**Assignment 17.2**

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

**Solution:**

Given:

No. of trials (n) = 50

Count of success (k) = 5

Count of failure (n-k) = 50 – 5 = 45

Probability of success (s) = 1/5

Probability of failure (1-s) = 1 – 1/5

We will be using binomial distribution to solve this problem:

P (‘k’ successes in ‘n’ trials) = *C* (*n*, *k*) \* (s)k \* (1−*s*) (*n*−*k*)

C (n, k) is called the coefficient for binomial distribution or binomial coefficient. It is on this coefficient that the distribution is named.

**C (n, k) is evaluated as below:**

1. When k < ( n / 2) then C (n, k) = *n*! / (( *k*! (*n*−*k*)!))
2. When k > ( n / 2 ) then C ( k, n, s ) = C ( n – k, n, 1 – s)

As, k < ( n / 2 )

P (‘k’ successes in ‘n’ trials) = ( *n*! / (( *k*! (*n*−*k*)!)) \* (s)k \* (1−*s*) (*n*−*k*)

P ( getting ‘D’ exactly 5 times out of 20)

= ( (50\*49\*48\*47\*46) / (5\*4\*3\*2\*1) ) \* (1/5)5 \* (1 - 1/5) (50-5)

= ( 254251200 / 120 ) \* .00032 \* .00004355

= 0.029527

**Probability of answering 5 wrong questions by a person is 0.029527**.