Assignment-1

CS22BTECH11006

12.13.5.15 Question : The probability that a student is not a swimmer is $\frac{1}{5}$ .Then the probability that out of five students, four are swimmers

1) $^5C_4 \left(\frac{4}{5}\right)^4 \frac{1}{5}$

2) $\left(\frac{4}{5}\right)^4 \frac{1}{5}$

3) $^5C_1 \frac{1}{5} \left(\frac{4}{5}\right)^4$

4) None of these

Solution: Given,

Parameter	Value	Description
n	5	number of students
q	$\frac{1}{5}$	probability for not a swimmer
p	$\frac{4}{5}$	probability for a swimmer
k	4	number of swimmers

TABLE 4

GIVEN INFORMATION

X : be number of swimmers
As picking a student is Bernoulli trial
So, X has binomial distribution

$$p_X(k) = {}^nC_k p^k q^{n-k} \qquad (1)$$

Probability that out of five students, four are swimmers is $p_X(4)$

$$p_X(4) = {}^5C_4 \left(\frac{4}{5}\right)^4 \left(\frac{1}{5}\right)^{5-4} \qquad (2)$$

$$= {}^5C_4 \left(\frac{4}{5}\right)^4 \frac{1}{5} \qquad (3)$$

$$= {}^5C_1 \frac{1}{5} \left(\frac{4}{5}\right)^4 \quad \left({}^5C_4 = {}^5C_1\right) \qquad (4)$$

Hence, option 1 and 2both are correct