

## Permutation & Combination

Date Planned : __ / __ / __	CBSE PATTERN	
Actual Date of Attempt : __ / __ / __	Level - 0	

- Eight chairs are numbered 1 to 8. Two women and 3 men wish to occupy one chair each. First the women choose the chairs from amongst the chairs 1 to 4 and then men select from the remaining chairs. Find the total number of possible arrangements.
- A candidate is required to answer 7 questions out of 12 questions, which are divided into two groups, each containing 6 questions. He is not permitted to attempt more than 5 questions from either group. Find the number of different ways of doing questions.
- Out of 18 points in a plane, no three are in the same line except five points which are collinear. Find the number of lines that that can be formed joining the point.
- We wish to select 6 person from 8 but, if the person A is chosen, then B must be chosen. In how many can selections be made?
- All possible four-digit numbers are formed using the digits 0, 1, 2, 3 so that no number has repeated digits. Find the number of even numbers among them.
- How many automobile license plates can be made, if each plate contains two different letters followed by three different digits?
- A bag contains 5 black and 6 red balls, determine the number of ways in which 2 black and 3 red balls can be selected from the lot.
- Find the number of permutations of  $n$  distinct things taken  $r$  together, in which 3 particular things must occur together.
- Find the number of different words that can be formed from the letters of the word 'TRIANGLE', so that no vowels are together.
- Find the number of positive integers greater than 6000 and less than 7000 which are divisible by 5, provided that no digit is to be repeated.
- A box contains two white, three black and four red balls. In how many ways can three balls be drawn from the box, if atleast one black ball is to be included in the draw?
- If  ${}^nC_{r-1} = 36$ ,  ${}^nC_r = 84$  and  ${}^nC_{r+1} = 126$ , then find the value of  ${}^rC_2$ .
- Find the number of integers greatest than 7000 that can be formed with the digits 3, 5, 7, 8 and 9 where no digits are repeated.
- If 20 lines are drawn in a plane such that no two of them are parallel and no three are concurrent, in how many points will they intersect each other?
- In a certain city, all telephone numbers have six digits, the first two digits always being 41 or 42 or 46 or 62 or 64. How many telephone numbers have all six digits distinct?
- In an examination, a student has to answer 4 questions out of 5 questions, questions 1 and 2 however compulsory. Determine the number of ways in which the student can make the choice.
- If a convex polygon has 44 diagonals, then find the number of its sides.

### OBJECTIVE TYPE

18. If  ${}^nC_{12} = {}^nC_8$ , then  $n$  is equal to:  
 (A) 20                      (B) 12                      (C) 6                      (D) 30
19. The number of possible outcomes when a coin is tossed 6 times is:  
 (A) 36                      (B) 64                      (C) 12                      (D) 32
20. The number of different four-digit numbers that can be formed with the digits 2, 3, 4, 7 and using each digit only once is:  
 (A) 120                      (B) 96                      (C) 24                      (D) 100
21. The sum of the digits in unit place of all the numbers formed with the help of 3, 4, 5 and 6 taken all at a time is:  
 (A) 432                      (B) 108                      (C) 36                      (D) 18
22. The total number of words formed by 2 vowels and 3 consonants taken from 4 vowels and 5 constants is:  
 (A) 60                      (B) 120                      (C) 7200                      (D) 720
23. If a five-digit number divisible by 3 is to be formed using the numbers 0, 1, 2, 3, 4 and 5 without repetitions, then the total number of ways this can be done is:  
 (A) 216                      (B) 600                      (C) 240                      (D) 3125
24. Everybody in a room shakes hands with everybody else. If the total number of handshakes is 66, then the total number of handshakes is 66, then the total number of persons in the room is:  
 (A) 11                      (B) 12                      (C) 13                      (D) 14
25. The number of triangles that are formed by choosing the vertices from a set of 12 points, seven of which lie on the same line is:  
 (A) 105                      (B) 15                      (C) 175                      (D) 185
26. The number of parallelograms that can be formed from a set of four parallel lines intersecting another set of three parallel lines is:  
 (A) 6                      (B) 18                      (C) 12                      (D) 9
27. The number of ways in which a team of eleven players can be selected from 22 players always including 2 of them and excluding 4 of them is:  
 (A)  ${}^{16}C_{11}$                       (B)  ${}^{16}C_5$                       (C)  ${}^{16}C_9$                       (D)  ${}^{20}C_9$
28. The number of 5-digit telephone numbers having atleast one of their digits repeated is:  
 (A) 90000                      (B) 10000                      (C) 30240                      (D) 69760
29. All the letters of the word 'EAMCET' are arranged in all possible ways. The number of such arrangements in which two vowels are not adjacent to each other is:  
 (A) 360                      (B) 114                      (C) 72                      (D) 54
30. The total number of 9-digit numbers which have all different digits is:  
 (A) 10!                      (B) 9!                      (C)  $9 \times 9!$                       (D)  $10 \times 10!$
31. The number of words which can be formed out of the letters of the word 'ARTICLE', so that vowels occupy the even place is:  
 (A) 1440                      (B) 144                      (C) 7!                      (D)  ${}^4C_4 \times {}^3C_3$
32. Let the eleven letters A, B, ..., K denote an arbitrary permutation of the integers (1, 2, ..., 11), then  $(A-1)(B-2)(C-3)...(K-11)$   
 (A) Necessarily zero                      (B) Always odd  
 (C) Always even                      (D) None of these

### Fill in the Blanks

33. If  ${}^nP_r = 840$  and  ${}^nC_r = 35$ , then  $r$  is equal to \_\_\_\_\_.
34.  ${}^{15}C_8 + {}^{15}C_9 - {}^{15}C_6 - {}^{15}C_7$  is equal to \_\_\_\_\_.
35. The number of permutations of  $n$  different objects, taken  $r$  at a time, when repetitions are allowed, is \_\_\_\_\_.
36. The number of different words that can be formed from the letters of the word 'INTERMEDIATE' such that two vowels never come together is \_\_\_\_\_.
37. Three balls are drawn from a bag containing 5 red, 4 white and 3 black balls. The number of ways in which this can be done, if at least 2 are red, is \_\_\_\_\_.
38. In a football championship, 153 matches were played. Every two-team played one match with each other. The number of teams, participating in the championship is \_\_\_\_\_.
39. The total number of ways in which six '+' and four '-' signs can be arranged in a line such that no two signs '-' occur together, is \_\_\_\_\_.
40. A box contains 2 white balls, 3 black balls and 4 red balls. The number of ways three balls be drawn from the box, if at least one black ball is to be included in the draw is \_\_\_\_\_.

### True or False

41. There are 12 points in a plane of which 5 points are collinear, then the number of lines obtained by joining these points in pairs is  ${}^{12}C_2 - {}^5C_2$ .
42. Three letters can be posted in five letter boxes in  $3^5$  ways.
43. In the permutations of  $n$  things  $r$ , taken together, the number of permutations in which  $m$  particular things occur together is  ${}^{n-m}P_{r-m} \times {}^rP_m$ .
44. In a steamer there are stalls for 12 animals and there are horses, cows and calves (not less than 12 each) ready to be shipped. They can be loaded in  $3^{12}$  ways.
45. If some or all of  $n$  objects are taken at a time, then the number of combinations is  $2^n - 1$ .
46. 4 Note of Rs. 100 and 5 note in which first of Rs. 1, second of Rs. 2, Third of Rs. 5, fourth of Rs. 20 and fifth one of Rs. 50 distributed in 3 children such that each child receives at least one note of Rs. 100. Find the total number of ways of distribution.
47. Eighteen guests are to be seated, half on each side of a long table. Four particular guest desire to sit on one particular side and three others on other side of the table. The number of ways in which the seating arrangements can be made is  $\frac{11!}{5!6!}(9!)(9!)$ .
48. How many numbers lying between 999 and 10000 can be formed with the help of the digit 0, 2, 3, 6, 7, 8 when the digits are not to be repeated?
49. To fill 12 vacancies there are 25 candidate of which 5 are from scheduled castes. If 3 of the vacancies are reserved for scheduled caste candidates while the rest are open to all, the number of ways in which the selection can be made is  ${}^5C_3 \times {}^{20}C_9$ .