

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						