

OPEN STUDENT FOUNDATION

Date : 29-02-2024

STD 12 Commerce Statistics

Total Marks : 125

CH 1 PART 2

* Answer The Following Questions as Directed.

[18]

- The events A_1 and A_2 of a random experiment are as follows. Find the sets showing the union event $A_1 \cup A_2$ and intersection event $A_1 \cap A_2$.
 $A_1 = \{x \mid 2 < x < 6, x \in \mathbb{N}\}$
 $A_2 = \{x \mid 3 < x < 9, x \in \mathbb{N}\}$
- One card is randomly drawn from a pack of 52 cards. Find the probability that it is (1) spade card or ace (2) neither spade nor ace.
- Two aircrafts drop bomb to destroy a bridge. The probability that a bomb dropped from the first aircraft hits the target is 0.9 and the probability that a bomb from the second aircraft hits the target is 0.7. The probability of one bomb dropped from both the aircrafts hitting the target is 0.63. The bridge is destroyed even if one bomb drops on it. Find the probability that the bridge is destroyed.
- Two events A and B in the sample space of a random experiment are mutually exclusive. If $3P(A) = 4P(B) = 1$ then find $P(A \cup B)$.
- The probability that the price of potato rises in the vegetable market during festive days is 0.8. The probability that the price of onion rises is 0.7. The probability of rise in price of both potato and onion is 0.6. Find the probability of rise in price of at least one of the two, potato and onion.
- If $P(B) = 2P(A|B) = 0.4$, then find $P(A \cap B)$.
- If the events A and B are independent and $3P(A) = 2P(B) = 0.12$, then find $P(A \cap B)$.
- $\begin{equation} \text{If } A = \{x \mid 1 \end{equation}$
- The events A_1 and A_2 of a random experiment are defined as follows. Find the sets showing union event $A_1 \cup A_2$ and intersection event $A_1 \cap A_2$.

* Answer The Following Questions as Directed.

[63]

- Two numbers are selected at random from the first five natural numbers. The sum of two selected numbers is at least 6 is denoted by event A and the sum of two selected numbers is even is denoted by event B . Write the sets showing the following events and answer the given questions.
(1) U (2) A (3) B (4) $A \cap B$
(5) $A \cap B$ (6) A' (7) $A - B$ (8) $A' \cap B$
(9) Can it be said that the events A and B are mutually exclusive? Give reason.
(10) State the number of sample points in the sample space of this random experiment.
- Two cards are drawn from a well shuffled pack of 52 cards. Find the probability that (1) both the cards are of different colour (2) both the cards are face cards (3) one of the two

cards is a king.

12. Three events A , B and C in a sample space are mutually exclusive and exhaustive. If $4P(A) = 5P(B) = 3P(C)$, then find $P(A \cup C)$ and $P(B \cup C)$.
13. 80 % customers hold saving account and 50% customers hold current account of a nationalised bank. 90% of the customers hold at least one of the saving account and the current account. If one of the account holders randomly selected from this bank holds a current account, find the probability that he holds a saving account.
14. If $P(M) = P(F) = \frac{1}{2}$, $P(A | M) = \frac{1}{10}$ and $P(A | F) = \frac{1}{2}$ for events A , M and F , then find $P(A \cap M)$ and $P(A \cap F)$.
15. There are 2 gold coins and 4 silver coins in a box. The other box contains 3 gold and 5 silver coins. One coin is selected from each box. Find the probability that one of the selected coins is a gold coin and the other is a silver coin.
16. One joint family has 3 sons and 2 daughters whereas the other joint family has 2 sons and 4 daughters. One joint family is selected from two joint families and a child is randomly selected from that family. Find the probability that the selected child is a girl.
17. If two balanced dice are thrown, then find the probability that
 - (1) at least one die shows number 5
 - (2) the first die shows the number 5 or 6 and the other die shows an even number.
18. A problem in Mathematics is given to Tania, Kathan and Kirti to solve. The probabilities of them solving the problem correctly are $\frac{2}{3}$, $\frac{3}{4}$ and $\frac{1}{2}$ respectively. Find the probability that the problem is solved correctly.
19. Person A can hit the target in 3 out of 5 attempts whereas person B can hit the target in 5 out of 6 attempts. If both of them attempt simultaneously, find the probability that the target is hit.
20. The probability that a person from a group reads newspaper X is 0.55, the probability that he read newspaper Y is 0.69 and the probability that he reads both the newspaper X and Y is 0.27. Find the probability that a person selected at random from this group.
 - (1) reads at least one of the newspapers X and Y .
 - (2) does not read any of the newspapers X and Y .
 - (3) reads only one of the newspapers X and Y .
21. For two events A and B in the sample space of a random experiment $P(A') = 0.3$, $P(B) = 0.6$ and $P(A \cup B) = 0.83$. Find $P(A \cap B')$ and $P(A' \cap B)$.
22. If $P(A') = \frac{7}{25}$, $P(B/A) = \frac{5}{12}$ and $P(A/B) = \frac{1}{2}$ for two events A and B in the sample space of a random experiment then find $P(A \cap B)$ and $P(B)$.
23. If two balanced coins are tossed, then find the probability of (1) getting one head and one tail and (2) getting at least one head.
24. Find the probability of having 5 Tuesdays in the month of August of any year.
25. A number is selected from the natural number 1 to 100 . Find the probability of the event that the selected number is a multiple of 3 or 5 .

26. Two balanced dice are thrown simultaneously. Find the probability that the sum of numbers on two dice is a multiple of 2 or 3.
27. There are two children in a family. If the first child is a girl then find the probability that both the children in the family are girls.
28. Among the various vehicle owners visiting a petrol pump, 80% vehicle owners visit to fill petrol in their vehicle and 60% vehicle owners visit to fill air in their vehicles. 50 % vehicle owners visit to fill air and petrol in their vehicle. Find the probability for the following events:
 - (1) If a vehicle owner has come to fill petrol in his vehicle, then that vehicle owner will fill air in his vehicle.
 - (2) If a vehicle owner has come to fill air in his vehicle, then that vehicle owner will fill petrol in his vehicle.
29. Find the probability of having 53 Thursdays in a leap year.
30. A box contains 10 chits of which 3 chits are eligible for a prize. A boy named Kathan randomly selects two chits from this box. Find the probability that Kathan gets the prize.

*** Answer The Following Questions as Directed.**

[44]

31. Two balanced dice are thrown simultaneously. Find the probability of the following events : (1) The sum of numbers on the dice is 6 . (2) The sum of numbers on the dice is not more than 10 . (3) The sum of numbers on the dice is a multiple of 3. (4) The product of numbers on the dice is 12 .
32. One family is randomly selected from the families having two children. Find the probability that (1) One child Is a girl and one child is a boy. (2) At least one child is a girl among the two children of the selected family.
33. The sample space for a random experiment of selecting numbers is $U = \{1, 2, 3, \dots, 120\}$ and all the outcomes in the sample space are equiprobable. Find the probability that the number selected is: (1) a multiple of 3 (2) not a multiple of 3 (3) a multiple of 4 (4) not a multiple of 4 (5) a multiple of both 3 and 4
34. Find the probability of getting R in the first place and M in the last place when all the letters of the word RANDOM are arranged in all possible ways.
35. Find the probability of getting vowels in the first, third and sixth place when all the letters of the word ORANGE are arranged in all possible ways.
36. Two balanced dice marked with numbers 1 to 6 are thrown simultaneously. Find the probability that (1) sum of numbers on both the dice is 7 (2) sum of numbers on both the dice is more than 10 (3) sum of number on both the dice is at the most 4 (4) both the dice show same numbers (5) sum of numbers on both the dice is 1 (6) sum of numbers on both the dice is 12 or less.
37. One card is randomly selected from a pack of 52 cards. Find the probability that the selected card is (1) club or queen card (2) neither a club nor a queen card.
38. For two events A and B in the sample space of a random experiment $P(A) = 2P(B) = 4P(A \cap B) = 0.6$. Find the probability of the following events :

(1) $A' \cap B'$

(2) $A' \cup B'$

(3) $A - B$

(4) $B - A$

39. For three mutually exclusive and exhaustive events A , B and C in the sample space of a random experiment $2P(A) = 3P(B) = 4P(C)$. Find $P(A \cup B)$ and $P(B \cup C)$.
40. Find the probability of getting R in the first place in all possible arrangements of each and every letter of the word RUTVA.
41. One number is randomly selected from the natural numbers 1 to 100. Find the probability that the number selected is either a single digit number or a perfect square.
