Problem Statement 1:

A test is conducted which is consisting of 20 MCQs (multiple choices questions) with every MCQ having its four options out of which only one is correct. Determine the probability that a person undertaking that test has answered exactly 5 questions wrong.

ANSWER:

C (n, k) = n! / (k!(n−k)!)

Here, n = 20, n - k = 5, k = 20 - 5 = 15

Here the probability of success = probability of giving a right answer = s = 1/4

Hence, the probability of failure = probability of giving a wrong answer = 1 - s
= 1 – 1/4 = 3/4

When we substitute these values in the formula for Binomial distribution we get,

So, P (exactly 5 out of 20 answers incorrect) = C (20, 5) * (1/4)^15 * (3/4)^5

P (5 out of 20) = (20∗19∗18∗17∗16) / (5∗4∗3∗2∗1) ∗ (1/4)^15 ∗ (3/4) ^ 5

= 0.0000034 (approximately)

Probability is **0.0000034** approximately.

Problem Statement 2:

A die marked A to E is rolled 50 times. Find the probability of getting a "D" exactly 5 times.

ANSWER:

Here, n = 50, k = 5, n - k = 45.

The probability of success = probability of getting a "D"= s = 1/5

Hence, the probability of failure = probability of not getting a "D" = 1 - s = 4/5.

Problem Statement 3:

Two balls are drawn at random in succession without replacement from an urn

containing 4 red balls and 6 black balls.

ANSWER:

Total Outcomes= 6+4 = 10

probability of getting **red** ball= 4/10=2/5

probability of getting **black** ball = 6/10 = 3/5