

## Permutations and Combinations

### Model 1: Permutation Basic

1. In how many different ways can 5 persons stand in a row for a photograph?



- 1) 100                      2) 120                      3) 50                      4) 5                      5) None of these

2. How many different words can be formed using the letters of the word 'BANKER'?



- 1) 120                      2) 6                      3) 720                      4) 12                      5) None of these

3. In how many ways can the letters of the word COMPUTER be arranged?

- 1) 6!                      2) 7!                      3) 8!                      4) 5040                      5) None of these

4. How many different 4 digit numbers can be formed using the digits 1, 2, 3, 6, 7 and 9?



- 1) 120                      2) 24                      3) 720                      4) 360                      5) None of these

### Model 2: Permutation Advanced

5. How many different words can be formed using the letters of the words



- (i) MIRROR                      (ii) BANANA                      (iii) SUCCESSFUL

- 1) 120, 60, 151200                      2) 6!, 6!, 10!                      3) 4!, 3!, 6!  
4) 120, 120, 360                      5) None of these

6. A set of 12 books has 3 identical Quant books, 3 identical Reasoning books, 4 identical English books and 2 different books on General Awareness. In how many different ways can these 12 books be arranged in a book-shelf?



- 1) 12!                      2)  $12!/(3! \times 3! \times 4!)$                       3)  $12!/(3! \times 3! \times 4! \times 2!)$   
4) 126                      5) None of these

7. In how many ways can a set of chess pieces consisting of a king, a queen, two identical rooks, two identical knights and two identical bishops be placed on the first row of a chessboard?

- 1)  $8!$                       2)  $8^8$                       3) 5040                      4) 4280                      5) None of these

8. A father has 2 apples and 3 pears. Each weekday (Monday through Friday) he gives one of the fruits to his daughter. In how many ways can this be done?

- 1) 120                      2) 10                      3) 24                      4) 12                      5) None of these

### Model 3: Permutation Conditional

9. How many different words can be formed using the letters of the word 'EDUCATION' such that



(i) the word always starts with the letter 'D'?

- 1)  $9!$                       2)  $8!$                       3)  $2 \times 8!$                       4)  $8!/2$                       5) None of these

(ii) the word always ends with a vowel?

- 1)  $5! \times 8!$                       2)  $8!$                       3)  $5 \times 8!$                       4)  $9!$                       5) None of these

(iii) the word always begins with the letter 'A' and ends with a consonant?

- 1)  $7!$                       2)  $7! \times 4!$                       3)  $4 \times 7!$                       4)  $8! \times 4$                       5) None of these

(iv) all the consonants are always together

- 1)  $6! \times 4$                       2)  $6!$                       3)  $2 \times 8!$                       4)  $6! \times 4!$                       5) None of these

(v) the letters D, A, O and N are always together

- 1)  $6! \times 4$                       2)  $6!$                       3)  $2 \times 8!$                       4)  $6! \times 4!$                       5) None of these

(vi) No two consonants are together

- 1)  $6! \times {}^6P_4$                       2)  $6!$                       3)  $5! \times {}^6P_4$                       4)  $6! \times 2!$                       5) None of these

(vii) the letters A and T are never together

- 1)  $7! \times {}^8P_4$                       2)  $7!$                       3)  $2 \times 7!$                       4)  $7! \times {}^8P_2$                       5) None of these

10. In how many ways can the letters of the word PLUMBER such that all the vowels are always together?

- 1)  $6! \times 2!$       2)  $7!$       3)  $5! \times 2!$       4)  $6!$       5) None of these

#### Model 4: Permutation with and Without Repetitions

11. How many 5 digit numbers can be formed with the digits 2, 4, 5, 8 and 9 when



(i) Repetition is not allowed

- 1) 5      2)  $5!$       3)  $5^5$       4) 25      5) None of these

(ii) Repetition is allowed

- 1) 5      2)  $5!$       3)  $5^5$       4) 25      5) None of these

12. How many 4 digit numbers can be formed with the digits 0, 1, 3 and 6?



- 1) 6      2)  $4!$       3) 9      4) 18      5) None of these

13. How many 4 digit numbers can be formed using the digits 5, 6, 8 and 9 such that



(i) The number is greater than 8000

- 1) 6      2)  $4!$       3) 12      4) 24      5) None of these

(ii) The number is less than 6000

- 1) 6      2)  $4!$       3) 12      4) 24      5) None of these

#### Model 5: Permutation Circular

14. In how many ways can 6 persons be seated around a circular table for dinner?



- 1)  $6!$       2)  $5!$       3)  $5!/2$       4)  $6!/2$       5) None of these

15. How many different garlands can be made using 12 flowers of different colors?



- 1)  $12!$                       2)  $11!$                       3)  $11!/2$                       4)  $12!/2$                       5) None of these

16. How many bracelets can be made by stringing 9 different colored beads together?

- 1) 20160                      2) 40320                      3) 80640                      4) 10080                      5) None of these

### Model 6: Permutation Complex

17. Eight boys participated in each of 5 different competitions. In how many different ways



can the winner prize be given for all the competitions?

- 1) 5                      2)  $5!$                       3)  $8^5$                       4)  ${}^8P_5$                       5) None of these

18. In how many ways can the top three ranks be awarded for a particular exam/competition



involving 12 participants?

- 1)  $12!$                       2)  $3!$                       3)  $12!/3!$                       4)  ${}^{12}P_3$                       5) None of these

### Model 7: Combination Basic

19. In how many different ways can a committee of 8 persons be formed out of 5 men and 3



women?

- 1)  $8!$                       2) 8                      3) 1                      4)  ${}^8C_3$                       5) None of these

20. In how many different ways can a cricket team of 11 players be chosen out of total 14



players?

- 1) 356                      2) 364                      3) 256                      4) 712                      5) None of these

**Model 8: Combination Conditional Type 1**

21. Out of 10 men, there are 4 doctors, 3 teachers and 3 lawyers and out of 8 women, there are 3



doctors, 3 dancers and 2 lawyers. In how many ways can a committee of 5 persons be formed such that

(i) There are 3 doctors and 2 lawyers in the committee?

- 1)  ${}^7C_5 \times {}^5C_5$     2)  ${}^{10}C_5 \times {}^8C_5$     3)  ${}^{10}C_7 \times {}^8C_5$     4)  ${}^7C_3 \times {}^5C_2$     5) None of these

(ii) There are 2 teachers and 1 doctor in the committee?

- 1) 678    2) 588    3) 756    4) 624    5) None of these

(iii) There are 2 female doctors and 2 male lawyers?

- 1) 108    2) 188    3) 256    4) 124    5) None of these

(iv) There are at least 3 doctors in the committee?

- 1)  ${}^7C_3 \times {}^{11}C_3 + {}^7C_4 \times {}^{11}C_4 + {}^7C_5$     2)  ${}^7C_2 \times {}^{11}C_3 + {}^7C_1 \times {}^{11}C_4 + {}^7C_5$

- 3)  ${}^7C_3 \times {}^{11}C_2 + {}^7C_5$     4)  ${}^7C_3 \times {}^{11}C_2 + {}^7C_4 \times {}^{11}C_1 + {}^7C_5$

- 5) None of these

(v) There is no doctor and no dancer in the committee?

- 1) 108    2) 178    3) 56    4) 112    5) None of these

22. A committee of 5 members is to be formed out of 5 professors, 6 Teachers and 3 Readers. In how many different ways can this be done such that

(i) The committee consists of 2 Professors, 2 Teachers and 1 Reader

- 1) 450    2) 225    3) 55    4) 90    5) None of these

(ii) The committee includes all the 3 Readers

- 1) 90    2) 180    3) 21    4) 55    5) None of these

23. A committee of 5 members is to be formed out of 3 trainees, 4 professors and 6 research associates. In how many different ways can this be done if

(i) The committee should have all 4 professors and 1 research associate or all 3 trainees and professors

- 1) 12                  2) 13                  3) 24                  4) 52                  5) None of these

(ii) The committee should have 2 trainees and 3 research associates.

- 1) 15                  2) 45                  3) 60                  4) 9                  5) None of these

### Model 9: Combination Conditional Type 2

24. In how many ways can a cricket team of 11 players be chosen out of 8 batsmen and 6 bowlers such that



(i) There are 7 batsmen

- 1)  ${}^8C_4 \times {}^6C_4$     2)  ${}^{14}C_{11}$     3)  ${}^8C_7 \times {}^6C_4$     4)  ${}^8C_7 \times {}^6C_5$     5) None of these

(ii) There are 5 bowlers

- 1)  ${}^8C_6 \times {}^6C_5$     2)  ${}^{14}C_{11}$     3)  ${}^8C_7 \times {}^6C_4$     4)  ${}^8C_7 \times {}^6C_5$     5) None of these

(iii) The majority is of batsmen

- 1)  ${}^8C_7 \times {}^6C_4 + {}^8C_8 \times {}^6C_3$                       2)  ${}^8C_6 \times {}^6C_5 + {}^8C_7 \times {}^6C_4 + {}^8C_8 \times {}^6C_3$   
 3)  ${}^8C_6 \times {}^6C_5$                                       4)  ${}^7C_3 \times {}^{11}C_2 + {}^7C_4 \times {}^{11}C_1 + {}^7C_5$   
 5) None of these

(iv) There are not more than 5 bowlers

- 1)  ${}^8C_7 \times {}^6C_4 + {}^8C_8 \times {}^6C_3$                       2)  ${}^{14}C_{11} - {}^6C_6 \times {}^8C_5$   
 3)  ${}^6C_5 \times {}^8C_6$                                       4)  ${}^7C_3 \times {}^{11}C_2 + {}^7C_4 \times {}^{11}C_1 + {}^7C_5$   
 5) None of these

(v) 2 particular batsmen are always included and 1 particular bowler is always excluded

- 1)  ${}^6C_6 \times {}^5C_5$     2)  ${}^{11}C_9$     3)  ${}^8C_7 \times {}^6C_4$     4)  ${}^8C_7 \times {}^6C_5$     5) None of these

25. In how many ways can 3 women be selected out of 15 women if one particular woman is always included and two particular women are always excluded?

- 1) 66                      2) 77                      3) 88                      4) 99                      5) None of these

### Model 10: Miscellaneous

26. In how many ways can a person choose one or more out of 5 different subject books?



- 1) 15                      2) 32                      3) 31                      4) 16                      5) None of these

27. In how many ways can a person choose 1 or more out of 4 electrical appliances?

- 1) 10                      2) 12                      3) 14                      4) 15                      5) None of these

28. In a party, there are 15 persons and every person shakes hand with every other person.



What will be the total number of handshakes?

- 1) 105                      2) 120                      3) 140                      4) 210                      5) None of these

29. How many parallelograms are formed by a set of 5 parallel lines intersecting another set of



8 parallel lines?

- 1) 56                      2) 140                      3) 280                      4) 120                      5) None of these

30. A sentence can be formed by choosing one word of each type from 7 nouns, 5 verbs and 2



adjectives written on a blackboard and we do not care about how much sense the sentence makes. How many different sentences can be formed? **[October 18, 2014 @ 1h 34m 40s]**

- 1)  $7^2 \times 5^2 \times 2^2$                       2)  $7 \times 5 \times 2 \times 3!$                       3)  $7! \times 5! \times 2!$                       4)  $2^7 \times 2^5 \times 2^2$                       5) None of these

**Answers**

1 - 2	2 - 3	3 - 3	4 - 4	5 - 1	6 - 2	7 - 3	8 - 2	9(i)-2
9(ii)-3	9(iii)-3	9(iv)-4	9(v)-4	9(vi)-3	9(vii)-4	10 - 1	11(i)-2	11(ii)-3
12 - 4	13(i)-3	13(ii)-1	14 - 2	15 - 3	16 - 1	17 - 3	18 - 4	19 - 3
20 - 2	21(i)-4	21(ii)-2	21(iii)-1	21(vi)-4	21(v)-3	22(i)-1	22(ii)-4	23(i)-1
23(ii)-3	24(i)-3	24(ii)-1	24(iii)-2	24(iv)-2	24(v)-2	25 - 1	26 - 3	27 - 4
28 - 1	29 - 3	30 - 2						

**Note:** The date and time mentioned against some questions refer to the doubts clarification session on Quantitative Aptitude in which the question was solved.