24U296 (Pages: 2) Name : .....

Reg. No : .....

SECOND SEMESTER UG DEGREE EXAMINATION, APRIL 2025

(FYUGP)

CC24USTA2MN109 - THEORY OF PROBABILITY

(Statistics - Minor Course)

(2024 Admission -Regular)

Time: 2.0 Hours Maximum: 70 Marks

Credit: 4

Part A (Short answer questions)

Answer ***all*** questions. Each question carries 3 marks.

1. What do you mean by sets? Explain universal set with suitable examples. [Level:2] [CO1]
2. A bag contains 8 black and 4 white balls. If 5 balls are drawn at random, compute the chance that three of them are black. [Level:3] [CO1]
3. Define multiplication theorem for independent events. [Level:2] [CO1]
4. Explain probability. Define classical definition of probability. [Level:2] [CO1]
5. Compute the probability of getting atleast one tail while tossing two unbiased coins. [Level:3] [CO1]
6. Explain variance. [Level:2] [CO2]
7. Define a random variable with example. [Level:2] [CO2]
8. Explain standard normal distribution. [Level:2] [CO3]
9. Describe Poisson distribution. [Level:2] [CO3]
10. Define simple random sampling. [Level:2] [CO4]

(Ceiling: 24 Marks)

Part B (Paragraph questions/Problem)

Answer ***all*** questions. Each question carries 6 marks.

11. For three events A,B and C prove or disprove that the pairwise independence need not imply their mutual independence. [Level:3] [CO1]
12. For any two events A and B prove that $P(A \cup B)=P(A)+P(B)-P(A \cap B)$. [Level:3] [CO1]
13. Given the following table. [Level:3] [CO2]

x	-3	-1	1	2
f(x)	1/2	1/4	1/8	1/8

Calculate E(x), $E(x^2)$and V(x)

14. Given a discrete random variable X with probability distribution as [Level:3] [CO2]

x	0	1	2	3	4
f(x)	0.2	k	2k	k/2	0.1

(a) Find value of k

(b) Find P($0.5 \leq X \leq 2.5$)

15. The weekly wages of 1000 workmen are normally distributed with a mean of 72 and a standard deviation 5.Calculate the number of workers whose wages lie (i) betweem 69 and 72 (ii) greater than 80 [Level:3] [CO3]

16. What are the advantages of using stratified random sampling over other sampling methods? Explain. [Level:2] [CO4]

17. Explain purposive sampling. [Level:2] [CO4]

18. Explain systematic sampling with suitable examples. [Level:2] [CO4]

(**Ceiling: 36 Marks)**

Part C (Essay questions)

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

19. Compute mean and variance and m.g.f of Poisson distribution. [Level:3] [CO3]

20. Describe the principal steps in a sample survey. [Level:2] [CO4]

(**1 × 10 = 10 Marks)**

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