Permutations and Combinations

Part 1 - Basic

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!x3!x4!)   3) 12!/(3!x3!x4!x2!)

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 x 8!   4) 8!/2   5) None of these

    (ii) the word always ends with a vowel?

       1) 5! x 8!   2) 8!   3) 5 x 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! x 4!   3) 4 x 7!   4) 8! x 4   5) None of these

    (iv) all the consonants are always together

       1) 6! x 4   2) 6!   3) 2 x 8!   4) 6! x 4!   5) None of these

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

       1) 6! x 4   2) 6!   3) 2 x 8!   4) 6! x 4!   5) None of these

    (vi) No two consonants are together

       1) 6! x $^6P_4$ 2) 6!   3) 5! x $^6P_4$ 4) 6! x 2!   5) None of these

    (vii) the letters A and T are never together

       1) 7! x $^8P_4$ 2) 7!   3) 2 x 7!   4) 7! x $^8P_2$ 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! x 2!   2) 7!   3) 5! x 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) $^8C_4$ x $^6C_4$ 2) $^{14}C_{11}$ 3) $^8C_7$ x $^6C_4$ 4) $^8C_7$ x $^6C_5$ 5) None of these

   (ii) There are 5 bowlers

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

   (iii) The majority is of batsmen

   1) $^8C_7$ x $^6C_4$ + $^8C_8$ x $^6C_3$ 2) $^8C_6$ x $^6C_5$ + $^8C_7$ x $^6C_4$ + $^8C_8$ x $^6C_3$

   3) $^8C_6$ x $^6C_5$ 4) $^7C_3$ x $^{11}C_2$ + $^7C_4$ x $^{11}C_1$ + $^7C_5$

   5) None of these

   (iv) There are not more than 5 bowlers

   1) $^8C_7$ x $^6C_4$ + $^8C_8$ x $^6C_3$ 2) $^{14}C_{11}$ - $^6C_6$ x $^8C_5$

   3) $^6C_5$ x $^8C_6$ 4) $^7C_3$ x $^{11}C_2$ + $^7C_4$ x $^{11}C_1$ + $^7C_5$

   5) None of these

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

   1) $^6C_6$ x $^5C_5$ 2) $^{11}C_9$ 3) $^8C_7$ x $^6C_4$ 4) $^8C_7$ x $^6C_5$ 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(iiii)-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.