

Assignment for Academic Year 2025-2026 (Session Beginning January 2026)

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 of points on them.

Ques 2. Let X be a random variable with following 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

$$\text{given by } f(x) = \begin{cases} \frac{1}{2}a, & |x| < a \\ 0, & \text{elsewhwer} \end{cases}$$

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

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