

SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)



Coimbatore – 35

DEPARTMENT OF MATHEMATICS PROBABILITY AND RANDOM VARIABLES

PART – A

1.A random variable 'X' has the following probability function:

| Х | -2 | -1 | 0 | 1 |
|------|-----|----|-----|-----|
| P(x) | 0.4 | K | 0.2 | 0.3 |

Find K and cumulative distribution function of 'X'.

2.A random variable 'X' has the following probability function:

| Х | 0 | 1 | 2 |
|------|-----|-----|-----|
| P(x) | 1/4 | 2/4 | 1/4 |

Find distribution function of 'X' and Find third moment of 'X'.

- 3. A continuous random variable 'X' has a pdf $f(x) = kx, 0 \le x \le 1$. Find K and P(X > 0.5).
- 4. The cumulative distribution function of a random variable 'X' is given by

 $F(x) = \begin{cases} 0 & , & x < 0 \\ kx & , & 0 \le x < 1 \\ 1 & , & x \ge 1 \end{cases}$. Find value of 'k '.

PART – B

1. A random variable 'X' has the following probability function:

| X | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|----|----|----|----|-----|-----|-----|-----|
| Y | а | 3a | 5a | 7a | 9a | 11a | 13a | 15a | 17a |

(i) Find 'a'

(ii) Distribution function of 'X'

(iii) Mean and Variance of 'X'

S.SINDHUJA/AP/MATHS/SNSCT



SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)



Coimbatore – 35

DEPARTMENT OF MATHEMATICS PROBABILITY AND RANDOM VARIABLES

(iv) Find the smallest value of x if $P(X \le x) > \frac{1}{2}$

(v)
$$P\left(\frac{1/2 < x < 5/2}{x > 1}\right)$$

2. A random variable 'X' has the following probability function:

| Х | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|------|---|---|----|----|----|----|-----------------|--------|
| P(x) | 0 | k | 2k | 2k | 3k | k² | 2k ² | 7k² +k |

(i) Find 'k'

(ii) Distribution function of 'X'

(iii) Mean and Variance of 'X'

(iv) Find the smallest value of x if $P(X \le x) > \frac{1}{2}$

(v)
$$P\left(\frac{\frac{1}{2} < x < \frac{5}{2}}{x > 1}\right)$$

3. The density function of a random variable 'X' is given by f(x) = kx(2-x), $0 \le x \le 2$. Find K and the variance of 'X'.

4. The density function of a random variable 'X' is given by $f(x) = c(x - x^2), 0 < x < 1$. Find

'c' and the variance of 'X'.

5. The cumulative distribution function of a random variable 'X' is given by

$$F(x) = \begin{cases} 0 & , \quad x < 1 \\ k(x-1)^4 & , \quad 1 \le x \le 3 \\ 1 & , \quad x > 3 \end{cases}$$

Find value of k and P(X< 2).

S.SINDHUJA/AP/MATHS/SNSCT