceiling: 20 Marks)

Part B (Short essay questions - Paragraph)

Answer *all* questions. Each question carries 5 marks.

13. Establish additive property of Binomial distribution.
14. Obtain the mgf of Poisson distribution.

15. If X is normally distributed with mean 11 and standard deviation 1.5, find the number x_0 such that
(i) $P(X > x_0) = 0.3$ (ii) $P(X < x_0) = 0.09$
16. For a geometric distribution $f(x) = 2^{-x}, x = 1, 2, 3, \dots$, prove that Chebyshev's inequality gives $P\{|X - 2| \leq 2\} > \frac{1}{2}$ while the actual probability is $\frac{15}{16}$.
17. What is systematic sampling?
18. Derive the distribution of $\frac{ns^2}{\sigma^2}$. Write its p.d.f.
19. State the relationship between normal, Chi-square, t and F distributions.

(Ceiling: 30 Marks)

Part C (Essay questions)

Answer any **one** question. The question carries 10 marks.

20. State and prove Weak law of large numbers.
21. Derive Chi-square distribution with 'n' degrees of freedom.

(1 × 10 = 10 Marks)
