NCERT Questions

26'EE BTECH Batch

August 15, 2023

1. If $\Pr(A|B) > \Pr(A)$, then which of the following is correct :
(A) $\Pr(B|A) < \Pr(B)$ P(B) (B $\Pr(AB) < \Pr(A).\Pr(B)$

(C) $\Pr(B|A) > \Pr(B)$ (D) $\Pr(B|A) = \Pr(B)$

2. A black and red dice are rolled.
(a) Find the conditional probability of obtaining a sum greater than 9, given that the black die resulted in a 5.
(b) Find the conditional probability of obtaining the sum 8, given that the red die resulted in a number less than 4.

3. Two Coins are tossed once, where
(i) E : Tail appears on one coin, F : one coin shows head
(ii) E : no tail appears, F : no head appears

4. If A and B are two events such that $\Pr(A)=\frac{1}{4}$,$\Pr(B)=\frac{1}{2}$ and $\Pr(A \mid B) = \frac{1}{8}$, find $\Pr(notAandnotB)$.

5. There are 5% defective items in a large bulk of items. What is the probability that a sample of 10 items will include not more than one defective item?

6. A person buys a lottery ticket in 50 lotteries, in each of which his chance of winning a prize is $\frac{1}{100}$. What is the probability that he will win a prize (a) at least once (b) exactly once (c) at least twice?

7. If 4-digit numbers greater than 5,000 are randomly formed from the digits 0, 1, 3, 5, and 7, what is the probability of forming a number divisible by 5 when, (i) the digits are repeated? (ii) the repetition of digits is not allowed?

8. A fair coin and an unbiased die are tossed. Let A be the event 'head appears on the coin' and B be the event '3 on the die'. Check whether A and B are independent events or not.

9. It is known that 10% of certain articles manufactured are defective. What is the probability that in a random sample of 12 such articles, 9 are defective?

10. Suppose X has a binomial distribution $B\left(6, \frac{1}{2}\right)$. Show that $X = 3$ is the most likely outcome. (Hint : $\mathrm{P}(X = 3)$ is the maximum among all $\mathrm{P}(x_i), x_i = 0, 1, 2, 3, 4, 5, 6$)

11. In an examination, 20 questions of true-false type are asked. Suppose a student tosses a fair coin to determine his answer to each question. If the coin falls heads, he answers 'true'; if it falls tails, he answers 'false'. Find the probability that he answers at least 12 questions correctly. Two Coins are tossed once, where

    (a) E : Tail appears on one coin, F : one coin shows head

    (b) E : no tail appears, F : no head appears

    Determine $\Pr(E \mid F)$.

12. A card is selected from a pack of 52 cards.

    (a) How many points are there in the sample space?

    (b) Calculate the probability that the card is an ace of spades.

    (c) Calculate the probability that the card is

        i. an ace

        ii. black card.

13. Bag I contains 3 red and 4 black balls and Bag II contains 4 red and 5 black balls. One ball is transferred from Bag I to Bag II and then a ball is drawn from Bag II. The ball so drawn is found to be red in colour. Find the probability that the transferred ball is black.

14. How many times must a man toss a fair coin so that the probability of having at least one head is more than 90%?

15. In a hurdle race, a player has to cross 10 hurdles. The probability that he will clear each hurdle is $\frac{5}{6}$. What is the probability that he will knock down fewer than 2 hurdles?

16. Three letters are dictated to three persons and an envelope is addressed to each of them, the letters are inserted into the envelopes at random so that each envelope contains exactly one letter. Find the probability that at least one letter is in its proper envelope.

17. In a game, a man wins a rupee for a six and loses a rupee for any other number when a fair dice is thrown.The man decided to throw a dice thrice but to quit as and when he gets a six.Find the expected value of the amount he wins/loses.

18. Two customers Shyam and Ekta are visiting a particular shop in the same week(Tuesday to Saturday). Each is equally likely to visit the shop on any day as on another day. What is the probability that both will visit the shop on (i) the same day? (ii) consecutive days? (iii) different days?

19. Consider the experiment of throwing a die, if a multiple of 3 comes up, throw the die again and if any other number comes, toss a coin. Find the conditional probability of the event 'the coin shows a tail',given that 'atleast one die shows a 3'.

20. A die is thrown again and again until three sixes are obtained. Find the probability of obtaining the third six in the sixth throw of the die.

21. Let X represent the difference between the number of heads and the number of tails obtained when a coin is tossed 6 times. What are possible values of X?