National University

of Computer & Emerging Sciences Peshawar Campus

Program: BS (CS & SE)
Semester: Spring-2022
Course: MT2005-Probability & Statistics

Examination: Assignment # 03
Total Marks: 10, Weightage: **2.5**
Date of Submission: 20 / 05 / 2022

Problem 1

Five boys and 5 girls are ranked according to their scores on an examination. Assume that no two scores are alike and all 10! possible rankings are equally likely. Let X denote the highest ranking achieved by a girl (for instance, $X = 2$ if the top-ranked person was male and the next-ranked person was female). Find $P\{X = i\}, i = 1, 2, ...$

Problem 2

Let X represent the difference between the number of heads and the number of tails obtained when a coin is tossed n times. What are the possible values of X ?

Problem 3

The joint probability density function of X and Y is given by

$$f(x,y) = \frac{6}{7}\left(x^2 + \frac{xy}{2}\right), \quad 0 < x < 1, \quad 0 < y < 2$$

(a) Verify that this is indeed a joint density function.

(b) Compute the density function of X .

(c) Find $P\{X > Y\}$.

Problem 4

The lifetime in hours of electronic tubes is a random variable having a probability density function given by

$$f(x) = a^2 x e^{-ax}, x \geq 0$$

Compute the expected lifetime of such a tube.

The End