



11. Describe the additive property of a gamma distribution.
12. Define bivariate normal distribution.
13. Define Chebyshev's inequality.
14. Let X_i assumes the values i and $-i$ with equal probabilities. Show that the WLLN cannot apply to the sequence $\{X_n\}$ of independent random variables.
15. Suggest any two applications of Central Limit Theorem.

PART – C
(Essay)

Answer **any 4** questions.

(4×4=16)

16. Derive the m.g.f. of a geometric distribution and hence find its mean and variance.
17. Derive mean and variance of a Hyper Geometric distribution.
18. Let $X \sim U(0, 1)$. Find the distribution of $Y = -2\log X$.
19. Show that Exponential distribution possesses the lack of memory property.
20. State and prove Chebyshev's Weak Law of Large numbers.
21. A symmetric die is thrown 600 times. Find the lower bound for the probability of getting 80 to 120 sixes.

PART – D
(Long Essay)

Answer **any 2** questions.

(2×6=12)

22. Derive the recurrence relation for the central moments of Poisson distribution.
 23. For a normally distributed random variable X , 10.03% of the items are under 25 kg of weight and 89.97% of the items are under 70 kg of weight. Find the mean and SD of X .
 24. Find the mean and variance of a Beta distribution of first kind with parameters p and q .
 25. Let X_1, X_2, \dots, X_n are independent and identically distributed random variables with mean μ . Show that \bar{X} converges in probability to μ .
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