Objective Questions

Question 1.
Mark (√) against the correct answer in each of the following:

If A and B are mutually exclusive events such that P(A) = 0.4, P(B) =x and P(A ∪ B) = 0.5, then x = ?

A. 0.2

B. 0.1

C. $\frac{4}{5}$

D. None of these

Answer:
If A and B are mutually exclusive events then,

P(A) = 0.4, P(B) = X

And P(A ∪ B) = P(A)+P(B) = 0.5 = 0.4 + P(B)

⇒ P(B) = 0.1

Question 2.
Mark (√) against the correct answer in each of the following:

If A and B are independent events such that P(A) = 0.4, P(B) = x and P(A ∪ B) = 0.5, then x = ?

A. $\frac{4}{5}$

B. 0.1

C. $\frac{1}{6}$

D. None of these

Answer:
As A and B are independent events such that P(A) = 0.4, P(B) = x

So, $P(A \cap B) = P(A)P(B)$

And $P(A \cup B) = P(A)+P(B)+P(A \cap B)$

$P(A \cup B) = 0.4 + X - 0.4X = 0.5$

$\Rightarrow 0.4 + 0.6X = 0.5$

$\Rightarrow X = 1/6$

Question 3.
Mark (√) against the correct answer in each of the following:

If P(A) = 0.8, P(B) = 0.5 and P(B/A) = 0.4, then P(A/B) =?

A. 0.32

B. 0.64

C. 0.16

D. 0.25

Answer:
$P(B/A) = \frac{P(A \cap B)}{P(A)}$

$\Rightarrow$ And P(A) = 0.8,

$\Rightarrow P(A \cap B) = 0.32$

So, $P(A/B) = \frac{P(A \cap B)}{P(B)}$

$\Rightarrow P(A/B) = \frac{0.32}{0.5} = 0.64$

$\Rightarrow$ Hence, the answer is b.

Question 4.

Mark (√) against the correct answer in each of the following:

If P(A) = $\frac{6}{11}$, P(B) = $\frac{5}{11}$ and P(A ∪ B) = $\frac{7}{11}$, then P(A/B)=?

A. $\frac{5}{6}$

B. $\frac{5}{7}$

C. $\frac{6}{7}$

D. $\frac{4}{5}$

Answer:
P(A) = $\frac{6}{11}$, P(B) = $\frac{5}{11}$ and P(A ∪ B) = $\frac{7}{11}$

P(A ∪ B) = P(A) + P(B) - P(A ∩ B)

$\Rightarrow \frac{7}{11} = \frac{6}{11} + \frac{5}{11} - P(A \cap B)$

$\Rightarrow$ P(A ∩ B) = $\frac{4}{11}$

P(A/B) = P(A ∩ B)/P(B)

$\Rightarrow$ P(A/B) = $\frac{\frac{4}{11}}{\frac{5}{11}} = \frac{4}{5}$

Question 5.
Mark (√) against the correct answer in each of the following:

If A and B are events such that P(A) = $\frac{1}{2}$, P(B) = $\frac{7}{12}$ and P(A′ ∪ B′) = $\frac{1}{4}$, then A and B are

A. Independent

B. Mutually exclusive

C. Both ‘a’ and ‘b.’

D. None of these

Answer:
We are having two events A and B such that

$P(A) = \frac{1}{2}$, $P(B) = \frac{7}{12}$ and $P(A' \cup B') = \frac{1}{4}$,

$P(A' \cup B') = P'(A \cap B) = 1 - P(A \cap B) = \frac{1}{4}$

$\Rightarrow P(A \cap B) = \frac{3}{4}$

⇒ As $P(A \cap B) \neq P(A).P(B)$ ... thus, they are not independent,

⇒ And as $P(A \cup B) \neq P(A) + P(B)$ ... thus, they are not mutually exclusive.

Hence, the answer is option d.

Question 6.
Mark (√) against the correct answer in each of the following:

It is given that the probability that A can solve a given problem is $\frac{3}{5}$ and the probability that B can solve the same problem is $\frac{2}{3}$. The probability that at least one of A and B can solve a problem is

A. $\frac{2}{5}$

B. $\frac{1}{15}$

C. $\frac{13}{15}$

D. $\frac{2}{15}$

Answer:
P(A) = probability that A can solve the problem

= 3/5

And P(B) = probability that B can solve the problem = 2/3

P(A U B) = P(A) + P(B), As the events are independent

⇒P(A∩B) = P(A).P(B)

Thus,

⇒ P(A) + P(B) = 3/5 +2/3 – 2/5 = 13/15

Question 7.
Mark (√) against the correct answer in each of the following:

The probabilities of A, B and C of solving a problem are $\frac{1}{6}$, $\frac{1}{5}$ and $\frac{1}{3}$ respectively. What is the probability that the problem is solved?

A. $\frac{4}{9}$

B. $\frac{5}{9}$

C. $\frac{1}{3}$

D. None of these

Answer:
The probability that the problem is solved = P(A∪B∪ C) = P(A)+P(B)+P(C)-P(A∩B)-P(B∩C)-P(C∩A) + 3P(A∩B∩C)

Considering independent events, P(A∩B) =P(A).P(B),

P(B∩C) =P(B).P(C), P(C∩A) =P(C).P(A),

P(A∩B∩C) =P(A).P(B).P(C),

Thus, P(A∪B∪ C) is,

$\Rightarrow \frac{1}{6}+\frac{1}{5}+\frac{1}{3}-\frac{1}{30}-\frac{1}{15}-\frac{1}{18}+3\left(\frac{1}{90}\right)=\frac{5}{9}$

Question 8.
Mark (√) against the correct answer in each of the following:

A can hit a target 4 times in 5 shots, B can hot 3 times in 4 shots, and C can hit 2 times in 3 shots. The probability that B and C hit and A does not hit is

A. $\frac{1}{10}$

B. $\frac{2}{5}$

C. $\frac{7}{12}$

D. None of these

Answer:
P(A) = $\frac{4}{5}$ P(B) = $\frac{3}{4}$ P(C) = $\frac{2}{3}$

P(B ∩ C ∩ A′) = P(B ∩ C) – P(B ∩ C ∩ A)

As the events are independent, So, P(B ∩ C) = P(B).P(C) = $\frac{3}{4} \times \frac{2}{3}$

And P(B ∩ C ∩ A) = P(B).P(C).P(A) = $\frac{4}{5} \times \frac{3}{4} \times \frac{2}{3}$

P(B ∩ C ∩ A′) = $\frac{1}{10}$

Question 9.
Mark (√) against the correct answer in each of the following:

A machine operates only when all of its three components function. The probabilities of the failures of the first, second and third component are 0.2, 0.3 and 0.5, respectively. What is the probability that the machine will fail?

A. 0.70

B. 0.72

C. 0.07

D. None of these

Answer:
The probability of failure of the first component = 0.2 =P(A)

The probability of failure of second component = 0.3 = P(B)

The probability of failure of third component = 0.5 = P(C)

As the events are independent,

The machine will operate only when all the components work, i.e.,

(1-0.2)(1-0.3)(1-0.5) = P(A′)P(B′)P(C′)

In rest of the cases, it won't work,

So P(AUBUC) = 1 – P(A′∩B′∩C′) = 1 – (0.8).(0.7).(0.5)

⇒ 1 – 0.28 = 0.72

Question 10.
Mark (√) against the correct answer in each of the following:

A die is rolled. If the outcome is an odd number, what is the probability that it is prime?

A. $\frac{2}{3}$

B. $\frac{3}{4}$

C. $\frac{5}{12}$

D. None of these

Answer:
The probability that the outcome which is either, 1, 3 or 5 is prime is

$= \frac{Favorable\ outcomes}{Total\ outcomes}$

Favourable outcomes = 3 or 5

Total outcomes = 1, 3, and 5

Thus, probability=

$\Rightarrow \frac{2}{3}$

Question 11.
Mark (√) against the correct answer in each of the following:

If A and B are events such that P(A) = 0.3, P(B) = 0.2 and P(A ∩ B) = 0.1, then P($\overline{A}$ ∩ B) = ?

A. 0.2

B. 0.1

C. 0.4

D. 0.5

Answer:
P(A) = 0.3, P(B) = 0.2 and P(A ∩ B) = 0.1

P($\overline{A}$ ∩ B) = P(B) – P(A ∩ B) = 0.2 – 0.1 = 0.1

Question 12.
Mark (√) against the correct answer in each of the following:

If P(A) = $\frac{1}{4}$, P(B) = $\frac{1}{3}$ and P(A ∩ B) = $\frac{1}{5}$, then P($\overline{B}$ / $\overline{A}$) = ?

A. $\frac{11}{15}$

B. $\frac{11}{45}$

C. $\frac{23}{60}$

D. $\frac{37}{45}$

Answer:

P(A) = $\frac{1}{4}$, P(B) = $\frac{1}{3}$ and P(A ∩ B) = $\frac{1}{5}$,

$P(\overline{B}/\overline{A}) = \frac{P(\bar{A} \cap \bar{B})}{P(\bar{A})} = \frac{1-P(A \cup B)}{1-P(A)} = \frac{1-\left(\frac{1}{4}+\frac{1}{3}-\frac{1}{5}\right)}{1-\frac{1}{4}}$

$\Rightarrow P(\overline{B}/\overline{A}) = \frac{23}{60}$

Question 13.
Mark (√) against the correct answer in each of the following:

If A and B are events such that P(A) = 0.4, P(B) = 0.8 and P(B/A) = 0.6, then P(A/B) =?

A. 0.2

B. 0.3

C. 0.4

D. 0.5

Answer:
P(A) = 0.4, P(B) = 0.8 and

P(B/A) = 0.6,

$P(B/A) = \frac{P(A \cap B)}{P(A)} = 0.6$

P(A ∩ B) = 0.24

$\Rightarrow P(A/B) = \frac{P(A \cap B)}{P(B)} = 0.3$

Question 14.

Mark (√) against the correct answer in each of the following:

If A and B are independent events, then $P\left(\overline{A} / \overline{B}\right)$=?

A. 1 – P(A)

B. 1 – P(B)

C. 1 – P(A/$\overline{B}$)

D. – P($\overline{A}$/B)

Answer:

$P\left(\overline{A} / \overline{B}\right) = \frac{P(\bar{A} \cap \overline{B})}{P(\bar{B})} = \frac{P(\bar{A})P(\overline{B})}{1-P(B)} = 1 - P(A)$

Question 15.
Mark (√) against the correct answer in each of the following:

If A and B are two events such that P(A ∪ B) = $\left(\frac{5}{6}\right)$, P(A ∩ B) = $\left(\frac{1}{3}\right)$ and P($\overline{B}$) = $\left(\frac{1}{2}\right)$, then the events A and B are

A. Independent

B. Dependent

C. Mutually exclusive

D. None of these

Answer:
Given,

P(A ∪ B) = $\left(\frac{5}{6}\right)$, P(A ∩ B) = $\left(\frac{1}{3}\right)$ and

P($\overline{B}$) = $\left(\frac{1}{2}\right)$, P(B) = 1- P($\overline{B}$) = 1- $\frac{1}{2}$ = $\frac{1}{2}$

⇒ P(B) = $\frac{1}{2}$

$\Rightarrow P(A) = \frac{2}{3}$

⇒ Hence, these are independent.

Question 16.
Mark (√) against the correct answer in each of the following:

A die is thrown twice, and the sum of the numbers appearing is observed to be 7. What is the conditional probability that the number 2 has appeared at least one?

A. $\frac{1}{6}$

B. $\frac{1}{3}$

C. $\frac{2}{7}$

D. $\frac{3}{5}$

Answer:
The die is thrown twice,

So the favourable outcomes that the sum appears to be 7 are

(1,6), (2,5), (3,4), (4,3), (5,2) and (6,1)

Out of these 2 appears twice,

So the probability that 2 appears at least once is:

$= \frac{Favorable\ outcomes}{Total\ outcomes}$

$\Rightarrow \frac{2}{6} = \frac{1}{3}$

Question 17.
Mark (√) against the correct answer in each of the following:

Two numbers are selected random from integers 1 through 9. If the sum if even, what is the

probability that both numbers are odd?

A. $\frac{1}{6}$

B. $\frac{2}{3}$

C. $\frac{4}{9}$

D. $\frac{5}{8}$

Answer:
The sum will be even when; both numbers are either even or odd,

i.e. for both numbers to be even, the total cases ${}^{5}C_1 X {}^{4}C_1$ (Both the numbers are odd)+ ${}^{4}C_1 X {}^{3}C_1$ (Both the numbers are even)= 32

The favourable number of cases will be,

Both odd, i.e. selecting numbers from 1, 3, 5, 7, or 9, i.e.

${}^{5}C_1 X {}^{4}C_1 = 20$

Thus, the probability that both numbers are odd will be =

$$= \frac{Favorable\ outcomes}{Total\ outcomes}$$

$$\Rightarrow \frac{20}{32} = \frac{5}{8}$$

Question 18.
Mark (√) against the correct answer in each of the following:

In a class, 60% of the students read mathematics, 25% biology and 15% both mathematics and biology. One student is selected at random. What is the probability that he reads mathematics if it is known that he reads biology?

A. $\frac{2}{5}$

B. $\frac{3}{5}$

C. $\frac{3}{8}$

D. $\frac{5}{8}$

Answer:
Given:

60% of the students read mathematics, 25% biology and 15% both mathematics and biology

That means,

Let the event A implies students reading mathematics,

Let the event B implies students reading biology,

Then, P(A) = 0.6

P(B) = 0.25

P(A∩B) = 0.15

We, need to find P(A/B) = P(A∩B)/ P(B)

$\Rightarrow \frac{0.15}{0.25} = \frac{3}{5}$

Question 19.
Mark (√) against the correct answer in each of the following:

A couple has 2 children. What is the probability that both are boys. If it is known that one of them is a boy?

A. $\frac{1}{3}$

B. $\frac{2}{3}$

C. $\frac{3}{4}$

D. $\frac{1}{4}$

Answer:
The couple has two children and one is known to be boy,

The probability that the other is boy will be =

$$\frac{Favorable\ outcomes}{Total\ outcomes}$$

Total outcomes are 3,

The first child is a boy, the second girl

The first child is a girl, the second boy

The first child is a boy, second boy

The favourable outcome is one,

Thus, the probability that the other is boy will be

⇒1/3

Question 20.
Mark (√) against the correct answer in each of the following:

An unbiased die is tossed twice. What is the probability of getting a 4, 5 or 6 on the first toss and a 1, 2, 3 or 4 on the second toss?

A. $\frac{1}{3}$

B. $\frac{2}{3}$

C. $\frac{3}{4}$

D. $\frac{5}{6}$

Answer:
A die is tossed twice,

The probability of getting a 4, 5 or 6 in the first trial is 3/6 = P(A)

The probability of getting a 1, 2, 3 or 4 in the second trial is 4/6 =P(B)

As the events are independent, the probability of these two events together will be, P(A).P(B) = 1/3.

Question 21.
Mark (√) against the correct answer in each of the following:

A fair coin is tossed 6 times. What is the probability of getting at least 3 heads?

A. $\frac{11}{16}$

B. $\frac{21}{32}$

C. $\frac{1}{18}$

D. $\frac{3}{64}$

Answer:
Using Bernoulli's Trial P(Success=x) = ${}^{n}C_{x}.p^{x}.q^{(n-x)}$

x=0, 1, 2, ...n and q = (1-p)

As the coin is thrown 6 times the total number of outcomes will be 2^6.

And we know that the favourable outcomes of getting at least 3 successes will be, getting a head

The probability of success is $\frac{1}{2}$ and of failure is also $\frac{1}{2}$

${}^{6}C_{3}(\frac{1}{2})^{3}(\frac{1}{2})^{3} + {}^{6}C_{4}(\frac{1}{2})^{4}(\frac{1}{2})^{2} + {}^{6}C_{5}\ (\frac{1}{2})^{5}(\frac{1}{2})^{1} + {}^{6}C_{6}(\frac{1}{2})^{6}(\frac{1}{2})^{0}$

$\Rightarrow \frac{21}{32}$

Question 22.
Mark (√) against the correct answer in each of the following:

A coin is tossed 5 times. What is the probability that tail appears an odd number of times?

A. $\frac{3}{5}$

B. $\frac{2}{15}$

C. $\frac{1}{2}$

D. $\frac{1}{3}$

Answer:
Using Bernoulli's Trial P(Success=x) = ${}^{n}C_{x}.p^{x}.q^{(n-x)}$

x=0, 1, 2, ...n and q = (1-p)

As the coin is tossed 5 times the total number of outcomes will be 2^5.

And we know that the favourable outcomes of getting the odd tail number of times ,successes will be, getting a tail

The probability of success is $\frac{1}{2}$ and of failure is also $\frac{1}{2}$

${}^{5}C_{1}(\frac{1}{2})^{1}(\frac{1}{2})^{4} + {}^{5}C_{3}(\frac{1}{2})^{3}(\frac{1}{2})^{2} + {}^{5}C_{5}\ (\frac{1}{2})^{5}(\frac{1}{2})^{0}$

$\Rightarrow \frac{16}{32} = \frac{1}{2}$

Question 23.
Mark (√) against the correct answer in each of the following:

A coin is tossed 5 times. What is the probability that the head appears an even number of times?

A. $\frac{2}{5}$

B. $\frac{3}{5}$

C. $\frac{4}{15}$

D. $\frac{1}{2}$

Answer:
Using Bernoulli's Trial P(Success=x) = ${}^{n}C_{x}.p^{x}.q^{(n-x)}$

x=0, 1, 2, ...n and q = (1-p)

As the coin is tossed 5 times the total number of outcomes will be 2^5.

And we know that the favourable outcomes of getting the head even number of times ,successes will be, getting a head,

The probability of success is $\frac{1}{2}$ and of failure is also $\frac{1}{2}$

the probability that head appears an even number of times =

P(0)+P(2)+P(4)

$= {}^{5}C_{2}(\frac{1}{2})^{2}(\frac{1}{2})^{3} + {}^{5}C_{3}(\frac{1}{2})^{3}(\frac{1}{2})^{2} + {}^{5}C_{5}\ (\frac{1}{2})^{5}(\frac{1}{2})^{0}$

$\Rightarrow \frac{16}{32} = \frac{1}{2}$

Question 24.
Mark (√) against the correct answer in each of the following:

8 coins are tossed simultaneously. The probability of getting at least 6 heads is

A. $\frac{7}{64}$

B. $\frac{57}{64}$

C. $\frac{37}{256}$

D. $\frac{249}{256}$

Answer:
Using Bernoulli's Trial P(Success=x) = ${}^{n}C_{x}.p^{x}.q^{(n-x)}$

x=0, 1, 2, ...n and q = (1-p)

As the coin is tossed 8 times the total number of outcomes will be 2^8.

And we know that the favourable outcomes of getting at least 6 heads are,successes will be, getting a head,

The probability of success is $\frac{1}{2}$ and of failure is also $\frac{1}{2}$

the probability of getting at least 6 heads is =

P(6) +P(7) +P(8)

$= {}^{8}C_{6}(\frac{1}{2})^{6}(\frac{1}{2})^{2} + {}^{8}C_{7}(\frac{1}{2})^{7}(\frac{1}{2})^{1} + {}^{8}C_{8}(\frac{1}{2})^{8}(\frac{1}{2})^{0}$

$\Rightarrow \frac{28+8+1}{256} = \frac{37}{256}$

Question 25.
Mark (√) against the correct answer in each of the following:

A die is thrown 5 times. If getting an odd number is a success, then what is the probability of getting at least 4 successes?

A. $\frac{4}{5}$

B. $\frac{7}{16}$

C. $\frac{3}{16}$

D. $\frac{3}{20}$

Answer:
Using Bernoulli's Trial P(Success=x) = ${}^{n}C_{x}.p^{x}.q^{(n-x)}$

x=0, 1, 2, ...n and q = (1-p)

As the die is thrown 5 times the total number of outcomes will be 6^5.

And we know that the favourable outcomes of getting at least 4 successes will be, either getting 1, 3 or 5 i.e., 1/6 probability of each, total, $\frac{3}{6}$ probability, p = $\frac{1}{2}$,q = $\frac{1}{2}$

The probability of success is $\frac{3}{6}$ and of failure is also $\frac{3}{6}$

$$= \frac{The\ favourable\ outcomes}{The\ total\ number\ of\ outcomes}$$

the probability of getting at least 4 successes =

P(4)+P(5)

$\Rightarrow {}^{5}C_{4}(\frac{1}{2})^{4}(\frac{1}{2})^{1} + {}^{5}C_{5}(\frac{1}{2})^{5}(\frac{1}{2})^{0}$

$\Rightarrow \frac{3}{16}$

Question 26.
Mark (√) against the correct answer in each of the following:

In 4 throws of a pair of dice, what is the probability of throwing doublets at least twice?

A. $\frac{7}{36}$

B. $\frac{17}{144}$

C. $\frac{19}{144}$

D. None of these

Answer:
Using Bernoulli's Trial P(Success=x) = ${}^{n}C_{x}.p^{x}.q^{(n-x)}$

x=0, 1, 2, ...n and q = (1-p)

As we know that the favourable outcomes of getting at least doublets twice are, successes will be, getting a doublet, i.e.,

, $p = \frac{1}{6}, q = \frac{5}{6}$

The probability of success is $\frac{1}{6}$ and of failure is also $\frac{5}{6}$

$$= \frac{The\ favourable\ outcomes}{The\ total\ number\ of\ outcomes}$$

the probability of getting at least 2 successes =

P(2)+P(3)+P(4)

$\Rightarrow {}^{4}C_{2}(\frac{1}{6})^{2}(\frac{5}{6})^{2} + {}^{4}C_{3}(\frac{1}{6})^{3}(\frac{5}{6})^{1} + {}^{4}C_{4}(\frac{1}{6})^{4}(\frac{5}{6})^{0}$

$\Rightarrow \frac{19}{144}$

Question 27.
Mark (√) against the correct answer in each of the following:

A pair of dice is thrown 7 times. If getting a total of 7 is considered a success, what is the probability of getting at most 6 successes?

A. $\left(\frac{5}{7}\right)^{7}$

B. $\left(\frac{1}{6}\right)^{7}$

C. $\left(1-\frac{1}{6^7}\right)$

D. None of these

Answer:
Using Bernoulli's Trial P(Success=x) = ${}^nC_x.p^x.q^{(n-x)}$

x=0, 1, 2, ...n and q = (1-p), here n = 7

As we know that the favourable outcomes of getting at most 6 success are, successes will be, getting a total of 7 is success, i.e.,

We can get 7 by, (1,6), (2,5), (3,4), (4,3), (5,2), (6,1)

, p = $\frac{6}{36}$,q = $\frac{30}{36}$

The probability of success is $\frac{1}{6}$ and of failure is also $\frac{5}{6}$

$$= \frac{The\ favourable\ outcomes}{The\ total\ number\ of\ outcomes}$$

the probability of getting at most 6 successes =

P(0)+P(1)+P(2)+P(3)+P(4)+P(5)+P(6) = 1-P(7)

$\Rightarrow 1 - {}^7C_7(\frac{1}{6})^7(\frac{5}{6})^0$

$\Rightarrow 1 - (\frac{1}{6})^7$

Question 28.
Mark (√) against the correct answer in each of the following:

The probability that a man can hit a target is $\frac{3}{4}$. He tries five times. What is the probability that he will hit the target at least 3 times?

A. $\frac{459}{512}$

B. $\frac{291}{364}$

C. $\frac{371}{464}$

D. None of these

Answer:
The probability that the man hits the target is 3/4

Using Bernoulli's Trial we have,

$P(Success=x) = {}^{n}C_{x}.p^{x}.q^{(n-x)}$

x=0, 1, 2, ...n and q = (1-p), n =5

p = , q =

Probability that he will hit at least 3 times is =

P(3)+P(4)+P(5)

$\Rightarrow {}^{5}C_{3}(\frac{3}{4})^{3}(\frac{1}{4})^{2}+{}^{5}C_{4}(\frac{3}{4})^{4}(\frac{1}{4})^{1}+{}^{5}C_{5}(\frac{3}{4})^{5}(\frac{1}{4})^{0}$

$\Rightarrow \frac{459}{512}$

Question 29.
Mark (√) against the correct answer in each of the following:

The probability of the safe arrival of one ship out of 5 is $\frac{1}{5}$. What is the probability of the safe arrival of at least 3 ships?

A. $\frac{1}{31}$

B. $\frac{3}{52}$

C. $\frac{181}{3125}$

D. $\frac{184}{3125}$

Answer:
The probability of safe arrival of the ship is 1/5

Using Bernoulli's Trial we have,

$P(Success=x) = {}^{n}C_{x}.p^{x}.q^{(n-x)}$

x=0, 1, 2, ...n and q = (1-p), n =5

p = 1/5 , q = 4/5

Probability of safe arrival of at least 3 ships is =

P(3)+P(4)+P(5)

$\Rightarrow {}^{5}C_{3}(\frac{1}{5})^{3}(\frac{4}{5})^{2}+{}^{5}C_{4}(\frac{1}{5})^{4}(\frac{4}{5})^{1}+{}^{5}C_{5}(\frac{1}{5})^{5}(\frac{4}{5})^{0}$

$\Rightarrow \frac{181}{3125}$

Question 30.
Mark (√) against the correct answer in each of the following:

The probability that an event E occurs in one trial is 0.4, Three independent trials of the experiment are performed. What is the probability that E occurs at least once?

A. 0.784

B. 0.936

C. 0.964

D. None of these

Answer:
The probability of occurrence of an event E in one trial is 0.4

Using Bernoulli's Trial we have,

$P(Success=x) = {}^{n}C_{x}.p^{x}.q^{(n-x)}$

x=0, 1, 2, ...n and q = (1-p), n =3

p = 0.4 , q = 0.6

The probability that E occurs at least once is,

P(1)+P(2)+P(3)

$\Rightarrow {}^{3}C_{1}(\frac{2}{5})^{1}(\frac{3}{5})^{2}+{}^{3}C_{2}(\frac{2}{5})^{2}(\frac{3}{5})^{1}+{}^{3}C_{3}(\frac{2}{5})^{3}(\frac{3}{5})^{0}$

$\Rightarrow \frac{98}{125} = 0.784$