

Course Code: MT-2005	Course Name: Probability & Statistics
Instructor Names :	Dr. Fahad Riaz, Ms. Alishba Tariq, Mr. Abdul Basit, Ms. Urooj, Mr. Nadeem Khan, Mr. Osama Bin Ajaz.
Student Roll No:	Section No:

Instructions:

1. Answer all the questions. Solutions to problems should be fully explained, using clear English sentences where necessary.
2. In case of any ambiguity, you may make assumptions. But your assumption should not contradict any statement in the question paper. **There are 3 questions and 1 page.**

Time: 60 minutes.

Maximum Points : 30

Question 1: CLO 2 10 points

There is one error in one of five blocks of a program i.e., probability of error is $1/5$. To find the error, we independently test three randomly selected blocks. Let X be the number of errors in these three blocks.

- (a) 3 points Draw the probability tree diagram.
- (b) 3 points Compute and verify the probability distribution (p.m.f) of X .
- (c) 4 points Compute the mean and standard deviation of X .

Question 2: CLO 2 10 points

- (a) Every day, a lecture may be canceled due to inclement weather with probability 0.05. Class cancellations on different days are independent.
 - i. 2 1/2 points There are 15 classes left this semester. Compute the probability that at least 4 of them get canceled.
 - ii. 2 1/2 points What is the probability that exactly 4 class canceled out of 10 classes.
- (b) A certain area of the eastern United States is, on average, hit by 6 hurricanes a year. Find the probability that in a given year that area will be hit by
 - i. 2 1/2 points fewer than 4 hurricanes.
 - ii. 2 1/2 points anywhere from 6 to 8 hurricanes.

Question 3: CLO 2 10 points

Two continuous random variables X and Y have the joint probability distribution.

$$f(x, y) = C(x^2 + y), \quad -1 \leq x \leq 1, \quad 0 \leq y \leq 1.$$

Find

- (a) 1 point the constant C .
- (b) 2 points the marginal distributions $g(x)$ and $h(y)$.
- (c) 3 points the probability $P(Y < 0.6)$ and the probability $P(X < 0.5, Y < 0.6)$.
- (d) 4 points the covariance σ_{XY} .