Std 10 (English)   <u>**Mathematics Part - I**</u>

Time 1HRS	**Chapter 5.SOLUTION**	**Marks 20**

Q.1   Multiple Choice Questions   **2**

1   From the following options, find the correct answer if P is an event of getting a head and an even
         number when a die and a coin are thrown simultaneously.
         a. P = {(H, 1), (H, 2), (T, 4)}   b. P = {(H,1), (H, 3), (H, 5)}
         c. P = {(H, 2), (H, 4), (H, 6)}   d. P = {(H, 2), (H, 3), (H, 4)}

Ans Option c.

2   From the following options find the correct answer if A is an event of getting an even number on upper
         face when a die is rolled.
         a. A = {1, 2, 3}   b. A = {2, 4, 5}   c. A = { 1, 3, 5}   d. A = {2, 4, 6}

Ans Option d.

Q.2   Answer the following   **2**

1   In each of the following experiments, write the sample space S and the number of sample points n(S)
         i. three coins are tossed simultaneously.
         ii. Form two-digit numbers using the digits 0,1,2,3 without repeating the digit.

Ans i. S = {HHH, HHT, HTH, THH, HTT, THT, TTH, TTT}
         n(S) = 8
         ii.S = {10, 12, 13, 20, 21, 23, 30, 31, 32}
         n(S) = 9

2   If two coins are tossed simultaneously, find the probability of getting a head on both the coins.

Ans S = {HH, HT, TH, TT},   n(S) = 4
         If event A is getting a head on both coins.
         A = {HH}, n(A) = 1
         $P(A) = \frac{n(A)}{n(S)} = \frac{1}{4}$

Q.3   Attempt the following (Activity)   **2**

1   Two dice are rolled simultaneously. Find the probability that
         i. the sum of the numbers on their upper faces is at the most 5.
         ii. the sum of the numbers on their upper faces is at the least 6.

         i. n(S) = 36
           n(A) = 10
         $\therefore$ P(A) = _____
               = $\frac{10}{36}$
               = _____
         ii.n(S) = 36
           n(A) = 26
           P(A) = _____
               = $\frac{26}{36}$
               =
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Ans 1) n(A)n(S)   2) 518   3) n(A)n(S)   4) 1318

Q.4 **Answer the following** **4**

1 A card is drawn at random from well-shuffled pack of 52 playing cards. Find the probability that the card drawn is a spade.

Ans There are 52 playing cards.

∴ $n(S) = 52$

Let A be the event that the card drawn is a spade.

There are 13 cards in the suit of Spades.

∴ $n(A) = 13$ $P(A) = \dfrac{n(A)}{n(S)}$

∴ $P(A) = \dfrac{13}{52} = \dfrac{1}{4}$.

2 A card is drawn at random from well-shuffled pack of 52 playing cards. Find the probability that the card drawn is
a face card.

Ans There are 52 playing cards.

∴ $n(S) = 52$

Let C be the event that the card drawn is a face card.

There are 3 × 4 = 12 face cards in a pack of 52 cards.

∴ $n(C) = 12$

$P(C) = \dfrac{n(C)}{n(S)}$ ∴ $P(C) = \dfrac{12}{52} = \dfrac{3}{13}$.

Q.5 **Solve the following(Any One)** **3**

1 A box contains 25 cards numbered 1 to 25. A card is drawn from the box at random. Find the probability that the number on the card is:
i. even
ii. prime
iii. multiple of 6

Ans $S = \{1, 2, 3, ... 25\}$ $n(s) = 25$

i) Even numbers are 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24 i.e number of favorable outcomes = 12

∴ Probability of an even number will be

$P(E) = \dfrac{12}{25}$

ii) Prime number are 2, 3, 5, 7, 11, 13, 17, 19, 23

i.e number of prime = 9

∴ Probability of prime will be

$P(E) = \dfrac{\text{Number of favourable outcome}}{\text{Number of possible outcome}} = \dfrac{9}{25}$

iii) Multiples of 6 are 6, 12, 18, 24

∴ Number of multiples = 4

∴ Probability of multiples of 6 will be

$P(E) = \dfrac{\text{Number of favourable outcome}}{\text{Number of possible outcome}} = \dfrac{4}{25}$

2 If one die is rolled then find the probability of each of the following events.

(i) Number on the upper face is prime
(ii)Number on the upper face is even.

Ans   'S' is the sample space.

$S = \{1, 2, 3, 4, 5, 6\}$ ∴ $n(S) = 6$

(i)   Event A : Prime number on the upper face.

$A = \{2, 3, 5\}$ ∴ $n(A) = 3$

$P(A) = \dfrac{n(A)}{n(S)}$

∴ $P(A) = \dfrac{3}{6} = \dfrac{1}{2}$

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(ii) Event B : Even number on the upper face.

B = {2, 4, 6}

∴ n(B) = 3

P(B) = n(B)n(S)

P(B) = 36 = 12

Q.6 Answer the following(Any One) 4

1 A sanitation committee of 2 members is to be formed from 3 boys and 2 girls. Write sample space 'S' and number of sample points n(S). Also write the following events in set form and number of sample points in the event.

(i) Condition for event A : at least one girl must be a member of the committee.

(ii) Condition for event B : Committee must be of one boy and one girl.

(iii) Condition for event C : Committee must be of boys only.

(iv) Condition for event D : At the most one girl should be a member of the committee.

Ans Suppose B_1, B_2, B_3 are three boys and G1, G2 are two girls

Out of these boys and girls, a sanitation committee of two members is to be formed.

∴ S = {B_1B_2, B_1B_3, B_2B_3, B_1G_1, B_1G_2, B_2G_1, B_2G_2, B_3G_1, B_3G_2, G_1G_2}

∴ n(S) = 10

(i) Condition for event A is that at least one girl should be in the committee.

A = {B_1G_1, B_1G_2, B_2G_1, B_2G_2, B_3G_1, B_3G_2, G_1G_2}

∴ n(A) = 7

(ii) Condition for event B is that one boy and one girl should be there in the committee.

B = {B_1G_1, B_1G_2, B_2G_1, B_2G_2, B_3G_1, B_3G_2}

∴ n(B) = 6

Condition for event C is that there should be only boys in the committee.

(iii) C = {B_1B_2, B_1B_3, B_2B_3}

∴ n(C) = 3

Condition for event D is that there can be at most one girl in the committee.

(iv) D = {B_1B_2, B_1B_3, B_2B_3, B_1G_1, B_1G_2, B_2G_1, B_2G_2, B_3G_1, B_3G_2}

∴ n(D) = 9

2 Two dice are rolled, write the sample space 'S' and number of sample points n(S). Also write events and number of sample points in the event according to the given condition.

(i) Sum of the digits on upper face is a prime number.

(ii) Sum of the digits on the upper face is multiple of 5.

(iii) Sum of the digits on the upper face is 25.

(iv) Digit on the upper face of the first die is less than the digit on the second die.

Ans Sample space,

S = {(1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6),

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

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

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

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

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

∴ n(S) = 36

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(i) Event E : The sum of the digits on the upper face is a prime number.

E = {(1, 1), (1, 2), (1, 4), (1, 6), (2, 1), (2, 3), (2, 5), (3, 2), (3, 4),

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

∴ n(E) = 15

(ii) Event F : The sum of the digits on the upper face is a multiple of 5.

F = { (1, 4), (2, 3), (3, 2), (4, 1), (4, 6), (5, 5), (6, 4) }

∴ n(F) = 7

(iii) Event G : The sum of the digits on the upper face is 25.

G = { }

∴ n (G) = 0   ... (G is an impossible event)

(iv) Event H : The number on upper face of first die is less than the digit on second die.

H = {(1, 2) (1, 3) (1, 4) (1, 5) (1, 6) (2, 3) (2, 4) (2, 5) (2, 6)

    (3, 4) (3, 5) (3, 6) (4, 5) (4, 6) (5, 6)}

∴ n(H) = 15

Q.7   **Answer the following (Any One)**   **3**

1   All the three face cards of spades are removed from a well-shuffled pack of 52 cards. A card is then drawn at random from the remaining pack. Find the probability of getting

i. a black face card

ii. a queen

iii. a black card

iv. a heart

v. a spade

vi. '9' of black colour

Ans In a pack of 52 cards

All the three face cards of spade are = 3

Number of remaining cards = 52 - 3 = 49

One card is drawn at random

    i. Probability of a black face card which are

       = 6 - 3 = 3 = 349

    ii. Probability of being a queen which are

       4 - 1 = 3

∴   Probability = 349

    iii. Probability of being a black card

       (26 - 3 = 23) = 2349

    iv. Probability of being a heart = 1349

    v. Probability of being a spade = (13 - 3 = 10)

       = 1049

    vi. Probability of being 9 of black colour (which are 2)

       = 249

2   A bag contains 15 balls of which some are white and others are red. If the probability of drawing a red ball is twice that of a white ball, find the number of white balls in the bag.

Ans In a bag, there are 15 balls.

Some are which and others are red.

Probability of red balls = 2 probability of white ball

Let number of white balls = x

Then, number of red balls = 15 - x

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∴ 15 - x15 = 2 ×x15

$\quad$ 15 - x = 2x

$\quad$ 15 = 3x

∴ x = 5

∴ No of white balls is 5.

YOUR FLIGHT , OUR WINGS .

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