Indian Institute of Technology Hyderabad

CS6660: Mathematical Foundations of Data Science (Probability)
Quiz 1
Date: 31 August 2024

Question	1	2	Total
Marks Scored			

Instructions:

- **Fill in your name and roll number on each of the pages.**

- **You may use any result covered in class directly without proving it.**

- **Unless explicitly stated in the question, DO NOT use any result from the homework without proof.**

1. **(1 Mark)**

   Consider a probability space $(\Omega, \mathscr{F}, \mathbb{P})$. Let $X : \Omega \to \mathbb{R}$ be a random variable with respect to $\mathscr{F}$ whose CDF is as depicted in Figure 1. Evaluate $\mathbb{P}(\{X \in [3, 6]\})$.
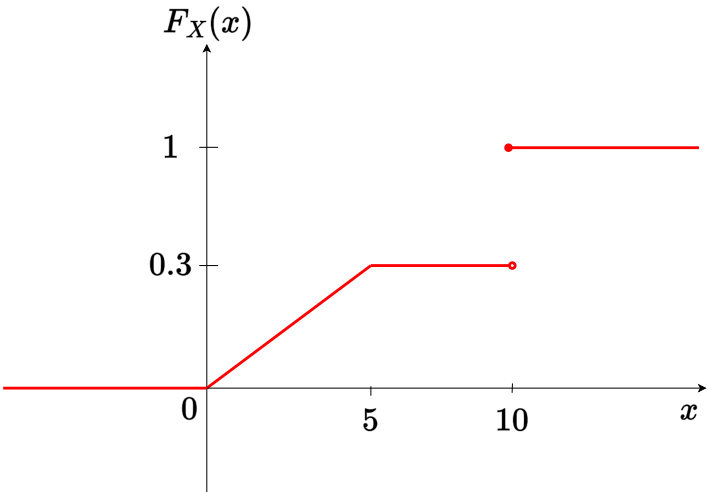

Figure 1: CDF of random variable X.

2. A box contains one coupon labelled 1, two identical coupons labelled 2, and so on up to ten identical coupons labelled 10. Two coupons are drawn simultaneously and uniformly at random from the box.

   (a) **(2 Marks)**
   Specify Ω and $\mathbb{P}$ for the experiment, assuming that $\mathscr{F} = 2^{\Omega}$.

   (b) **(2 Marks)**
   Find the probability of the event that the two coupons carry the same number.