Assignment for Academic Year 2024-2025 (Beginning January 2025)

CLASS: BA-3rd Year **Course Name: Probability and Statistics**

Course Code: MATH313TH (SEC-3)

ASSIGNMENT-1

Attempt any **THREE** of the following questions:

Ques 1. Two unbiased dice are thrown. Find the expected value of the sum of numbers od points on them.

Ques 2. Let X be a random variable with flowing probability distribution:

x	-3	6	9
p(x)	1/6	1/2	1/3

Find $E(X)$ and $E(X^2)$ and using the laws of expectation evaluate $E(2X+1)^2$

Ques 3. Find the characteristics function of the random variable X having density function given by $f(x) = \begin{cases} \frac{1}{2}a, & |x| < a \\ 0, & elsewhwer \end{cases}$.

Ques 4. Two unbiased dice are thrown. Find the probability that neither a doublet nor a total of 10 will appear.

Ques 5. Find the probability distribution of the number of heads when three coins are tossed simultaneously.

ASSIGNMENT-2

Attempt any **THREE** of the following questions:

Ques 1. A die is thrown 6 times. If getting an odd number is a success, what is the probability of

(i) 5 successes (ii) at least 5 successes (iii) at most 5 successes?

Ques 2. If 5% of the electric bulbs manufactured by a company are defective, use Poisson distribution to find the probability that in a sample of 100 bulbs:

(i) None is defective

(ii) 5 bulbs will be defective (Given: $e^{-5} = 0.007$)

Ques 3. If X is uniformly distributed with mean $\frac{1}{2}$ and variance $\frac{25}{12}$, find P(X > 0) and P(X < 1).

Ques 4. The joint probability mass function of discrete r.v. (X, Y) given by p(1, 1) = 0.5, p(1, 2) = 0.1 , p(2, 1) = 0.1 , p(2, 2) = 0.3

Find (i) Marginal p.m.f. of X and Y

(ii) Conditional p.m.f. of X given Y = 1.

Ques 5. If the joint probability density function of X and Y is given by

$$f(x,y) = \begin{cases} \frac{1}{4}(2x+y), 0 < x < 1, & 0 < y < 2 \\ 0, & otherwise \end{cases}$$