ज्ञानेन प्रकाशते जगत्
INDUS UNIVERSITY

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

$$f(x) = \frac{1}{7} \quad 1 < x < 8$$
$$= 0 \quad otherwise$$

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

10) An unbiased coin is tosses 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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