



1. Find n if : (i) $(n+2)! = 2550 \times n!$ (ii) $(n+1)! = 12 \times (n-1)!$ [49,3]
2. Prove that: $\frac{(2n)!}{n!} = \{1.3.5 \dots (2n-1)\}2^n$
3. Prove that the inequalities $(n!)^2 \leq n^n$. $n! < (2n)!$ for all positive integers n
4. If $\frac{(2n)!}{3!(2n-3)!}$ and $\frac{n!}{2!(n-2)!}$ are in the ratio 44: 3, find n . [6]
5. Prove that $\frac{n!}{(n-r)!} + \frac{n!}{(n-r+1)!(r-1)!} = \frac{(n+1)!}{r!(n-r+1)!}$
6. A room has six doors. In how many ways can a man enter the room through one door and come out through a different door? [30]
7. In monthly test teacher decides that there will be three question, one from each of exercises 7,8 and 9 of the text book. If there are 12 questions in Exercise 7, 18 in exercise 8 and 9 in exercise 9, in how many ways can three question be selected? [1944]
8. How many numbers are between 100 1000 in which all the digits are distinct? [648]
9. How many numbers are between 100 1000 such that at least one of their digits is 7? [900]
10. How many four-digit numbers can be formed using the digits 0,1,2,3,4,5 if (i) repetition of digits is not allowed (ii) repetition of digits is allowed? [300,1080]
11. How many numbers greater than 1000, but not greater than 4000 can be formed with the digits 0,1,2,3,4 if: (i) repetition of digits is allowed? (ii) Repetition of digits is not allowed. [375,72]
12. In how many ways can 3 prizes be distributed among 4 boys, when (i) no boys get more than one prizes. (ii) a boy get any number of prize (iii) no boy gets all the prizes? [24, 64, 60]
13. By using digits 0,1,2,3,4 and 5 (repetition not allowed) numbers are formed by using any number of digits. Find the total number of non-zero number that can be formed. [1630]
14. If $2P(5,3) = P(4n,4)$, find n [5]
15. If $P(9,5) + 5.P(9,4) = P(10,r)$ find r . [5]
16. If $P(56,r+6):P(54,r+3) = 308000:1$, find r . [41]
17. Prove that if $r \leq s \leq n$, then $P(n,s)$ is divide by $P(n,r)$
18. If P_m states for $P(m,m)$, then prove that: $1 + 1.P_1 + 2.P_2 + 3.P_3 + \dots + n.P_n = (n+1)!$
19. How many different signals can be given using any number of flags from 5 flags of different colours [325]
20. How many number lying between 100 and 1000 can be formed with the digits 1,2,3,4,5 if the repetition of digits is not allowed [60]
21. Find the sum of all the numbers that can be formed with the digits 2,3,4,5 taken all at a time [93324]
22. Determine the number of natural number smaller than 10^4 , in the decimal notation of which all the digits are distinct. [5274]
23. How many words, with or without meaning can be formed using all the letters of the word *EQUATION*, using each latter exactly once. [8!]
24. How many 4-letter words, with or without meaning can be formed using all the letters of the word *LOGARITHMS*, using each latter exactly once. [5040]



25. There are six periods in each working day of a school. In how many ways can one arrange 5 subjects such that each subject is allowed at least one period? [3600]
26. If a denotes the number of permutations of $(x + 2)$ things taken all at a time, b the number of permutations of x things taken 11 at a time and c the number of permutation of $x - 11$ things taken all at a time such that $a = 182bc$ find the value of x . [12]
27. In how many ways can 6 boys and 5 girls be arranged for a group photo graph if the girls are to sit on chairs in a row and the boy are stand in a row behind them? [86400]
28. How many word can be formed from the letters of the word 'DAUGHTER' so that (i) the vowels always come together? (ii) the vowel never come together? [4320, 36000]
29. In how many ways 5 boys and 3 girls can be selected in a row so that no two girls are together? [144000]
30. In how many ways can 9 examination papers be arranged so that the best and the worst papers never together? [282240]
31. How many even numbers are there with three digits such that if 5 is one of the digits, then 7 is the next digits? [365]
32. A cod word is to consist of two distinct English alphabetical followed by two distinct number from 1 to 9. For example CA23 is a code word. How many such code words are there? How many of them end with an integer? [20800]
33. The principal wants to arrange 5 students on the plate form such that the boy 'SALIM' occupies the second position and such that the girl 'SITA, is always adjacent to the girl 'RITA'. How many such arranged are possible?