

# MATHS

## BOOKS - NDA PREVIOUS YEARS

### PERMUTATION AND COMBINATION

#### Mcq

1. How many 3-digit numbers, each less than 600, can be formed from  $\{1, 2, 3, 4, 7, 9\}$  if repetition of digits is allowed ?

A. 216

B. 180

C. 144

D. 120

**Answer: C**



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**2.** There are four chairs with two chairs in each row. In how many ways can four persons be

seated on the chairs, so that no chair remains unoccupied

A. 6

B. 12

C. 24

D. 48

**Answer: C**



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3. In how many ways can the letters of the word CORPORATION be arranged so that vowels always occupy even places ?

A. 120

B. 2700

C. 720

D. 7200

**Answer: D**



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4. If all permutation of the letters of the word 'LAGAN' are arranged as in dictionary, then what is the rank of 'NAAGL' ?

A. 48th word

B. 49th word

C. 50th word

D. 51st word

**Answer: B**



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5. If a secretary and a joint secretary are to be selected from a committee of 11 members, then in how many ways can they be selected ?

A. 110

B. 55

C. 22

D. 11

**Answer: B**



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6. Assertion (A) : The number of triangles that can be formed by joining the mid-points of any three adjacent faces of a cube is 20

Reason (R): If there are  $n$  points on a plane and none of them are collinear, then the number of triangles that can be formed is  $C(n, 3)$

A. Both A and R are individually true, and R is the correct explanation of A

B. Both A and R are individually true but R is not the correct explanation of A

C. A is true but R is false

D. A is false but R is true

**Answer: A**



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7. Assertion (A) : The number of selections of 20 distinct things taken 8 at a time is same as that taken 12 at a time

Reason (R):  $C(n, r) = C(n, s)$ , if  $n = r + s$



- A. Both A and R are individually true, and R is the correct explanation of A
- B. Both A and R are individually true but R is not the correct explanation of A
- C. A is true but R is false
- D. A is false but R is true

**Answer: A**



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8. If the letters of the word BAZAR are arranged in dictionary order, then what is the 50th word ?

A. ZAABR

B. ZBAAR

C. ZBRAA

D. ZAARB

**Answer: D**



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9. In how many ways can 7 person stand in the form of a ring ?

A.  $P(7, 2)$

B.  $7!$

C.  $6!$

D.  $\frac{7!}{2}$

**Answer: C**



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10. In how many ways can be letters of the word 'CABLE' be arranged so that the vowels should always occupy odd positions ?

A. 12

B. 18

C. 24

D. 36

**Answer: D**



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11. What is  $\frac{(n + 2)! + (n + 1)(n - 1)!}{(n + 1)(n - 1)!}$  equal to ?

A. 1

B. Always an odd integer

C. A perfect square

D. None of the above

**Answer: C**



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12. A meeting is to be addressed by 5 speakers A, B, C, D, E. In how many ways can the speakers be ordered, if B must not precede A (immediately or otherwise)?

A. 120

B. 24

C. 60

D.  $5^4 \times 4$

**Answer: B**



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**13.** On a railway there are 20 stations. The number of different tickets required in order that it may be possible to travel from every station to every station is

A. 40

B. 380

C. 400

D. 420

**Answer: B**



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14. What is the number of five-digit numbers formed with 0, 1, 2, 3, 4 without any repetition of digits ?

A. 24

B. 48

C. 96

D. 120

**Answer: C**





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15. A group consists of 5 men and 5 women. If the number of different five-person committees containing  $k$  men and  $(5-k)$  women is 100, what is the value of  $k$ ?

A. 2 only

B. 3 only

C. 2 or 3

D. 4

**Answer: C**



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**16.** If 7 points out of 12 are in the same straight line, then the number of triangles formed is

A. 84

B. 175

C. 185

D. 201

**Answer: C**



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**17.** In how many ways can 3 books on Hindi and 3 books on English be arranged in a row on a shelf, so that not all the Hindi books are together ?

A. 144

B. 360

C. 576

D. 720

**Answer: C**



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**18.** How many words, with or without meaning can be formed by using all the letters of the word 'MACHINE', so that the vowels occurs only the odd position ?

A. 1440

B. 720

C. 640

D. 576

**Answer: D**



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**19.** From 7 men and 4 women a committee of 6 is to be formed such that the committee contains at least two women. What is the number of ways to do this?

A. 210

B. 371

C. 462

D. 5544

**Answer: B**



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20. If  $P(32, 6) = kC(32, 6)$ , then what is the value of  $k$ ?

A. 6

B. 32

C. 120

D. 720

**Answer: D**



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**21.** What is the smallest natural number  $n$  such that  $n!$  is divisible by 990

A. 9

B. 11

C. 33

D. 99

**Answer: B**



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**22. What is the value of  $r$ , if  $P(5, r) = P(6, r-1)$  ?**

A. 9



B. 5

C. 4

D. 2

**Answer: C**



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**23.** What is the number of words formed from the letters of the word 'JOKE' , so that the vowels and consonants alternate?

A. 4

B. 8

C. 12

D. None of these

**Answer: B**



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**24.** If  $C(n, 12) = C(n, 8)$  then find the values of  $C(n, 17)$  and  $C(22, n)$

A. 131, 1140

B. 1140, 231

C. 1380, 256

D. 231, 292

**Answer: B**



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**25.** In a football championship, 153 matches were played. Every two teams played one

match with each other. The number of teams, participating in the championship is ..... .

A. 21

B. 18

C. 17

D. 15

**Answer: B**



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**26.** The number of times the digit 3 will be written when listing the integers from 1 to 1000, is

A. 269

B. 308

C. 300

D. None of these

**Answer: C**



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27. What is the number of ways of arranging the letters of the word 'BANANA' so that no two N's appear together ?

A. 40

B. 60

C. 80

D. 100

**Answer: A**



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28. How many three digit odd numbers can be formed by using the digits 1,2,3,4,5,6 if; The repetition of digits is not allowed? The repetition of digits is allowed?

A. 60

B. 108

C. 120

D. 216

**Answer: B**



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29. A team of 8 players is to be chosen from a group of 12 players. Out of the 8 players one is to be elected as captain and another as vice-captain. In how many ways can this be done?

(A) 27720 (B) 13860 (C) 6930 (D) 495

A. 27720

B. 13860

C. 6930

D. 495



**Answer: A**



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**30.** What is the number of words that can be formed from the letters of the word 'UNIVERSAL', the vowels remaining always together ?

A. 720

B. 1440

C. 17280

D. 21540

**Answer: C**



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**31.** What is the number of signals that can be sent by 6 flags of different colour taking one or more at a time ?

A. 21

B. 63

C. 720

D. 1956

**Answer: B**



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**32.** In how many ways can a committee consisting of 3 men and 2 women be formed from 7 men and 5 women ?

A. 45

B. 350

C. 700

D. 4200

**Answer: B**



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**33.** What is the total number of combination of  $n$  different things taken 1, 2, 3, ...,  $n$  at a time ?

A.  $2^{n+1}$

B.  $2^{2n+1}$

C.  $2^{n-1}$

D.  $2^n - 1$

**Answer: D**



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**34.** 5 books are to be chosen from a lot of 10 books. If  $m$  is the number of ways of choice when one specified book is always included and  $n$  is the number of ways of choice when a

specified book is always excluded, then which one of the is correct

A.  $m > n$

B.  $m = n$

C.  $m = n - 1$

D.  $m = n - 2$

**Answer: B**



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**35.** In how many ways 6 girls can be seated in two chairs ?

A. 10

B. 15

C. 24

D. 30

**Answer: D**



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36. What is the value of  $n$ , if

$$P(15, n - 1) : P(16, n - 2) = 3 : 4?$$

A. 10

B. 12

C. 14

D. 15

**Answer: C**



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37. Using the digits 1, 2, 3, 4 and 5 only once, how many numbers greater than 41000 can be formed ?

A. 41

B. 48

C. 50

D. 55

**Answer: B**



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**38.** A, B, C, D and E are coplanar points and three of them lie in a straight line. What is the maximum number of triangles that can be drawn with these points as their vertices ?

A. 5

B. 9

C. 10

D. 12

**Answer: B**



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**39.** There are 4 candidates for the post of a lecturer in Mathematics and one is to be selected by votes of 5 men. What is the number of ways in which the votes can be given ?

A. 1048

B. 1072

C. 1024

D. 625

**Answer: D**



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40. What is the value of  $\sum_{r=1}^n \frac{P(n, r)}{r!}$  ?

A.  $2^n - 1$

B.  $2^n$

C.  $2^n - 1$

D.  $2^n + 1$

**Answer: A**



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**41.** In how many ways 4 boys and 3 girls can be seated in a row so that they are alternate?

A. 12

B. 72

C. 120

D. 144

**Answer: D**



**42.** The number of permutations that can be formed from all the letters of the word 'BASEBALL' is

A. 540

B. 1260

C. 3780

D. 5040

**Answer: D**



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43. If  $P(77, 31) = x$  and  $C(77, 31) = y$ , then which one of the following is correct?

A.  $x = y$

B.  $2x = y$

C.  $77x = 31y$

D.  $x > y$

**Answer: D**



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44. In how many ways can the letters of the word 'GLOOMY' be arranged so that the two O's should not be together ?

A. 240

B. 480

C. 600

D. 720

**Answer: A**





**45.** Out of 7 consonants and 4 vowels, words are to be formed by involving 3 consonants and 2 vowels. The number of such words formed is :

A. 25200

B. 22500

C. 10080

D. 5040

**Answer: A**



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**46.** How many different words can be formed by taking four letters out of the letters of the word 'AGAIN' if each word has to start with A ?

A. 6

B. 12

C. 24

D. None of the above

**Answer: C**



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**47.** Find the number of ways in which one can post 5 letters in 7 letter boxes.

A.  $7^5$

B.  $3^5$

C.  $5^7$

D. 2520

**Answer: A**



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**48.** From a group of 15 cricket players, a team of 11 players is to be chosen. In how many ways can this be done?

A. 364

B. 1001

C. 1365

D. 32760

**Answer: C**



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**49.** How many words can be formed using all the letters of the word 'NATION' so that all the three vowels should never come together ?

A. 354

B. 348

C. 288

D. None of these

**Answer: C**



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50. If  $A = \{a, b, c, d\}$ ,  $B = \{p, q, r, s\}$  than which of the following are relations from  $A \rightarrow B$ ? Give reasons for your answer.:

$$R_4 = \{(a, p), (q, a), (b, s), (s, b)\}$$

A. 4096

B. 4094

C. 128

D. 126

**Answer: A**



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51. If all the letters of the word AGAIN be arranged as in a dictionary, what is the fiftieth word?

A. NAAGI

B. NAAIG

C. IAAGN

D. IAANG

**Answer: B**



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52. The number of ways in which a cricket team of 11 players be chosen out of a batch of 15 players so that the captain of the team is always included, is



A. 165

B. 364

C. 1001

D. 1365

**Answer: C**



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**53.** A polygon has 44 diagonals. The number of its sides are

A. 11

B. 10

C. 8

D. 7

**Answer: A**



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**54.** The number of ways in which 3 holiday tickets can be given to 20 employees of an

organization if each employee is eligible for any one or more of the tickets, is

A. 1140

B. 3420

C. 6840

D. 8000

**Answer: D**



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55. The number of 3-digit even numbers that can be formed from the digits 0,1,2,3,4 and 5, repetition of digits being not allowed, is

A. 60

B. 56

C. 52

D. 48

**Answer: C**



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56. What is the number of ways in which 3 holiday travel tickets to be given to 10 employees of an organization, if each employee is eligible for any one or more of the tickets? (b) 120 (a) 60 (d) 1000 (c) 5000

A. 60

B. 120

C. 500

D. 1000

**Answer: D**



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57. What is the number of four-digit decimal numbers ( $< 1$ ) in which no digit is repeated ?

A. 3024

B. 4536

C. 5040

D. None of the above

**Answer: B**



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58. What is the number of different messages that can be represented by three 0's and two 1's ?

A. 10

B. 9

C. 8

D. 7

**Answer: A**



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**59.** Out of 15 points in a plane,  $n$  points are in the same straight line. 445 triangle can be formed by joining these points. What is the value of  $n$  ?

A. 3

B. 4

C. 5

D. 6



**Answer: C**



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**60.** A five-digit number divisible by 3 is to be formed using the digits 0,1,2,3 and 4 without repetition of digits. What is the number of ways this can be done ?

A. 96

B. 48

C. 32

D. No number can be formed

**Answer: D**



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**61.** What is the number of odd integers between 1000 and 9999 with no digit repeated ?

A. 2100

B. 2120

C. 2240

D. 3331

**Answer: C**



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**62.** The number of different words (eight-letter words) ending and beginning with a consonant which can be made out of the letters of the word 'EQUATION' is

A. 5200

B. 4320

C. 3000

D. 2160

**Answer: B**



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**63. 25.** How many different permutations can be made out of the letters of the word PERMUTATION?

A. 19958400

B. 19954800

C. 19952400

D. 39916800

**Answer: A**



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**64.** A tea party is arranged for  $2m$  people along two sides of a long table with  $m$  chairs on each side,  $r$  men wish to sit on one

particular side and  $s$  on the other. IN how many ways can they be seates ?  $[r, s, \leq m]$

A.  $24 \times 8! \times 8!$

B.  $(81)^3$

C.  $210 \times 8! \times 8!$

D.  $16!$

**Answer: C**



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**65.** How many numbers between 100 and 1000 can be formed with the digits 5, 6, 7, 8, 9, if the repetition of digits is not allowed ?

A.  $3^5$

B.  $5^3$

C. 120

D. 60

**Answer: D**



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**66.** How many four-digit numbers divisible by 10 can be formed using 1, 5, 0, 6, 7 without repetition of digits ?

A. 24

B. 36

C. 44

D. 64

**Answer: A**



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67. The number of triangles that can be formed by choosing the vertices from a set of 12 points, seven of which lie on the same straight line, are:

A. 185

B. 175

C. 115

D. 105

**Answer: A**



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68. There are 17 cricket players, out of which 5 players can bowl. In how many ways can a team of 11 players be selected so as to include 3 bowlers ?

A.  $C(7, 11)$

B.  $C(12, 8)$

C.  $C(17, 5)$

D.  $C(5, 3) \times C(12, 8)$

**Answer: D**



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**69.** The total number of 5 -digit numbers that can be composed of distinct digits from 0 to 9 is

A. 45360

B. 30240

C. 27216

D. 15120

**Answer: C**



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**70.** What is the sum of all three-digit numbers that can be formed using all the digits 3, 4 and 5, when repetition of digits is not allowed ?

A. 2664

B. 3882

C. 4044

D. 4444

**Answer: A**



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71. Three dice having digits 1,2,3,4,5 and 6 on their faces are marked I, II and III and rolled. Let  $x$ ,  $y$  and  $z$  represent the number on die-I die-II and die-III respectively. What is the number of possible outcomes such that  $x > y > z$ ?

A. 14

B. 16

C. 18

D. 20

**Answer: D**



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**72.** There are ten points in a plane. Of these ten points, four points are in a straight line and with the exception of these four points, on three points are in the same straight line. Find

i. the number of triangles formed, ii the number of straight lines formed iii the number of quadrilaterals formed, by joining these ten points.

A. 90

B. 45

C. 40

D. 30

**Answer: B**



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73. From 6 programmers and 4 typists, an office wants to recruit 5 people. What is the number of ways this can be done so as to recruit at least one typist ?

A. 209

B. 210

C. 246

D. 242

**Answer: C**





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74. How many three-digit even numbers can be formed using the digits 1, 2, 3, 4 and 5 when repetition of digits is not allowed ?

A. 36

B. 30

C. 24

D. 12

**Answer: D**



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