XII-MATHEMATICS

UNIT-11 -PROBABILITY DISTRIBUTIONS

Important 2 and 3 Marks:

1). In a pack of 52 playing cards two are drawn at random simultaneously. If the number of black cards drawn is a variable , find the values of the random variable ad number of points in its inverse images.

2). An urn contains 5 mangoes and 4 apples. Three fruits are taken at random. If the number of apples taken is a random variable, then find the values of the random variable and number of points in its inverse images.

3). An urn contains 2 white balls and 3 red balls. A sample of 3 balls are chosen at random from the urn. If x denotes the number of red balls chosen. Find the values taken by the random variable x and its number of inverse images.

4). A pair of pair dice is rolled once. Find the probability mass function to get the number of fours. 5). If the probability mass function f(x) of a random variable x is

X	1	2	3	4
F(x)	$\frac{1}{12}$	$\frac{5}{12}$	$\frac{5}{12}$	$\frac{1}{12}$

Find i) its cumulative distribution function

ii) p ($x \leq 3$) iii) p($x \geq 2$)

6. Three fair coins are tossed simultaneously. Find the probability mass function for number of needs occurred .

7). Suppose a discrete random variable can only take the values 0,1,and 2 the probability mass function is defined by

F(x) = x^2+1 , for x= 0,1,2

x , otherwise

i)The value of k ii) cumulative distribution function iii) p($x \geq 1$)

8). Suppose X is the number of tails occurred when three fair coins are tossed once simultaneously.

Find the values of the random variable X and number of points in its inverse images.

9). A six sided die is marked '2' on one face , '3' on two faces, and '4' on remaining three faces. The Find i) The probability mass function

ii) p (x< 3)

iii) p(x ≥ 2)

iii) $F(x) = \begin{cases} 0, & -\infty < x < -2 \\ 0.25, & -2 \le x < -1 \\ 0.60, & -1 \le x < 0 \\ 0.90, & 0 \le x < 1\ 1 \\ , & 1 \le x < \infty \end{cases}$

Find **i) p (x < 0)**

ii) p (x ≥ -1)

11). A random variable x has the following probability mass function

X	1	2	3	4	5
F(x)	k^2	$2k^2$	$3k^2$	2k	3k

Find **i) The value of k**

ii) p (2 ≤ x < 5)

iii) p (3 < x)

12). A random variable x has the following probability mass function

X	1	2	3	4	5	6
F(x)	K	2k	6k	5k	6k	10k

Find **i) p (2< x < 6)**

ii) p (2 ≤ x < 5)

iii) p (x ≤ 4)

iv) p (3 < x)

13). The probability density function of x is given

by $F(x) = k \times e^{-2x}$ $x > 0$

0 $x \geq 0$, find the value k

14). Suppose that amount of milk sold daily at a milk booth is distributed with a minimum of 200 litres and a maximum of 600 litres with probability density function

$$F(x) = \begin{cases} k & 200 \leq x \leq 600 \\ 0 & \text{otherwise} \end{cases}$$

Find i) the value of k ii) the distribution function

iii) The probability that daily sales will fall between 300 liters and 500 litres.

15). Let x be a random variable denoting the life time of an electrical equipment having probability density function

$$F(x) = \begin{cases} k e^{-2x} & x > 0 \\ 0 & x \leq 0 \end{cases}$$

i).The value of k ii) The Distribution function iii) p (x < 2)

iv) Caluculate the probability that x is atleast four unit of time

v) p (x = 3)

16). The probability density function of x is given

$$\text{by } F(x) \quad \begin{cases} k e^{-x/3} & x > 0 \\ 0 & x \leq 0 \end{cases}$$

Find i) The value o f k ii) The distribution function iii) p (x < 3)

iv) p (5 ≤ x) v) p (x ≤ 4)

17). If x is the random variable with distribution function f(x) given by

$$F(x) = \begin{cases} 0, & -\infty < x < 0 \\ \frac{1}{2}(x^2 + x), & 0 \leq x < 1 \\ 1, & 1 \leq x < \infty \end{cases}$$

Then find **i) the probability density function f(x)**

ii) p ($0.3 \leq x \leq 0.6$)

18). A pair of fair dice is rolled once. Find the probability mass function to get the number of fours.