

1. Define Following terms:

Two dimensional random variables, marginal distribution and conditional distribution.

2. For a random variable X, p.m.f is given as under:

$$P(x) = c(x+1)(y+1), \quad x = 0, 1, ; y = 1, 2$$
$$= 0 \quad \text{otherwise}$$

Where c is constant to be determined. Then, find conditional function of Y given X.

3. Define: Independence of random variables, product moment,

4. Define conditional expectation. Show that  $E[E(X/Y)] = E(X)$

5. Obtain Karl Pearson's coefficient of correlation, if the (r,s)th raw moments are

$$\mu_{r,s}^{\prime} = \frac{1}{(r+2)(s+1)}, \quad r = 1, 2, \dots, s = 1, 2, \dots$$

6. What is Stochastic process and markov chain? Give one illustration of markov chain.

7. State and prove the Chapman Kolmogorov equation for discrete markov chain.

8. What are transition probabilities and transition probability matrix?

9. For the following transition matrix, with initial distribution probability  $\Pr[X_0 = i] = 1/3, i=0,1,2$  then, find  $P[X_1 = 1 | X_0 = 2]$ ,  $P[X_2 = 2 | X_1 = 1]$  and  $P[X_2 = 2, X_1 = 1 | X_0 = 2]$

$$\begin{bmatrix} 3/4 & 1/4 & 0 \\ 1/4 & 1/2 & 1/4 \\ 0 & 3/4 & 1/4 \end{bmatrix}$$

10. Define different states used in markov chain.

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**Paper: STA – 205**

1. Write full form of C.S.O. and N. S. S. O. Also, State the objectives of N.S.S.O.
2. State main activities of C. S.O.
3. Describe the role of Indian Statistical System, in brief.
4. State the important statistical organisations come under the purview of Central Government.
5. State the principle steps involved in a sample survey.
6. Explain in brief, different types sampling.
7. State the difference between sample survey and census.
8. Define the terms: Census, sample, population, statistic, parameter, with illustration.
9. Define the term Sampling. State its purpose.

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