Introduction to Statistical Methods

(S1-23_AIMLCZC418) – Assignment 1

AIML Section- 4

Each question carries 02 Marks (2 x 5 = 10 Marks)
Duration: 13th December 2023 – 29th December 2023
1) Submissions are individual
2) Solve these on paper, scan, and upload
3) Plagiarism results in zero marks
4) Write your name, BITS ID and Section on each page

1. The mean income per month of a society of 25 members is Rs.350 and the standard deviation is Rs. 50. Five more members are admitted to the society and their incomes in Rs per month are 260, 300, 320, 490 and 590. Find the mean and standard deviation of income for the new group of 30 members.
2. Somin on his birthday took his friends to ice cream parlour. He orders 8 packs Vanilla ice cream, 10 packs of chocolate and 12 packs of Pista.
   a) If Somin wants to serve 3 packs of vanilla and serving order is important, how many ways are there to do this?
   b) If 6 packs of ice cream are chosen randomly from 30 for serving how many ways are there to do this?
   c) If 6 packs are randomly selected, how many ways are there to obtain 2 packs of each variety.
   d) If 6 packs are randomly selected, what is the probability that the result is 2 packs of each variety being chosen?
   e) If 6 packs are randomly selected, what is the probability that all of them are same variety?

3. A random variable X has the following probability distribution

X	0	1	2	3	4	5	6	7	8
P(X)	a	3a	5a	7a	9a	11a	13a	15a	17a

   Find
   a) the value of 'a'
   b) $P(X < 3)$
   c) $P(0 < X < 5)$
   d) The smallest value of λ for which $P(X \leq \lambda) > 0.5$.
4. A man has three coins A, B and C. Coin A is unbiased, the probability that a head will result when B is tossed is 2/3; the probability that a head will result when C is tossed is 1/3. If one of the coins, chosen at random is tossed three times and it gives a total of two heads and one tail then find the probability that the chosen coin was A.
5. Suppose the following three boxes are given:
   Box A has 10 lightbulbs of which 4 are defective.
   Box B has 6 lightbulbs of which 1 is defective.
   Box C has 8 lightbulbs of which 3 are defective.

   A box is chosen at random, and then a bulb is randomly selected from the chosen box.
   a) Find the probability p that the bulb is non-defective.
   b) If the bulb is non-defective, find the probability that it came from box A.

----ALL THE BEST----