

## CHAPTER 8

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# PROBABILITY

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1. The Theoretical probability of an event E written as  $P(E)$  is

$$P(E) = \frac{\text{Number of outcomes favourable to E}}{\text{Number of all possible outcomes of the experiment.}}$$

2. The sum of the probability of all the elementary events of an experiment is 1.
3. The probability of a sure event is 1 and probability of an impossible event is 0.
4. If E is an event, in general, it is true that  $P(E) + P(\bar{E}) = 1$ .
5. From the definition of the probability, the numerator is always less than or equal to the denominator therefore  $0 \leq P(E) \leq 1$ .

### MULTIPLE CHOICE QUESTIONS

1. If E is an event then  $P(E) + P(\bar{E}) = \dots\dots\dots ?$
- |       |        |
|-------|--------|
| (a) 0 | (b) 1  |
| (c) 2 | (d) -1 |
2. The probability of an event that is certain to happen is :
- |       |        |
|-------|--------|
| (a) 0 | (b) 2  |
| (c) 1 | (d) -1 |
3. Which of the following can not be the probability of an event :
- |                   |                    |
|-------------------|--------------------|
| (a) $\frac{2}{3}$ | (b) $\frac{-3}{2}$ |
| (c) 15%           | (d) 0.7            |

4. If  $P(E)$  is .65 what is  $P(\text{Not } E)$ ?
- (a) .35 (b) .25  
(c) 1 (d) 0
5. If  $P(E)$  is 38% of an event what is the probability of failure of this event?
- (a) 12% (b) 62%  
(c) 1 (d) 0
6. A bag contains 9 Red and 7 blue marbles. A marble is taken out randomly, what is the  $P(\text{red marble})$ ?
- (a)  $\frac{7}{16}$  (b)  $\frac{9}{16}$   
(c)  $\frac{18}{16}$  (d)  $\frac{14}{16}$
7. In a Survey it is found that every fifth person possess a vehicle what is the probability of a person not possessing the vehicle?
- (a)  $\frac{1}{5}$  (b)  $\frac{4}{5}$   
(c)  $\frac{3}{5}$  (d) 1
8. Anand and Sumit are friends what is the probability that they both have birthday on 11th Nov. (ignoring leap year).
- (a)  $\frac{1}{12}$  (b)  $\frac{1}{7}$   
(c)  $\frac{1}{365}$  (d)  $\frac{1}{366}$
9. The number of face cards in a well shuffled pack of cards are :
- (a) 12 (b) 16  
(c) 4 (d) 52

10. A die is thrown once. What is the probability of getting an even prime number?
- (a)  $\frac{3}{6}$  (b)  $\frac{1}{6}$   
(c)  $\frac{1}{2}$  (d)  $\frac{1}{3}$
11. The probability of an impossible event is :
- (a) 0 (b) 1  
(c) -1 (d)  $\infty$
12. From the letters of the word "Mobile", a letter is selected. The probability that the letter is a vowel, is
- (a)  $\frac{1}{3}$  (b)  $\frac{3}{7}$   
(c)  $\frac{1}{6}$  (d)  $\frac{1}{2}$
13. An arrow pointer is spined which is placed on a fixed circular number plate numbered from 1 to 12 at equal distance. The pointer is equally likely to rest at any number. What is the probability that it will rest at
- (a) number 10 (b) an odd number  
(c) a number multiple of 3 (d) an even number

### SHORT ANSWER TYPE QUESTIONS

14. Two dice are rolled once what is the probability of getting a doublet?
15. A die is rolled once. What is the probability of getting a prime number?
16. A bank A.T.M. has notes of denomination 100, 500 and 1000 in equal numbers. What is the probability of getting a note of Rs. 1000.
17. What is the probability of getting a number greater than 6 in a single throw of a die.

18. A selection committee interviewed 50 people for the post of sales manager. Out of which 35 are males and 15 are females. What is the probability of a female candidate being selected.
19. A bag contains cards numbering from 5 to 25. One card is drawn from the bag. Find the probability that the card has numbers from 10 to 15.
20. In 1000 lottery tickets there are 5 prize winning tickets. Find the probability of winning a prize if a person buys one tickets.
21. It is known that in a box of 600 screws, 42 screws are defective. One screw is taken out at random from this box. Find the probability that it is not defective.
22. Write all the possible outcomes when a coin is tossed twice.
23. Two dice are rolled simultaneously. Find the probability that the sum is more than and equal to 10.
24. From the well shuffled pack of 52 cards. Two Black kings and Two Red Aces are removed. What is the probability of getting a face card.
25. In a leap year what is the probability of 53 Sundays.
26. A box contains cards numbered from 2 to 101. One card is drawn at random. What is the probability of getting a number which is a perfect square.
27. Tickets numbered from 1 to 20 are mixed up together and then a ticket is drawn at random. What is the probability that the ticket has a number which is a multiple of 3 or 7?
28. From the well shuffled pack of 52 cards. Few cards of same colour are missing. If  $P(\text{Red card}) = \frac{1}{3}$  and  $P(\text{Black card}) = \frac{2}{3}$  then which colour of cards are missing and how many?
29. A bag contains 5 red balls and 'n' green balls. If the  $P(\text{green ball}) = 3 \times P(\text{red ball})$  then what is the value of n.
30. If from the well shuffled pack of cards all the aces are removed, find the probability of getting red card.
31. What is the probability of getting a total of less than 12 in the throws of two dice?

32. From the data (1, 4, 9, 16, 25, 29). If 29 is removed what is the probability of getting a prime number.
33. A card is drawn from an ordinary pack of playing cards and a person bets that it is a spade or an ace. What are the odds against his winning the bet.

### LONG ANSWER TYPE

34. A coin is tossed thrice then find the probability of  
(i) 2 heads                      (ii) 2 tails                      (iii) 3 heads.
35. The king, queen and jack of clubs are removed from a deck of 52 playing cards and the remaining cards are shuffled. A card is drawn from the remaining cards. Find the probability of getting a card of (i) heart; (ii) queen; (iii) Clubs.
36. A box contains 5 Red balls, 8 white balls and 4 Green balls. One ball is taken out of the box at random. What is the probability that ball is (i) red; (ii) white; (iii) Not green.
37. 12 defective pens are mixed with 120 good ones. One pen is taken out at random from this lot. Determine the probability that the pen taken out is not defective.
38. A number  $x$  is selected from the numbers 1, 2, 3 and then a second number  $y$  is randomly selected from the numbers 1, 4, 9. What is the probability that the product  $xy$  of two numbers will be less than 9?
39. A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears (i) a two digit number (ii) a perfect square number (ii) a number divisible by 5.
40. A game consists of tossing a one rupee coin 3 times and noting its outcome each time. Anand wins if all the tosses give the same result *i.e.*, three heads or three tails and loses otherwise. Calculate the probability that Anand will lose the game.
41. A die is thrown twice. What is the probability of getting : (i) The Sum of 7; (ii) The sum of greater than 10; (iii) 5 will not come up either time.
42. A card is drawn at random from a well shuffled deck of playing card. Find the probability that the card drawn is

- (a) a card of spade or an ace      (b) a red king  
 (b) either a king or a queen      (d) neither a king nor a queen
43. A jar contains 24 balls, some are green and other are blue. If a ball is drawn at random from the jar, the probability that it is green is  $\frac{2}{3}$ . Find the number of blue balls in the jar.

### ANSWERS

- |  |                          |
|--|--------------------------|
| 1. b   | 2. c                     |
| 3. b   | 4. a                     |
| 5. b   | 6. b                     |
| 7. b   | 8. c                     |
| 9. a   | 10. b                    |
| 11. a  | 12. d                    |
| 13. (i) $\frac{1}{12}$ ; (ii) $\frac{1}{2}$ ; (iii) $\frac{1}{3}$ ; (iv) $\frac{1}{3}$ | 14. $\frac{1}{6}$        |
| 15. $\frac{1}{2}$  | 16. $\frac{1}{3}$        |
| 17. 0  | 18. $\frac{3}{10}$       |
| 19. $\frac{2}{7}$  | 20. $\frac{1}{200}$      |
| 21. $\frac{93}{100}$   | 22. S = [HH, TT, HT, TH] |
| 23. $\frac{1}{6}$  | 24. $\frac{5}{24}$       |

25.  $\frac{2}{7}$

26.  $\frac{9}{100}$

27.  $\frac{2}{5}$

28. Red, 13

29. 15

30.  $\frac{1}{2}$

31.  $\frac{35}{36}$

32. zero

33.  $\frac{9}{13}$

34. (i)  $\frac{3}{8}$ ; (ii)  $\frac{3}{8}$ ; (iii)  $\frac{1}{8}$

35. (i)  $\frac{13}{49}$ ; (ii)  $\frac{3}{49}$ ; (iii)  $\frac{10}{49}$

36. (i)  $\frac{5}{17}$ ; (ii)  $\frac{8}{17}$ ; (iii)  $\frac{13}{17}$

37.  $\frac{9}{10}$

38.  $\frac{5}{9}$

39. (i)  $\frac{9}{10}$ ; (ii)  $\frac{1}{10}$ ; (iii)  $\frac{1}{5}$

40.  $\frac{3}{4}$

41. (i)  $\frac{1}{6}$ ; (ii)  $\frac{1}{12}$ ; (iii)  $\frac{25}{36}$

42. (i)  $\frac{4}{13}$ ; (ii)  $\frac{1}{26}$ ; (iii)  $\frac{11}{13}$ ; (iv)  $\frac{2}{13}$

43. 8.