CUET (UG) – MATHEMATICS

Chapter Test - Section B2: Applied Mathematics - Unit IV: Probability Distributions

General Instructions

1. Total Questions: **20**
2. Duration: **60 Minutes**
3. All questions are compulsory.
4. Each question carries **5 marks**.
5. For each correct answer: **+5 marks**.
6. For each incorrect answer: **-1 mark**.
7. No negative marking for unanswered questions.
8. Use of calculator or electronic devices is strictly prohibited.
9. Choose the most appropriate answer from the given options.

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1. A discrete random variable X takes values 1, 2, 3, 4 with probabilities 0.1, 0.2, 0.3, 0.4. The mean of X is:
   (A) 2.5
   (B) 3.0
   (C) 1.5
   (D) 4.0

2. If X follows a Binomial distribution with $n = 5$ and $p = 0.2$, the probability of at least one success is:
   (A) $1 - (0.8)^5$
   (B) $(0.8)^5$
   (C) $1 - (0.2)^5$
   (D) $1 - 5(0.2)(0.8)^4$

3. In a Poisson distribution, if $P(X = 0) = 0.2$, then the variance of the distribution is:
   (A) $\log(5)$
   (B) $e^{0.2}$
   (C) 0.8
   (D) 0.2

4. For a Normal Distribution with mean 50 and standard deviation 5, the Z-score for $x = 60$ is:
   (A) 1
   (B) 2
   (C) 10
   (D) -2

5. If the variance of a random variable X is 9, then the standard deviation of $2X + 5$ is:
   (A) 9
   (B) 6
   (C) 18
   (D) 3

6. For a Binomial distribution, if the mean is 10 and the number of trials is 50, the probability of failure q is:
   (A) 0.2
   (B) 0.8
   (C) 0.5
   (D) 0.1

7. If X is a Poisson random variable such that $E(X^2) = 6$, then the mean λ is:
   (A) 2
   (B) 3
   (C) 1.5
   (D) 6

8. The total area under the standard normal curve to the right of $Z = 1$ is approximately:
   (A) 0.1587
   (B) 0.3413
   (C) 0.8413
   (D) 0.5000

9. Which of the following is NOT a property of a Binomial experiment?
   (A) Fixed number of trials

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(B) Trials are independent
(C) Probability of success changes in each trial
(D) Only two possible outcomes

10. If $E(X) = 10$, then $E(X - E(X))$ is:
(A) 10
(B) 0
(C) 5
(D) 1

11. In a Poisson distribution, the probability of more than one success is:
(A) $1 - P(X = 0) - P(X = 1)$
(B) $1 - P(X = 0)$
(C) $P(X = 0) + P(X = 1)$
(D) $e^{-\lambda}(1 + \lambda)$

12. For a Normal Distribution, the quartile deviation QD is approximately:
(A) 0.67σ
(B) σ
(C) 0.79σ
(D) 1.25σ

13. If X is a random variable such that $P(X = x) = \frac{1}{n}$ for $x = 1, 2, ..., n$, then $E(X)$ is:
(A) $n/2$
(B) $(n + 1)/2$
(C) n
(D) 1

14. A bag contains 3 red and 2 blue balls. If 2 balls are drawn with replacement, the variance of the number of red balls is:
(A) 0.48
(B) 0.24
(C) 0.60
(D) 1.20

15. The mean of a standard normal distribution is always:
(A) 1
(B) σ
(C) 0
(D) 0.5

16. In a Binomial distribution, the maximum value of variance is:
(A) $n/2$
(B) $n/4$
(C) np
(D) n

17. If $\lambda = 0.5$ for a Poisson distribution, $P(X = 2)$ is:
(A) $e^{-0.5}/8$
(B) $e^{-0.5}/4$
(C) $e^{-0.5}/2$
(D) $0.5e^{-0.5}$

18. The curve of a Normal distribution is:
(A) Positively skewed

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(B) Negatively skewed
(C) Bell-shaped and symmetrical
(D) U-shaped

19. If X follows a Binomial distribution (n, p), the mean of X/n is:
(A) p
(B) np
(C) $1/n$
(D) p/n

20. For a Poisson distribution, if $\lambda = 1$, then $P(X \geq 1)$ is:
(A) $1 - 1/e$
(B) $1/e$
(C) 1
(D) e

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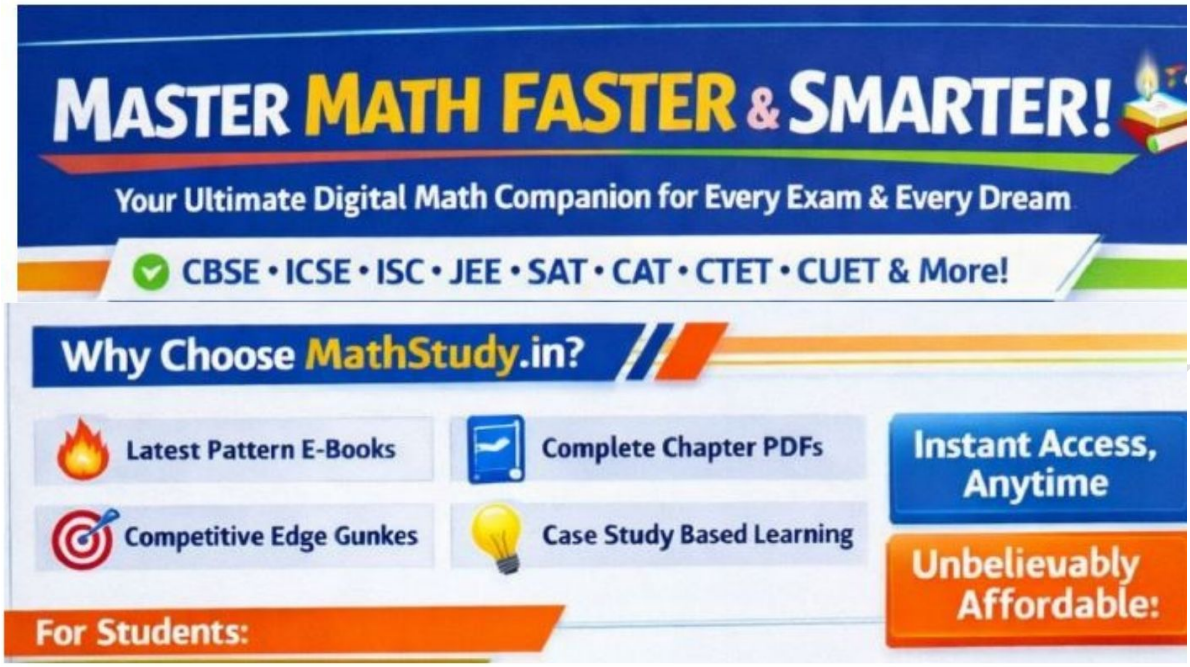

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