

**TASK 2 – A-**

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.

**Solution –**

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,  $P(\text{exactly 5 out of 20 answers incorrect}) = C(20, 5) * (1/4)^5 * (3/4)^{15}$

$\rightarrow P(5 \text{ out of } 20) = (20*19*18*17*16) / (5*4*3*2*1) * (1/4)^5 * (3/4)^{15}$

$= 0.0000034$  (approx)

Thus the required probability is **0.0000034** approximately.

**TASK 2 –B-**

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

**Solution –**

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” =  $1 - s = 4/5$ .

**TASK 2 –C-**

Two balls are drawn at random in succession without replacement from an urn containing 4 red balls and 6 black balls. Find the probabilities of all the possible outcomes.

**Solution –**

First determine the probabilities of the events.

Events	Probability
RR =	$(4/10)(3/9) = 2/15$
RB =	$(4/10)(6/9) = 4/15$
BR =	$(6/10)(4/9) = 4/15$
BB =	$(6/10)(5/9) = 1/3$

The probability of 0 blue balls (RR) is  $2/15$

The probability of 1 blue ball is (RB or BR) is  $4/15 + 4/15 = 8/15$

The probability of 2 blue balls (BB) is  $1/3$

So the probability distribution is: Z   p(Z)

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0 =  **$2/15$**

1 =  **$8/15$**

2 =  **$1/3$**