50- Practice Questions

Permutation And Combination

Questions

1. If there are 7 teams in a tournament, how many matches will be played among them so that every team will play a match with every other team?
   1. 42
   2. 28
   3. 21
   4. 24
   5. None of these

2. In how many ways the letters of the word “TRANSITION” can be arranged so that all vowels remain together?
   1. 13520
   2. 15120
   3. 13250
   4. 14520
   5. None of these

3. Find the number of words that can be formed by using all letters of the word 'TANGLE', if it starts with the letter G and ends with the letter A.
   1. 18
   2. 12
   3. 28
   4. 24
   5. 36

4. How many ways can the letters of the word "WINTER" be arranged so that the vowels are at the two ends?
   1. 12
   2. 24
   3. 48
   4. 36
   5. 22

5. In how many ways the letters of the word LEVERAGE can be rearranged?
   1. 4250
   2. 5220
   3. 6720
   4. 7280
   5. None of these

6. In how many ways 3 pencils can be chosen from the box of 25 pencils?
   1. 1700
   2. 2200
   3. 2100
   4. 1200
   5. 2300

7. In how many ways a team of 5 players can be made from 11 players if a particular player is never chosen?
   1. 752
   2. 456
   3. 386
   4. 252
   5. None of these

8. Find the number of ways of selecting 4 novels from 7 different novels that a particular novel is not included.
   1. 125

2. 252
3. 25
4. 35
5. 15

9. 5 girls are to be seated in a row. In how many ways can it be done if the youngest girl always sits in the middle?
   1. 18
   2. 24
   3. 60
   4. 30
   5. 48

10. In how many ways can the letters of the word ‘FUNNY’ be arranged by having both N’s together?
    1. 23
    2. 32
    3. 24
    4. 42
    5. 48

11. In how many ways 3 boys and 2 girls can be seated in a row so that they are alternated?
    1. 24
    2. 12
    3. 14
    4. 28
    5. 26

12. In how many ways can 4 boys and 3 girls be seated in a row so that they are in an alternate position?
    1. 121
    2. 144
    3. 184
    4. 224
    5. None of these

13. Find the number of words that can be formed by using all letters of the word ' FRIDAY', if the order of vowels remains the same.
    1. 220
    2. 420
    3. 360
    4. 324
    5. 320

14. Find the number of words that can be formed by using all letters of the word ' PAINTING', if it starts with letter A and ends with letter T.
    1. 360
    2. 420
    3. 720
    4. 480
    5. 540

15. Find the number of words that can be formed by using all letters of the word ' HONESTY', if it starts with the letter Y and ends with the letter S.
    1. 30
    2. 60
    3. 120
    4. 180

5. 320

16. In how many ways can the letter of the word CHESTNUT is arranged so that vowels always occur together?
1. 3640
2. 4240
3. 2460
4. 5040
5. 5246

17. In a group of 5 boys and 4 girls, 5 students must be selected. In how many ways it can be done so that only 2 boys are included?
1. 36
2. 40
3. 32
4. 26
5. 12

18. In how many ways do you form a team of 6 students chosen from 7 boys and 5 girls to include exactly one girl?
1. 102
2. 100
3. 75
4. 105
5. 110

19. There are five prizes to be distributed among eight students. If no students get more than one prize, then in how many ways can this be done?
1. 5720
2. 6230
3. 6720
4. 5540
5. None of these

20. In how many ways can the letters of the word 'PERMANENT' be arranged?
1. 52300
2. 90720
3. 42680
4. 82235
5. None of these

21. How many words can be formed by using letters of the word “DESIGN”?
1. 360
2. 420
3. 720
4. 560
5. 620

22. In a party 19 persons shake hands with every other person. Find the total no of handshakes in the party?
1. 190
2. 171
3. 380
4. 342
5. None of these

23. In how many ways can 6 teachers and 5 students be seated in a row so that they sit alternately?
1. 62800
2. 74500
3. 82000

4. 86400
5. None of these

24. In how many ways can the letters of the word TERRORISTS be arranged by taking 4 letters at a time?
    1. 648
    2. 524
    3. 746
    4. 785
    5. 758

25. In how many ways can the letters of the word ENGINEERING be arranged?
    1. 152100
    2. 177200
    3. 277200
    4. 324560
    5. None of these

26. If $(1\times2\times3\times4\times....n) = n!$

then $[14)! - (13)! - (12)!]$ is equal to:

1. $14 \times 12 \times (12)!$
2. $14 \times 12 \times (13)!$
3. $14 \times (13) \times (13)!$
4. $13 \times 12 \times (12)!$
5. None of these

27. In how many ways can 4 blue beads and 3 red beads be arranged in a row such that all the blue beads are together, and all the red beads are together

1. 4! x 3! x 2!
2. 4! x 3! x 3!
3. 4! x 3! x 1!
4. 4! x 3!
5. None of these

Direction (28-29) How many ways 4 girls and 6 boys can be seated in a row so that.

28. Boys are always together?

1. 56640
2. 42600
3. 34824
4. 86400
5. 72400

29. Girls are always together?

1. 600480
2. 500240

3. 120960
4. 132960
5. None of these

Direction -Out of total 11 members, a 5-member delegation is to be sent abroad.

30. In how ways can the selection be made so that a particular member is always included?

1. 310
2. 410
3. 210
4. 720
5. 420

31. In how many ways can the letters of the word VOWEL be arranged so that all the consonants occupy odd places, vowels come on even places?

1. 8
2. 10
3. 12
4. 18
5. 20

32. 8 students appear in an examination. In how many ways can the result be announced?

1. 128
2. 64
3. 512
4. 256
5. None of these

33. How many 8-digit numbers can be formed using the digits 1, 2, 0, 2, 4, 1, 2, 4?

1. 1120
2. 1320
3. 1740
4. 1470
5. None of these

34. If the letters of the Word SINHA are arranged in all possible ways and these words are written out as in Dictionary, then the rank of the word SINHA is

1. 256
2. 512
3. 114
4. 200
5. 64

35. In how many ways can the letters of the word "DISCHARGE" be arranged in such a way that the vowels always come together?

1. 28400
2. 30240
3. 21420
4. 24830
5. None of these

36. In a Group of 8 boys and 6 girls, six children are to be selected. In how many ways can they be selected such that at least one boy should be there?

1. 2023
2. 1002
3. 3002
4. 2103
5. None of these

37. There are 20 Bikes in the No-Parking zone. On a Particular day, A policeman planned to fine the four bikes of the No-Parking Zone. In how many ways can he plan such that no two of the bikes are next to each other?

1. 2420
2. 2580
3. 2380
4. 2640
5. 2001

38. In how many ways can the letter of the word 'JUSTICE' be arranged?

1. 2520
2. 5040
3. 1680
4. 2920
5. None of these

39. In how many ways can 6 boys and 3 girls to be seated in a row such that all the boys are seated together, and all the girls seated together?

1. 7! ×6! 1!
2. 3! ×6! ×3!
3. 4! ×6! ×1!
4. 2! ×6! ×3!
5. None of these

40. From 6 officers and 8 Jawans, in how many ways can 5 be chosen to include exactly 3 officers?

1. 560
2. 1020
3. 470

4. 480
5. None of these

41. In how many ways can the letters of the word “INCORPORATION” be arranged so that the vowels come together?

1. 427800
2. 604800
3. 369800
4. 548000
5. None of these

42. In how many ways can the selection of 4 boys and 3 girls be made from a group of 6 boys and 6 girls?

1. 620
2. 300
3. 280
4. 480
5. 340

43. Among a set of 4 black balls and 3 white balls, how many selections of 3 balls can be made such that at least 2 of them are black balls?

1. 18
2. 36
3. 40
4. 44
5. 22

44. A football team of 11 players is to be formed from 20 players including 5 defenders and 4 goal keepers. In how many ways can a team be formed so that the team contains exactly 2 goal keepers and at least 3 defenders?

1. 48500
2. 45623
3. 45620
4. 43560
5. None of these

45. In how many ways a Cricketer can make a Double century with fours and Sixes only?

1. 12
2. 18
3. 26
4. 17
5. 11

46. Find the no. of words formed by using all the letters of the word DISCOUNT, so that the vowels are never together?

1. 24000
2. 42500
3. 36000
4. 36800
5. None of these

47. An examinee is required to answer eight questions out of 16 questions which are divided into two groups each containing eight questions and he is not permitted to answer more than six questions from any group. In how many ways can he answer the eight questions?

1. 17770
2. 15260
3. 14370
4. 12740
5. None of these

48. How many different words can be formed with the letters of the word PRACTICE such that each of the word begin with E and ends with R?

1. 852
2. 720
3. 360
4. 420
5. 920

49. How many five-digit numbers can be formed using the digits 0, 1, 2, 3, 4 and 5 which are divisible by 5, without repeating the digits?

1. 320
2. 36
3. 216
4. 6
5. None of these

50. Out of 6 men and 3 women a committee of 3 members is to be formed so that it has 2 men and 1 woman. In how many ways can this be done?

1. 65
2. 90
3. 45
4. 180
5. None of these

-Explanations-

Ans-3

1. For any match, we must choose any 2 teams out of 7 so total matches = 7C2 = (7×6)/ (2×1) = **21**

Ans-2

2. Total number of ways = (7! x 4!)/ (2! x 2! x 2!) = 15120

Ans-4

3. Total words "TANGLE" = 6

The remaining places can be filled in 4! ways = 24

Ans-3

4. Total number of letters = 6

Four consonants can be arranged in 4! Ways and two vowels can be arranged in 2!

Required number of arrangements = 4! x 2! = 48

Ans-3

5. The word LEVERAGE consists of 8 letters in which 'E' comes thrice.

Number of arrangements = 8! /3! =8×7×6×5×4×3×2 /3×2

= 6720

Ans-5

6. Number of ways = $^{25}C3$ = n! /r! (n-r)! (25 × 24 × 23)/ (3 × 2) = 2300

Ans-4

7. Since a particular player is never chosen, it means that 5 players are selected out of = (11 - 1) players = 10 players

∴ Required no of ways = $^{10}C5$ = 252

Ans-5

8. Since a particular novel is not included, it means that 4 novels are selected out of = (7 - 1) books = 6 novels

∴ Required no of ways = $^6C4 = 15$

Ans-2

9. The position of the youngest girl is fixed, and the position of the remaining four is to be decided.

Four girls can be seated in the four remaining seats in 4! = 4 × 3 × 2 × 1 = 24 ways.

Ans-3

10. The number of different ways in which the letters of the word ‘FUNNY’ can be arranged having both N’s together = 4! = 24

Ans-2

11. 4 boys can be seated in 3! Ways.

3 boys can be seated in 2! Ways.

Required number of ways = 3! × 2! = 12

Ans-2

12. First boys are seated in 4 positions in 4! Ways.

Now remaining 3 places can be filled by 3 girls in 3! Ways.

So, number of ways = 4! × 3! = 144

Ans-3

13. Total words “FRIDAY” = 6

Number of vowels (I, A) = 2

But in these, we cannot change the order of vowels.

Suppose the required ways be 'n' multiplied by 2! ways with 'n' must be given 6!

=> 2! × n = 6!

=> n = 360 ways

Ans-3

14. Total words “PAINTING” = 8

Remaining places can be filled in 6! ways = 720

Ans-3

15. Total words "HONESTY" = 7

Remaining places can be filled in 5! ways = 120

Ans-4

16. Number of letters in 'CHESTNUT' = 8

Number of vowels = (E, U) = 2!

Number of consonants = (C, H, S, T, N, T) = 6! /2!

Now, consider the number of vowels together as one and vowels can be arranged = 2!

So total number of ways = (7! /2!) × 2! = 5040

Ans-2

17. $^{5}C2 \times {}^{4}C3$ = [5! / (5 -2)! 2!] × [4! /(4 -3)! 3!]

= [5! /3! 2!] × [4! /1! 3!]

=40 ways

Ans-4

18. 1 girl can be chosen in $^{5}C1$ = 5 ways and

5 boys can be chosen in $^{7}C5$ = 21 ways

Total number of ways = 5 × 21 = 105 ways

Ans-3

19. Required no. of ways = $^{8}P5$

= 8! / (8 - 5)!

= 8! /3!

= 6720

Ans-2

20. There are 9 letters in the word PERMANENT, out of which 'N' and 'E' appears twice.

Required number of ways = [9! / (2! x 2!)]

= (9 x 8 x 7 x 6 x 5 x 4 x 3 x 2 x 1)/ (2 x 1 x 2 x 1)

= 90720

Ans-3

21. required number of words = 6! =720

Ans-2

22. As two persons are involved in one handshake, total number of handshakes in the party = $^{19}C_2$ = `(19x18)/2` = 171

Ans-4

23. T S T S T S T S T S T

Now 6 teachers can be seated in 6 places in 6! Ways.

5 students can be seated in 5! ways.

∴ Required no. of ways = 6! × 5! = 720 × 120 = 86400

Ans-5

24. There are 10 letters in the given word TERRORISTS, and we have 10 letters of 6 different kinds viz,

(T, T, T), (I, I), (S, S), E, O, R

For a group of four letters, we have four cases.

(i) Three alike and one different

(ii) Two alike and two other alike

(iii) Two alike and other two different

(iv) All four different

In case (i), the number of selections = 3C3 × 5C1 = 5

In case (ii), the number of selections = 3C2 = 3

[Since, we can select two pairs out of 3 pairs (T, T) (I, I) (S, S)]

In case (iii), the number of selections = 3C1 × 5C2 = 30

[since we can select one of 3 pairs and then two from the remaining 5 letters say, I, S, E, O, R]

In case (iv), the number of selections = 6C4 = 15

[since we can select 4 different letters from 6 letters T, I, S, E, O, R]

In case (i), the number of arrangements = 5 ×4! /3! = 20

In case (ii), the number of arrangements = 3 ×4! / (2! ×2!) = 18

In case (iii), the number of arrangements = 30 ×4! /2! = 360

In case (iv), the number of arrangements = 15 × 4! = 360

Hence, the required number of arrangements = 20 + 18 + 360 + 360 = 758

Ans-3

25. There are 11 letters in the word ENGINEERING and E occurs 3 times, I occur 2 times, N occurs 3 times and G occurs 2 times

Thus, the required number of arrangements = (11!)/ (3! x 2! x 2! x 3!) = 2,77,200 ways

Ans-1

26. (14! -13! -12!) =14×13×12! - 13×12! - 12! = 12! [14×13-13-1]

= 12! [14×13 - 14]

= 12! ×14 [13-1]

= 12! ×14×12

Ans-1

27. Required no. of ways = 4! x 3! x 2!

Ans-4

28. Required number of ways = 5! X 6! = 120 x 720 = 86,400

Ans-3

29. Required number of ways = 7! X 4! = 5040 x 24 = 1,20,960

Ans-3

30. As the person is always included, therefore,

$$C_1 \times 10C_4 = 1 \times \frac{10 \times 9 \times 8 \times 7}{4 \times 3 \times 2} = 210$$

Ans-3

31. Consonants comes on Place number 1,3,5

So, number of arrangements = 3! = 6

Vowels come on Place number 2,4

So, number of arrangements = 2! = 2

Total number of arrangements = 6 × 2 = 12 ways

Ans-4

32. Each student can either pass or fail

So there exists two possibilities for each student.

So total number of ways = 2^8 = 256

Ans-4

33. There are 8 digits 1, 2, 0, 2, 4, 1, 2, 4 in which 1 occurs 2 times, 2 occurs 3 times and 4 occurs 2 times

∴ Number of 8-digit numbers = 8! / (2! ×3! ×2!) = 1680

But out of these 1680 numbers there are some numbers which begin with '0' and they are not 8-digit numbers.

The numbers of such numbers beginning with '0' = 7! / (2! ×3! ×2!) = 210

Hence the required number of 8-digit numbers = 1680 – 210 = 1470

Ans-3

34. The number of words begin with 'A' is 4!

The number of words begin with 'H' is 4!

The number of words begin with 'I' is 4!

The number of words begin with 'N' is 4!

Number of words begin with SA is 3!

Number of Words begin with SH is 3!

Words begin with 'SI' are SIAHN, SIANH, SIHAN, SIHNA, SINAH, SINHA

∴ Rank of the Word = 4! + 4! + 4! + 4! + 3! + 3! + 6 = 114

Ans-2

35. The arrangement is made in such a way that the vowels always come together i.e., DSCHRG(IAE)

Considering Vowels as one letter, 7 different letters can be arranged in 7! Ways = 5040

The Vowels "IAE" can be arranged themselves in 3! Ways = 6

Therefore, required number of ways = 5040 × 6 = 30240

Ans-3

36. For At least 1 boy we have (1 boy and 5 girls), (2 boys and 4 girls), (3 boys and 3 girls), (4 boys and 2 girls), (5 boys and 1 girl), (6 boys)

∴ Required Number of ways = $({}^8C_1 \times {}^6C_5) + ({}^8C_2 \times {}^6C_4) + ({}^8C_3 \times {}^6C_3) + ({}^8C_4 \times {}^6C_2) + ({}^8C_5 \times {}^6C_1) + {}^8C_6$

= 48 + 420 + 1120 + 1050 + 336 + 28 = 3002 ways

Ans-3

37. Considering 4 bikes as one, there are 17 Bikes (16 + 1) from which a policeman fines such that no two such bikes are next to each other.

This can be done in ${}^{17}C_4$ ways = 17! / (4! ×13!) = 2380 ways

Ans-2

38. The word 'JUSTICE' contains 7 letters which can be arranged in 7! Ways i.e., 5040 ways.

Ans-4

39. Number of ways in which boy and girls can be seated = 6! ×3!

Total number of ways when boys are seating together and girls are seating together = 2! × 6! × 3!

Ans-1

40. Required Number of ways = $^{6}C3 \times {}^{8}C2$ = 6! / (3! ×3!) × 8! / (2! ×6!) = 20 × 28 = 560

Ans-2

41. In the word "INCORPORATION", we treat the vowels IOOAIO as one letter

Thus, we have, NCRPRTN (IOOAIO)

This has 8(7+1) letters of which R and N occurs 2 times and the rest are different.

Number of ways arranging these letters = 8! / (2! ×2!) = 10080

Now, 6 vowels in which O occurs 3 times and I occur 2 times, can be arranged in 6! / (3! ×2!) = 60

∴ Required number of ways = 10080 × 60 = 604800

Ans-2

42. Selection of 4 boys from 6 boys = $^{6}C4$ = 6! / (4! ×2!) = 15

Selection of 3 girls from 6 girls = $^{6}C3$ = 6! / (3! ×3!) = 20

Required number of ways = 15 × 20 = 300

Ans-5

43. Selecting at least 2 black balls from a set of 4 black balls in total selection of 3 balls can be

2 black and 1 white balls

3 black and 0 white balls

Therefore, our solution expression looks.

$^{4}C2 \times {}^{3}C1 + {}^{4}C3 \times {}^{3}C0$

6 X 3 + 4 X 1 = 18 + 4 = 22 ways

Ans-4

44. Total number of Defenders = 5

Total number of Goal keepers = 4

Total number of Normal players = 11 [20- (5+4)]

Possible Combinations:

∴ Required Number of ways = (5C3 × 4C2 × 11C6) + (5C4 × 4C2 × 11C5) + (5C5 × 4C2 × 11C4)

= 5! / (3! ×2!) × 4! / (2! ×2!) × 11! / (6! ×5!) + 5! /4! × 4! / (2! ×2!) × 11! / (5! ×6!) + 5! /5! × 4! / (2! ×2!) × 11! / (4! ×7!)

= 10 × 6 × 462 + 5 × 6 × 462 + 1 × 6 × 330

= 27720 + 13860 + 1980 = 43560

Ans-4

45. The possible number of ways are.

Every 3 fours = 2 sixes = 12 runs

Therefore, every new combination is in the difference of 12 runs.

8 is the lowest score for which fours are required and 200 is the maximum score for which fours are required.

Therefore, number of possible ways = ((200-8)/12) + 1 = 17

Ans-3

46. Total number of words formed by using all the letters of the given word = 8! = 8 × 7 × 6 × 5 × 4 × 3 × 2 × 1 = 40320

Number of words formed when vowels are together = DISCOUNT = 3! × 6! = 6 x 720 = 4320

Number of words formed when vowels are never together = 40320 – 4320 = 36000

Ans-4

47. Required number of ways = $({}^8C_6 \times {}^8C_2 + {}^8C_5 \times {}^8C_3 + {}^8C_4 \times {}^8C_4 + {}^8C_3 \times {}^8C_5 + {}^8C_2 \times {}^8C_6)$

= (28 × 28 + 56 × 56 + 70 × 70 + 56 × 56 + 28 × 28)

= 12,740

Ans-3

48. When E and Rare fixed as first and last letters of the word, then we have only 6 letters to be arranged.

Hence required number of ways = (6!) / (2!) = 360

Ans-3

49. CASE 1: If last digit is 0, number of 5 digit can be formed by using the 1, 2,3,4& 5 = 5× 4×3×2 = 120

CASE 2: If last digit is 5, number of 5 digit can be formed by using the 0, 1, 2, 3 & 4.

= 4× 4×3×2 = 96 (as a number can never start with 0)

So total number of digits = 120 + 96 = 216

Ans-3

50.Number of ways = ${}^6C_2$ x ${}^3C_1$

= 15 x 3 = 45