

**23U469**

(Pages: 2)

Name : .....

Reg. No : .....

**FOURTH SEMESTER B.Voc. DEGREE EXAMINATION, APRIL 2025**

(CBCSS-UG)

(Regular/Supplementary/Improvement)

**CC21U SDC4 PD11 - PROBABILITY DISTRIBUTIONS AND SAMPLING THEORY**

(Information Technology - Skill Component Course)

(2021 Admission onwards)

Time: 2 Hours

Maximum: 60 Marks

Credit: 3

**Part A** (Short answer questions)

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

1. Discuss any two real life situations where Poisson law can be applied.
2. Explain Geometric distribution.
3. Explain exponential distribution.
4. Define Gamma Distribution.
5. Explain the term Convergence in probability.
6. Explain Bernoulli's weak law of large numbers.
7. List the limitations of sampling.
8. Explain statistical regularity.
9. Define Non-sampling error.
10. List the importance of standard error.
11. Identify the person who discovered the sampling distribution of sample variance.
12. Discuss the distribution of the square of t-variate.

**(Ceiling: 20 Marks)**

**Part B** (Short essay questions - Paragraph)

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

13. Derive the M.G.F of Binomial distribution.
14. Derive the M.G.F of Normal distribution.
15. Write down the probability function of a normal variate.
  - i) With mean 20 and standard deviation 4.
  - ii) With mean 0 and standard deviation 64.

16. Let  $X$  be a r.v taking values  $-1, 0, +1$  with probabilities  $1/8, 6/8, 1/8$  respectively. Find using chebychev's inequality, the upper bound of the probability  $P(|X| \geq 1)$
17. State Central limit theorem and give its assumptions.
18. Describe methods of simple random sampling.
19. Define Chi-square,  $t$ , and  $F$  statistics. Bring out the relation connecting them.

**(Ceiling: 30 Marks)**

**Part C (Essay questions)**

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

20. Describe the different stages of statistical enquiry.
21. Define mode of a random variable. Show that the mode of  $F$  distribution is at  $F = \frac{n_2(n_1 - 2)}{n_1(n_2 + 2)}$

**(1 × 10 = 10 Marks)**

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