

QUIZ - 1

Maximum marks: 10

All questions are objective (i.e. no proof needed).

Question 1. Fill in the blanks:

Marks: 1×8

- (1) If A and B are independent and disjoint events. Then $\min(P(A), P(B))$ is _____
- (2) Let E and F be two independent events with $P(E) = p$ and $P(F) = q$. Then the value of conditional probability $P(E|E \cup F)$ is _____
- (3) Two numbers x_1 and x_2 are chosen (randomly) from the interval $[1, N]$ where N is some positive integer. Probability that $x_1 \geq x_2$ is _____
- (4) If X is a random variable with distribution function F_X . Then the cumulative distribution function of $aX + b$ (where $a > 0$) is _____
- (5) Let X be a random variable that takes values in positive integers with

$$P(X = m) = \begin{cases} \frac{1}{2^m} & m = 1, 2, \dots \\ 0 & \text{otherwise} \end{cases}$$

The value of $E[X]$ is _____

- (6) True or False: If F and G are cumulative distribution functions then $F + G$ is also a cumulative distribution function _____
- (7) If E_1, E_2, E_3 be arbitrary events such that $P(E_i) \geq 2/3$ for $i = 1, 2, 3$. Suppose further that $P(E_1 \cap E_2 \cap E_3) = 0$. The value of $P(E_1) + P(E_2) + P(E_3)$ is _____.
- (8) Suppose

$$f(k) = \begin{cases} \frac{\lambda}{k(k+1)}, & k = 1, 2, 3, \dots \\ 0, & \text{otherwise} \end{cases}$$

is a probability mass function. The value of λ is _____

Question 2. A bag contains t balls out of which r are red in color. A man draws k balls out of the bag. Let X denotes the number of red balls drawn. Marks: 1×2

- (1) For any $0 \leq a \leq k$, the value of probability $P(X = a)$ is _____.
- (2) Expected value of X is _____.

[For part (2), give a closed form expression.]