PM SHRI KENDRIYA VIDYALAYA GACHIBOWLI,GPRA CAMPUS,HYD-32
PRACTICE PAPER 13 (2023-24)
CHAPTER 14 PROBABILITY (ANSWERS)

SUBJECT: MATHEMATICS **MAX. MARKS : 40**

CLASS : X **DURATION : 1½ hrs**

General Instructions:

(i). **All** questions are compulsory.

(ii). This question paper contains 2**0** questions divided into five Sections A, B, C, D and E.

(iii). **Section A** comprises of **10 MCQs** of **1 mark** each. **Section B** comprises of 4 questions of **2 marks** each. **Section C** comprises of 3 questions of **3 marks** each. **Section D** comprises of 1 question of **5 marks** each and **Section E** comprises of 2 Case Study Based Questions of **4 marks** each.

(iv). There is no overall choice.

(v). Use of Calculators is not permitted

SECTION – A

Questions 1 to 10 carry 1 mark each.

1. A bag has 5 white marbles, 8 red marbles and 4 purple marbles. If we take a marble randomly, then what is the probability of not getting purple marble?

(a) 0.5 (b) 0.66 (c) 0.08 (d) 0.77

Ans: (d) 0.77

Total number of purple marbles = 4

Total number of marbles in bag = 5 + 8 + 4 = 17

Probability of getting not purple marbles = 13/17 = 0.77

2. Two dice are thrown simultaneously. What is the probability of getting doublet?

(a) 1/36 (b) 1/6 (c) 5/6 (d) 11/36

Ans: (b) 1/6

Number of Possible outcomes are 36

Number of favourable outcomes = 6

Probability = 6/36 = 1/6

3. A box contains cards numbered 9 to 53. A card is drawn at random from the box. The probability that the drawn card has a number which is a perfect square is :

(a) 1/45 (b) 2/15 (c) 4/45 (d) 1/9

Ans. (d) 1/9

P(perfect Square)= 5/45 = 1/9

4. A card is selected from a deck of 52 cards. The probability of being a red face card is

(a) 3/26 (b) 3/13 (c) 2/13 (d) 1/2

Ans: (a) 3/26

Total number of red face cards = 6

∴ Probability of being a red face card = 6/52 = 3/26

5. The probability of getting a bad egg in a lot of 400 is 0.035. The number of bad eggs in the lot is

(a) 7 (b) 14 (c) 21 (d) 28

Ans: (b) 14

Total number of eggs = 400

Probability of getting a bad egg P(E) = 0.035

Consider x as the number of bad eggs

P(E) = Number of bad eggs/ Total number of eggs

Substituting the values

0.035 = x/400 ⇒ 35/1000 = x/400 ⇒ x = 35/1000 x 400

$\Rightarrow x = 140/10 \Rightarrow x = 14$

6. Two dice are thrown at the same time and the product of numbers appearing on them is noted. The probability that the product is a prime number is
(a) 1/3 (b) 1/6 (c) 1/5 (d) 5/6
Ans: (b) 1/6
Total number of possible outcomes = 36
Now for the product of the numbers on the dice is prime number can be have in these possible ways = (1, 2), (2, 1), (1, 3), (3, 1), (5, 1), (1, 5)
So, number of possible ways = 6
∴ Required probability = 6/36 = 1/6

7. A ticket is drawn at random from a bag containing tickets numbered from 1 to 40. The probability that the selected ticket has a number which is a multiple of 5 is
(a) 1/5 (b) 3/5 (c) 4/5 (d) 1
Ans: (a) 1/5

8. Two different dice are thrown together. The probability of getting the sum of the two numbers less than 7 is:
(a) 5/12 (b) 7/12 (c) 12/5 (d) 3/11
Ans: (a) 5/12
Total outcomes = 36
Number of outcomes in which sum of two numbers is less than 7 = 15
∴ Required probability = 15/36 = 5/12

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

9. **Assertion (A):** The probability of getting exactly one head in tossing a pair of coins is 1/2.
Reason (R): The sample space of two coin tossed is = {HH, TT, HT, TH} = 4
Ans: (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

10. **Assertion (A):** The probability of winning a game is 0.4, then the probability of losing it, is 0.6.
Reason (R): P(E) + P (not E) = 1
Ans: (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. Find the probability of getting 53 Fridays in a leap year.
Ans: Leap year contains 366 days. $\Rightarrow$ 52 weeks + 2 days 52 weeks contain 52 Fridays.
We will get 53 Fridays if one of the remaining two days is a Friday. Total possibilities for two days are:
(Sunday, Monday), (Monday, Tuesday), (Tuesday, Wednesday), (Wednesday, Thursday), (Thursday, Friday), (Friday, Saturday), (Saturday, Sunday)
There are 7 possibilities and out of these there are 2 favourable cases.
∴ P (53 Fridays) = $\frac{2}{7}$

12. One card is drawn at random from a well-shuffled deck of 52 playing cards. Find the probability that the card drawn is (i) either a red card or a king, (ii) neither a red card nor a queen.
Ans: Total number of cards = 52
(i) Number of either red card or a king card = 28
Required Probability = $\frac{28}{52} = \frac{7}{13}$
(ii) Number of cards neither a red card or a queen card = 52 – 28 = 24
Required Probability = $\frac{24}{52} = \frac{6}{13}$

13. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball from the bag is thrice that of a red ball, find the number of blue balls in the bag.
Ans: Let the number of blue balls be *x*.
Total number of balls in the bag = $5 + x$
$\therefore$ Probability of drawing a red ball = $\frac{5}{5+x}$
and probability of drawing a blue ball = $\frac{x}{5+x}$
Given probability of drawing a blue ball = 3 × probability of drawing a red ball
$\Rightarrow 3\times\frac{5}{5+x} = \frac{x}{5+x} \Rightarrow 15 = x$
$\Rightarrow$ Number of blue balls = 15

14. Cards numbered 1 to 30 are put in a bag. A card is drawn at random from this bag. Find the probability that the number on the drawn card is
(i) not divisible by 3.
(ii) a prime number greater than 7.
Ans : Total possible outcomes of drawing a card from a bag out of 30 cards = 30.
(i) Favourable outcomes for a card numbered not divisible by 3 = 20 (i.e. 1, 2, 4, 5, 7, 8, 10, 11, 13, 14, 16, 17, 19, 20, 22, 23, 25, 26, 28 and 29).
Probability of drawing a card numbered not divisible by 3 = 20/30 = 2/3
(ii) Favourable outcomes for a prime numbered card greater than 7 = 6 (i.e. 11, 13, 17, 19, 23 and 29)
Probability of drawing a prime number card, greater than 7 = 6/30 = 1/5

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. Two coins are tossed simultaneously. What is the probability of getting
(i) At least one head? (ii) At most one tail? (iii) A head and a tail?
Ans: Total number of outcomes = 4
(i) Number of outcomes with at least one head = 3
$\therefore$ Required probability $= 3/4$
(ii) Number of outcomes with at most one tail = 3
$\therefore$ Required probability = $3/4$
(iii)Number of outcomes with a head and a tail = 2
$\therefore$ Required probability $= 2/4 = 1/2$

16. All the black face cards are removed from a pack of 52 playing cards. The reaming cards are well shuffled and then a card is drawn at random. Find the probability of getting (i) face card (ii) red card (iii) black card.
Ans: When all the black face cards are removed,
Remaining number of cards = 52 – 6 = 46
(i) Number of face cards in the remaining deck = 6

∴ P(getting a face card) = 6/46 = 3/23
(ii) Number of red cards in the remaining deck = 26
∴ P (getting a red card) = 26/46 = 13/23
(iii) Number of black cards in the remaining deck = 20
∴ P (getting a black card) = 20/46 = 10/23

17. Two dice are thrown at the same time. What is the probability that the sum of the two numbers appearing on the top of the dice is
(i) at least 9? (ii) 7? (iii) less than or equal to 6?
Ans: (i) Number of outcomes with sum of the numbers is at least 9 = 10
∴ Required Probability = 10/36 = 5/18
(ii) Number of outcomes with sum of the numbers 7 = 6
∴ Required Probability = 6/36 = 1/6
(iii) Number of outcomes with sum of the numbers less than or equal to 6 = 36
∴ Required Probability = 15/36 = 5/12

SECTION – D

Questions 18 carry 5 marks.

18. From a pack of 52 playing cards, jacks, queens, kings and aces of red colour are removed. From the remaining a card is drawn at random. Find the probability that the card drawn is (i) a black queen (ii) a red card (iii) a face card (iv) a spade card
Ans: From the total playing 52 cards, red coloured jacks, queen, kings and aces are removed(i.e., 2 jacks, 2 queens, 2 kings, 2 aces) ∴ Remaining cards = 52 – 8 = 44
(i) Favourable cases for a black queen are 2 (i.e., queen of club or spade)
∴ Probability of drawing a black queen = 2/44 = 1/22
(ii) Favourable cases for red cards are 26 – 8 = 18 (as 8 cards have been removed) (i.e.9 diamonds + 9 hearts)
∴ Probability of drawing a red card = 18/44 = 9/22
(iii) Favourable cases for a face card are 6 (i.e. 2 black jacks, queens and kings each)
∴ Probability of drawing a face card = 6/44 = 3/22
(iv) Favourable cases for a spade card are 13
∴ Probability of drawing a spade card = 13/44

OR

A box contains cards bearing numbers from 6 to 70. If one card is drawn at random from the box, find the probability that it bears
(i) a one digit number. (ii) a number divisible by 5.
(iii) an odd number less than 30. (iv) a composite number between 50 and 70.
Ans: Number of cards in the box = 65
(i) Cards bearing one digit numbers are 6, 7, 8, 9
Number of such cards = 4

$\therefore$ Probability of card bears a one digit number = $\frac{4}{65}$

(ii) B = Number on the cards is divisible by 5
$\therefore$ Cards favourable to B are 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70

$\therefore$ P(B) = $\frac{13}{65} = \frac{1}{5}$

(iii) C = Cards with an odd number less than 30 i.e. 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29

P(C) = $\frac{12}{65}$

(iv) D : Card with composite number between 50 and 70
i.e. 51, 52, 54, 55, 56, 57, 58, 60, 62, 63, 64, 65, 66, 68, 69

$\therefore$ P(D) = $\frac{15}{65} = \frac{3}{13}$

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. Tushara took a pack of 52 cards. She kept aside all the black face cards and shuffled the remaining cards well.

Based on the above information answer the following questions.

(i) Write the number of total possible outcomes.

(ii) She draws a card from the well-shuffled pack of remaining cards. What is the probability that the card is a face card?

(iii) Write the probability of drawing a black card.

OR

(iii) What is the probability of getting neither a black card nor an ace card?

Ans: (i) Total possible outcomes = 52 – 6 = 46

(ii) Number of favourable outcomes = 6

P(face card) = 6/46 = 3/23

(iii) Number of black cards in the shuffled cards = 13 + 7 = 20

P(black card) = 20/46 = 10/23

OR

Number of black cards and ace = 20 + 2 = 22

∴ Number of favourable outcomes = 46 – 22 = 24

P(neither a black card nor an ace) = 24/46 = 12/23

20. A, B, C, D and E are five friends. They prepared some numbered cards with labelled from 11 to 60 and then they put all the number cards in the empty box. In this game, every friend was asked to pick the card randomly and after each draw, card was replaced back in the box.

(a) Find the probability that the number on the drawn card is an odd number (1)

(b) Find the probability that the number on the drawn card is a perfect square number (1)

(c) Find the probability that the number on the drawn card is divisible by 5 (1)

(d) Find the probability that the number on the drawn card is a prime number less than 20 (1)

Ans: (a) Total number of outcomes = 50

Total number of odd number cards = 25
Hence probability of getting an odd number card = 25/50 = 1/2
(b) Total number of perfect square cards = 4
16, 25, 36 and 49.
Hence probability of getting a heart card = 4/50 = 2/25
(c) Total number of cards divisible by 5 = 10
Hence probability of cards divisible by 5 = 10/50 = 1/5
(d) Total number of prime number less than 20 = 4
Hence probability of getting prime number less than 20 = 4/50 = 2/25