SHIKSHA CLASSES

Subject : Algebra **Answer Paper** **Marks : 20**

Class : X **5. Probability**

Q.1: A) Choose the correct alternatives of the following questions. 2

1) Result of a random experiment is known as.

Ans: b) Outcome

2) In a pack of 52 playing cards total face cards are

Ans: d) 12

B) Define sample space with suitable example. 1

Ans: Sample space : The set of all possible out comes of a random experiment is called sample space e.g. A coin is tossed $S = \{H, T\}$

Q.2: A) Attempt any ONE of the following. 2

1) How many possibilities are there in each of the following.

i) Any day of a week is to be selected.

Ans: There are 7 possibilities

ii) Select one card from the pack of 52 cards.

Ans: There are 52 possibilities

2) Two coins are tossed simultaneously write the sample space (s) and number of sample (p) and n(s). Also write it in set form the condition that getting no head.

Ans: Two coins are tossed.

$S = \boxed{\{HH, HT, TH, TT\}}$

$\therefore \quad n(S) = 4$

$\therefore$ By given condition

we have no head outcome

$\therefore \quad A = \boxed{\{TT\}}$

$\therefore \quad n(A) = 1$

B) Attempt any ONE of the following. 2

1) There are 15 tickets in a box, each bearing one of the numbers from 1 to 15. One ticket is drawn at random from the box. Find the probability of event that the ticket drawn.

i) Shows an even number.

ii) Shows a number which is a multiple of 5.

Ans: Let 'S' is the sample space. 15 tickets in a box

$\therefore \quad n(S) = 15$

Event A : Ticket drawn shows an even number

$n(A) = \{2, 4, 6, 8, 10, 12, 14\}$

$n(A) = 7$

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

$$= \frac{7}{15}$$

$$P(A) = \frac{7}{15}$$

Event B : Ticket drawn shows a number which is a multiple of 5

$n(B) = \{5, 10, 15\}$

$n(B) = 3$

$$P(B) = \frac{n(B)}{n(S)}$$

$$= \frac{3}{15}$$

$$= \frac{1}{5}$$

2) One die is rolled then find the probability of each of following events.

i) No. on upper face is prime

ii) No. on upper face is even

Ans: Let 'S' be sample space

$S = \{1, 2, 3, 4, 5, 6\}$

$\therefore n(S) = 6$

i) Let A be event that number on upper face is prime.

$A = \{2, 3, 5\}$

$n(A) = 3$

$$P(A) = \frac{n(A)}{n(S)} = \frac{3}{6} = \frac{1}{2}$$

ii) Let B be event that number on upper face is even

$B = \{2, 4, 6\}$

$\therefore n(B) = 3$

$$P(B) = \frac{n(B)}{n(S)} = \frac{3}{6} = \frac{1}{2}$$

Q.3: A) Attempt any ONE of the following. 2

1) Write sample space 's' and number of sample point n(s) for the following experiment. Also write events A, B, C in the set form and write n(A), n(B) and n(C). One die is rolled.

Event A : Even number on the upper face

Event B : Odd number on the upper face

Event C : Number greater than 4

Ans: One die is rolled.

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

Event A : Even number on the upper face

$A = \{2, 4, 6\}$

$\therefore n(A) = 3$

Event B : odd number on the upper face

$B = \{1, 3, 5\}$

$\therefore n(B) = 3$

Event C : Number greater than 4

$C = \{5, 6\}$

$\therefore n(C) = 2$

2) Find the probability of the following when a coin is tossed.

i) Getting head ii) Getting tail

Ans: Sample space

$S = \{H, T\}$

$\therefore \quad n(S) = \boxed{2}$

i) Let A be event of getting head.

$A = \boxed{H}$

$\therefore \quad n(A) = 1$

$$\therefore \quad P(A) = \frac{\boxed{n(A)}}{\boxed{n(S)}} = \frac{1}{2}$$

ii) Let B be event of getting tail.

$B = \boxed{T}$

$\therefore \quad n(B) = 1$

$$\therefore \quad P(B) = \frac{\boxed{n(B)}}{\boxed{n(S)}} = \frac{1}{2}$$

B) Attempt any ONE of the following. 3

1) Two digit numbers are formed using digits, 0,1, 2, 3, 4, 5 without repetition of the digits.

Event A : The number formed is even.

Event B : The number formed is divisible by 3

Event C : The number formed is greater than 50. Write n(A), n(B) and n(C).

Ans: The sample space

$S = \{10, 12, 13, 14, 15, 20, 21, 23, 24, 25, 30, 31, 32, 34, 35, 40, 41, 42, 43, 45 50, 51, 52, 53, 54\}$

$\therefore n(S) = 25$

Event A : The number formed is even.

$A = \{10, 12, 14, 20, 24, 30, 32, 34, 40, 42, 50, 52, 54\}$

$\therefore n(A) = 13$

Event B : The number formed is divisible by 3

$B = \{12, 15, 21, 24, 30, 42, 45, 51, 54\}$

$\therefore n(B) = 9$

Event C : The number formed is greater than 50

$C = \{51, 52, 53, 54\}$

$\therefore n(C) = 4$

2) A card is drawn from a well shuffled pack of 52 playing cards. Find the probability of each event. The card drawn is.

i) A red card ii) A face card.

Ans: Let 'S' be a sample space

$\therefore n(S) = 52$

Event A : Card drawn is red card.

Total red cards = 13 heart + 13 diamonds

= 26

$\therefore n(A) = 26$

$$\therefore P(A) = \frac{n(A)}{n(S)} = \frac{26}{52} = \frac{1}{2}$$

Event B : Card drawn is face card

Total face card cards = 12

$\therefore n(B) = 12$

$$\therefore P(B) = \frac{n(B)}{n(S)} = \frac{12}{52} = \frac{3}{13}$$

Q. 4 : Attempt any ONE of the following. 4

1) A card is drawn from a well shuffled pack of 52 playing cards. Find the probability of each event. The card drawn is.

i) A red card

ii) a face card

iii) A diamond card

iv) A spade card.

Ans: i) A red card

There are 26 red cards

Let A be the event the card drawn is a red card

$\therefore n(A) = 26$

$$\therefore P(A) = \frac{n(A)}{n(S)} = \frac{\cancel{26}\,1}{\cancel{52}\,2} = \frac{1}{2}$$

ii) A face card

Let 'B' be the event the card drawn is a face card

$\therefore$ There are 12 face card

$\therefore n(B) = 12$

$$\therefore P(B) = \frac{n(B)}{n(S)} = \frac{\cancel{12}\,3}{\cancel{52}\,13} = \frac{3}{13}$$

iii) A diamond card

Let 'C' be the event the card drawn is a diamond card

There are 13 diamond cards

$\therefore n(C) = 13$

$$P(C) = \frac{n(C)}{n(S)} = \frac{13}{52} = \frac{1}{4}$$

iv) A spade card

Let 'D' be the event the card drawn is spade card There are 13 spade cards

$n(D) = 13$

$$\therefore P(D) = \frac{n(D)}{n(S)} = \frac{13}{52} = \frac{1}{4}$$

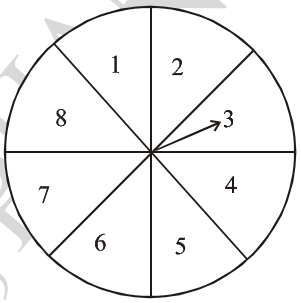
2) A game of a chance, a spinning arrow comes to rest at one of the numbers 1, 2, 3, 4, 5, 6, 7, 8. All these are equally likely outcomes find the probability that if will rest at.

i) 8

ii) An odd number

iii) A number greater than 2

iv) A less than 9



Ans: The sample sapce is

S = {1, 2, 3, 4, 5, 6, 7, 8}

$\therefore n(S) = 8$

1) Let 'A' be the event that the arrow points at 8

Then A = {8}

$\therefore$ $n(A) = 1$

$$\therefore P(A) = n(A) = \frac{1}{8}$$

2) Let 'B' be the event that arrow points at an odd number

B = {1, 3, 5, 7}

$\therefore$ $n(B) = 4$

$$P(B) = \frac{n(B)}{n(S)} = \frac{\cancel{4}}{\cancel{8}\,2} = \frac{1}{2}$$

3) Let c be the event that the arrow points at number greater than 2

C = {3, 4, 5, 6, 7, 8}

$\therefore$ $n(C) = 6$

$$P(c) = \frac{n(C)}{n(S)} = \frac{\cancel{6}\,3}{\cancel{8}\,4} = \frac{3}{4}$$

4) Let 'D' be the event that the arrow points number less than 9

D = {1, 2, 3, 4, 5, 6, 7, 8 }

$\therefore$ n (D) = 8

$$P(D)=\frac{n(D)}{n(S)}=\frac{8}{8}=1$$

1) $\frac{1}{8}$ 2) $\frac{1}{2}$ 3) $\frac{3}{4}$ 4) 1

Q.5: Attempt any ONE of the following. 3

1) If a card is drawn from a pack of 52 cards. Find the probability of the following events.

i) Event A : Getting a black card.

ii) Event B : Not getting a black card

iii) Events C : Getting a card bearing number between 2 to 5 including 2 and 5.

Ans: The sample space 'S' contains 52 sample points.

$$\therefore n(S)=52$$

i) 'A' is the event getting black card

$\therefore$ There are 26 black cards

$\therefore$ n(A) = 26

$$\therefore P(A)=\frac{n(A)}{n(S)}=\frac{\cancel{26}\ 1}{\cancel{52}\ 2}=\frac{1}{2}$$

ii) 'B' is the event not getting a black card.

$\therefore$ Out of 52 cards, 26 are black cards and 26 are red cards

$\therefore$ n(B) = 26

$$\therefore P(B)=\frac{n(B)}{n(S)}=\frac{\cancel{26}\ 1}{\cancel{52}\ 2}=\frac{1}{2}$$

iii) 'C' is the event getting a card bearing number betⁿ 2 to 5 including 2 and 5

There are 4 cards bearing 2, 3, 4, 5 in each of the four suits

$\therefore$ There are in all 4 x 4 = 16 cards

$\therefore$ One card can be drawn out of 16 cards in 16 ways

$\therefore$ n(C) = 16

$$\therefore P(C)=\frac{n(C)}{n(S)}=\frac{16}{52}=\frac{4}{13}$$

1) $\frac{1}{2}$ 2) $\frac{1}{2}$ 3) $\frac{4}{13}$

2) A sanitation committee of two members is to be formed from 3 boys and 2 girls. Write sample space 's' and number of sample pts n(S). Also find the probability that.

i) At least one girl must be member of the committee.

ii) Committee must be of one boy and one girl.

iii) Committee must be of boys only.

iv) At most one girl.

Ans: Let B_1, B_2, B_3 are three boys and G_1, G_2 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}

$\therefore$ n (S) = 10

i) Let 'A' be the event 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}

$\therefore$ n(A) = 7

$$\therefore P(A)=\frac{n(A)}{n(S)}=\frac{7}{10}$$

ii) Let 'B' the event committtee must be of one boy and one girl.

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

$\therefore$ n (B) = 6

$$P(B)=\frac{n(B)}{n(S)}=\frac{\cancel{6}\ 3}{\cancel{10}\ 5}=\frac{3}{5}$$

iii) Let 'c' be the event committee must be of boys only.

C = {B_1B_2, B_1B_3, B_2B_3}

$$n(c) = 3 \quad \therefore p(c)=\frac{n(c)}{n(s)}=\frac{3}{10}$$

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