

B.Tech.-3rd Semester-CE/IT/CSE/EC/CIVIL/METALLURGY/ICT/Cyber Security

Subject: Probability, Statistics & Numerical Analysis

Subject Code- MA0314

Unit-1 Basics of Probability & Probability Distributions.

Tutorial-1

- 1) Three unbiased coins are tossed. Find the probability of getting (i) exactly two heads, (ii) at least one tail, (iii) at most two heads, (iv) a head on the second coin, and (v) exactly two heads in succession.
- 2) From a collection of 10 bulbs, of which 4 are defective, 3 bulbs are selected at random and fitted into lamps. Find the probability that (i) all three bulbs glow, and (ii) the room is lit.
- 3) A card is drawn from a pack of 52 cards. Find the probability of getting a king or a heart or a red card.
- 4) A bag contains 3 red and 4 white balls. Two draws are made without replacement. What is the probability that both the balls are red?
- 5) A businessman goes to hotels X, Y, Z for 20%, 50%, 30% of the time respectively. It is known that 5%, 4%, 8% of the rooms in X, Y, Z hotels have faulty plumbings. What is the probability that the businessman's room having faulty plumbing is assigned to Hotel Z?
- 6) A fair die is tossed once. If the random variable is getting an even number, find the probability distribution of X.

7) A fair dice is tossed. Let the random variable X denote the twice the number appearing on the dice. Write the probability distribution of X .

8) Two unbiased dice are thrown at random. Find the probability distribution of the sum of the numbers on them.

9) Show that the function $f(x)$ defined by

$$f(x) = \begin{cases} \frac{1}{7} & 1 < x < 8 \\ 0 & \text{otherwise} \end{cases}$$

is a Probability Density Function for a random variable. Hence, find $P(3 < x < 10)$

10) An unbiased coin is tossed 6 times. Find the probability of getting (i) exactly 4 tails; (ii) at least 4 tails.

11) The probability that a pen manufactured by a company will be defective is $1/10$. If 12 such pens are manufactured, find the probability that

- 1) Exactly two will be defective
- 2) At least two will be defective
- 3) None will be defective

12) Let X be a Poisson variate with $P(X = 2) = 0.25$ and $P(X = 3) = 0.125$. Find $P(X = 0)$, $P(X = 1)$ and $P(X < 3)$.

13) 100 electric bulbs are found to be defective in a lot of 500 bulbs. Use Poisson distribution to find the probability that at most 3 bulbs are defective in a box of 100 bulbs. [Use $e^{-2} = 0.1353$]

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