# Permutation & Combination

| Miscellaneous Question Bank | Level – 1 |
|---|---|

**1.** The value of 1.1! + 2.2! + 3.3! + . . . . . + $n.n!$ is:

**(A)** $(n + 1)!$ **(B)** $(n + 1)! + 1$ **(C)** $(n + 1)! - 1$ **(D)** None of these

**2.** The number of the factors of 20! is:

**(A)** 4140 **(B)** 41040 **(C)** 4204 **(D)** 81650

**3.** The number of ways of distributing 8 identical balls in 3 distinct boxes so that none of the boxes is empty is:

**(A)** $3^8$ **(B)** 21 **(C)** 5 **(D)** $^8C_3$

**4.** Three dice are rolled. The number of possible outcomes in which at least one die shows 5 is:

**(A)** 215 **(B)** 36 **(C)** 125 **(D)** 91

**5.** A three-digit number divisible by 3 is to be formed using the digits 0, 1, 2 with repetition. The total number of ways, in which this can be done is:

**(A)** 4 **(B)** 5 **(C)** 9 **(D)** 6

**6.** An eight-digit number divisible by 9 is to be formed by using 8 digits out of the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 without replacement. The number of ways in which this can be done is:

**(A)** 9! **(B)** 2(7!) **(C)** 4(7!) **(D)** (36) (7!)

**7.** A committee of 12 is to be formed from 9 women and 8 men. In how many ways this can be done if at least five women have to be included in a committee?

**(A)** 5062 **(B)** 6062 **(C)** 7062 **(D)** 8062

**8.** The results of 21 football matches (win, lose or draw) are to be predicted. The number of forecasts that contain exactly 18 correct results is:

**(A)** $^{21}C_3\ 2^{18}$ **(B)** $^{21}C_{18}\ 2^3$ **(C)** $3^{21} - 2^{18}$ **(D)** $^{21}C_3\ 3^{21} - 2^{18}$

**9.** In a city no two persons have identical set of teeth and there is no person without a tooth. Also, no person has more than 32 teeth. If we disregard the shape and size of tooth and consider only the positioning of the teeth, then the maximum population of the city is:

**(A)** $2^{32}$ **(B)** $(32)^2 - 1$ **(C)** $2^{32} - 1$ **(D)** $2^{32-1}$

**10.** At an election there are five candidates and three members are to be elected, and a voter may vote for any number of candidates not greater than the number to be elected. The number of ways in which the person can vote is:

**(A)** 25 **(B)** 30 **(C)** 35 **(D)** $2^5 - 2^3$

**11.** There are three pigeon holes marked *M*, *P*, *C*. The number of ways in which we can put 12 letters so that 6 of them are in *M*, 4 are in *P* and 2 are in *C* is:

**(A)** 2520 **(B)** 13860 **(C)** 12530 **(D)** 25220

**12.** The number of ways of selecting 4 cards of an ordinary pack of playing cards so that exactly 3 of them are of the same denomination is:

**(A)** 2496 **(B)** ${}^{13}C_3 \times {}^4C_3 \times 48$ **(C)** ${}^{52}C_3 \times 48$ **(D)** None of these

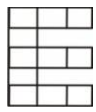
**13.** A person buys eight packets of TIDE detergent. Each packet contains one coupon, which bears one of the letters of the word TIDE. If he shows all the letters of the word TIDE, he gets one free packet. If he gets exactly one free packet, then the number of different possible combinations of the coupons is:

**(A)** ${}^7C_3 - 1$ **(B)** ${}^8C_4 - 1$ **(C)** ${}^8C_3$ **(D)** $4^4$

**14.** The number of ways in which we can place 9 different balls in 3 different boxes such that in every box at least 2 balls are placed is:

**(A)** 11508 **(B)** 11608 **(C)** 12508 **(D)** 12608

**15.** Number of ways in which AAABBB can be placed in the squares of the figure as shown so that no row remains empty, is:



**(A)** 2430 **(B)** 2160

**(C)** 1620 **(D)** None of these

**16.** Let $n_1 < n_2 < n_3 < n_4 < n_5$ be positive integers such that $n_1 + n_2 + n_3 + n_4 + n_5 = 20$.
The number of such distinct arrangements $(n_1, n_2, n_3, n_4, n_5)$ is:

**(A)** 5 **(B)** 6 **(C)** 7 **(D)** 8

**17.** The number of subsets of a set containing *n* distinct objects is:

**(A)** ${}^nC_1 + {}^nC_2 + {}^nC_3 + \ldots + {}^nC_{n-1}1$ **(B)** $2^n - 1$

**(C)** ${}^nC_0 + {}^nC_1 + \ldots + {}^nC_n$ **(D)** $2^n + 1$

**18.** The number of 10-digit numbers that can be written by using the digits 0 and 1 is:

**(A)** $2^{10}$ **(B)** $2^9$ **(C)** $2^{10} - 2$ **(D)** 10!

**19.** In a cricket championship, there are 36 matches. The number of teams, if each plays 1 match with the other are:

**(A)** 9 **(B)** 10 **(C)** 8 **(D)** 12

**20.** If ${}^{2n+1}P_{n-1} : {}^{2n-1}P_n = 3:5$, then $n$ equals:

**(A)** 5 **(B)** 4 **(C)** 3 **(D)** 2

**21.** The number of ways in which 9 persons can be divided into three equal groups is:

**(A)** 280 **(B)** 840 **(C)** 560 **(D)** 1680

**22.** How many numbers greater than 40000 can be formed from the digits 2, 4, 5, 5, 7 ?

**(A)** 12 **(B)** 24 **(C)** 36 **(D)** 48

**23.** The number of subsets of {1, 2, 3, ...., 9} containing atleast one odd number is:

**(A)** 324 **(B)** 396 **(C)** 496 **(D)** 512

**24.** If ${}^{16}C_r = {}^{16}C_{r+2}$, then ${}^{r}P_{r-3}$ equals:

**(A)** 31 **(B)** 120 **(C)** 210 **(D)** 840

**25.** The number of seven-digit numbers with sum of the digits equal to 10 and formed by using the digits 1, 2 and 3 only, is:

**(A)** 55 **(B)** 66 **(C)** 77 **(D)** 88

**26.** Assuming the balls to be identical except for difference in colours, the number of ways in which one or more balls can be selected from 10 white, 9 green and 7 black balls is:

**(A)** 880 **(B)** 629 **(C)** 630 **(D)** 879

**27.** **Statement 1:** The number of ways of distributing 10 identical balls in 4 distinct boxes such that no box is empty, is ${}^{9}C_3$.

**Statement 2:** The number of ways of choosing any 3 places from 9 different places is ${}^{9}C_3$.

**(A)** Statement-1 is True, Statement-2 is True and Statement-2 is a correct explanation for Statement-1

**(B)** Statement-1 is True, Statement-2 is True and Statement-2 is NOT a correct explanation for Statement-1

**(C)** Statement-1 is True, Statement-2 is False

**(D)** Statement-1 is False, Statement-2 is True

**28.** There are 10 points in a plane, out of these 6 are collinear. If N is the number of triangles formed by joining these points, then:

**(A)** $N > 190$ **(B)** $N \le 100$ **(C)** $100 < N \le 140$ **(D)** $140 < N \le 190$

**29.** From 6 different novels and 3 different dictionaries, 4 novels and 1 dictionary are to be selected and arranged in a row on the shelf so that the dictionary is always in the middle. Then, the number of such arrangements is:

**(A)** atleast 500 but less than 750 **(B)** atleast 750 but less than 1000
**(C)** atleast 1000 **(D)** less than 500

**30.** In a shop, there are five types of ice-creams available. A child buys six ice-creams.

**Statement 1:** The number of different ways the child can buy the six ice-creams is ${}^{10}C_3$.

**Statement 2:** The number of different ways the child can buy the six ice-creams is equal to the number of different ways of arranging 6A's and 4B's in a row.

**(A)** Statement-1 is True, Statement-2 is True and Statement-2 is a correct explanation for Statement-1
**(B)** Statement-1 is True, Statement-2 is True and Statement-2 is NOT a correct explanation for Statement-1
**(C)** Statement-1 is True, Statement-2 is False
**(D)** Statement-1 is False, Statement-2 is True

**31.** At an election, a voter may vote for any number of candidates not greater than the number to be elected. There are 10 candidates and 4 are to be elected. If a voter votes for atleast one candidate, then the number of ways in which he can vote, is:

**(A)** 6210 **(B)** 385 **(C)** 1110 **(D)** 5040

**32.** The range of the function $f(x) = {}^{7-x}P_{x-3}$ is:

**(A)** {1, 2, 3} **(B)** {1, 2, 3, 4, 5, 6}
**(C)** {1, 2, 3, 4} **(D)** {1, 2, 3, 4, 5}

**33.** In how many ways 5 persons can sit at a round table, if two of the persons do not sit together?

**34.** In a conference 10 speakers are present. If $S_1$ wants to speak before $S_2$ and $S_2$ wants to speak after $S_3$, then the number of ways all the 10 speakers can give their speeches with the above restriction if the remaining seven speakers have no objection to speak at any number is:

**(A)** ${}^{10}C_3$ **(B)** ${}^{10}P_8$ **(C)** ${}^{10}P_3$ **(D)** $\frac{10!}{3}$

**35.** A family consists of a grandfather, 5 sons and daughters and 10 grandchildren. They are to be seated in a row for dinner. The grandchildren wish to occupy the 5 seats at each end and the grandfather refuses to have grandchildren on either side of him. In how many ways can the family be made to sit?

**(A)** $4 \times 5! \times 10!$ **(B)** $5 \times 5! \times 10!$
**(C)** $4 \times 4! \times 10!$ **(D)** $9! \times 5! \times 4$

***36.** If n objects are arranged in a circle, then the number of ways of selecting three of these objects so that no two of them are next to each other is:

**(A)** $\frac{(n)(n-4)(n-5)}{6}$ **(B)** $\frac{n}{3} \times {}^{n-4}C_2$

**(C)** ${}^{n-2}C_3 - {}^{n-4}C_1$ **(D)** None of these

***37.** A professor tells 3 jokes in his class each year. In order not to repeat the same triple jokes over a period of 12 years, minimum number of jokes he needs to have with him.

***38.** Number of ways in which 30 identical things are distributed among six persons is:

**(A)** ${}^{17}C_5$ if each gets odd number of things

**(B)** ${}^{16}C_{11}$ if each gets odd number of things

**(C)** ${}^{14}C_5$ if each gets even number of things (excluding 0)

**(D)** ${}^{15}C_{10}$ if each gets even number of things (excluding 0)

***39.** If $N$ denotes the number of ways of selecting $r$ objects out of $n$ distinct objects $(r \geq n)$ with unlimited repetition but with each object included at least once in selection, then $N$ is equal to:

**(A)** ${}^{r-1}C_{r-n}$ **(B)** ${}^{r-1}C_n$ **(C)** ${}^{r-1}C_{n-1}$ **(D)** None of these

***40.** If $n$ is the number of necklaces which can be formed using 17 identical pearls and two identical diamonds and similarly $m$ is number of necklaces which can be formed using 17 identical pearls and 2 different diamonds, then:

**(A)** $n = 9$ **(B)** $m = 18$ **(C)** $n = 18$ **(D)** $m = 9$

***41.** There are 10 students of which 2 are brothers. The number of ways in which they can be seated at a circular table if exactly 2 students sit between the brothers is:

**(A)** ${}^{8}C_4 \times \underline{|4} \times \underline{|6}$ **(B)** ${}^{8}C_2 \times \underline{|6} \times \underline{|2} \times \underline{|2}$

**(C)** ${}^{8}P_2 \times \underline{|6} \times \underline{|2}$ **(D)** ${}^{8}P_4 \times \underline{|6}$

***42.** 5 men and 4 women are to be seated around a circular table so that women are always separated. The number of ways of doing so is:

**(A)** $\underline{|5} \times \underline{|4}$ **(B)** $(\underline{|4})^2 \times 5$ **(C)** $(\underline{|5})^2 \times 6$ **(D)** $\underline{|6} \times \underline{|5}$

***43.** The number of ways of arranging 10 persons around a circular table so that 3 particular persons are always together is:

**(A)** $\underline{|10} \times \underline{|3}$ **(B)** $\underline{|9} \times 60$ **(C)** $\underline{|7} \times \underline{|3}$ **(D)** $\underline{|6} \times 42$

***44.** Number of points of intersection of $n$ straight lines if $n$ satisfies ${}^{n+5}P_{n+1} = \frac{11(n-1)}{2} \times {}^{n+3}P_n$ is:

**(A)** 15 **(B)** 28 **(C)** 21 **(D)** 10

***45.** If ${}^nC_4, {}^nC_5$ and ${}^nC_6$ are in A.P., the value of $n$ can be:

**(A)** 14 **(B)** 11 **(C)** 7 **(D)** 8

***46.** If ${}^{n+5}P_{n+1} = \frac{11(n-1)}{2}.{}^{n+3}P_n$, then the value of n is:

**(A)** 7 **(B)** 8 **(C)** 6 **(D)** 5

***47.** The exponent of 12 in 100! is:

**(A)** 32 **(B)** 48 **(C)** ${}^7P_2 - 10$ **(D)** ${}^8P_2 - 8$

**48.** The number of seven- digit numbers, with sum of the digits equal to 9 and that don't contains zero.

**(A)** 25 **(B)** 26 **(C)** 28 **(D)** 27

**Paragraph for Questions 49 – 52**

Consider all possible permutations of the letters of the word ENDEANOEL

**49.** The number of permutations containing the word ENDEA, is:

**(A)** 5! **(B)** $2 \times 5!$ **(C)** $7 \times 5!$ **(D)** $21 \times 5!$

**50.** The number of permutations in which the letter $E$ occurs in the first and the last positions, is:

**(A)** 5! **(B)** $2 \times 5!$ **(C)** $7 \times 5!$ **(D)** $21 \times 5!$

**51.** The number of permutations in which none of the letters $D$, $L$, $N$ occurs in the last five positions, is:

**(A)** 5! **(B)** $2 \times 5!$ **(C)** $7 \times 5!$ **(D)** $21 \times 5!$

**52.** The number of permutations in which the letters $A$, $E$, $O$ occur only in odd positions, is:

**(A)** 5! **(B)** $2 \times 5!$ **(C)** $7 \times 5!$ **(D)** $21 \times 5!$

**Paragraph for Questions 53 – 55**

These are 12 seats in the first row of a theatre of which 4 are to be occupied. Find the number of ways of arranging 4 persons so that:

**53.** No two persons sit side by side.

**(A)** 3022 **(B)** 3244 **(C)** 3246 **(D)** 3024

**54.** There should be atleast 2 empty seats between any two persons

**(A)** 360 **(B)** 340 **(C)** 320 **(D)** 380

**55.** Each person has exactly one neighbour.

**(A)** 800 **(B)** 760 **(C)** 864 **(D)** 480

**Paragraph for Questions 56 – 57**

How many seven-letters words can be formed by using the letters of the word SUCCESS so that:

**56.** The two C are together but not two S are together?

**(A)** 24 **(B)** 32 **(C)** 20 **(D)** 18

**57.** No two C and no two S are together?

**(A)** 90 **(B)** 94 **(C)** 96 **(D)** 92

| Miscellaneous Question Bank | Level – 2 |
|---|---|

**58.** Let $S = \{1,2,3,4\}$. then the number of ordered pairs of disjoint subsets of S is:

**(A)** 40 **(B)** 81 **(C)** 42 **(D)** 41

**59.** In an examination the maximum marks for each of three papers is $n$ and that for fourth paper is $2n$. Then the number of ways in which a candidate can get $3n$ marks is:

**(A)** $\frac{1}{6}(n-1)(5n^2+10n+6)$ **(B)** $\frac{1}{6}(n+1)(5n^2+10n+6)$

**(C)** $\frac{1}{6}(n+1)(5n^2+n+6)$ **(D)** None of these

**60.** The number of permutations of the letters of the word HINDUSTAN such that neither 'HIN nor '*DUS*' nor '*TAN*' appears, are:

**(A)** 166674 **(B)** 169194 **(C)** 166680 **(D)** 181434

**61.** Six cards and six envelopes are numbered 1, 2, 3, 4, 5, 6 and cards are to be placed in envelopes so that each envelope contains exactly one card and no card is placed in the envelope bearing the same number and moreover the card numbered 1 is always placed in envelope numbered 2. Then the number of ways it can be done is:

**(A)** 264 **(B)** 265 **(C)** 53 **(D)** 67

**62.** If 20% of three subsets (i.e., subsets containing exactly three elements) of the set $A = \{a_1, a_2, ..., a_n\}$ contains $a_1$, then the value of $n$ is:

**(A)** 15 **(B)** 16 **(C)** 17 **(D)** 18

**63.** The number of ways in which $n$ distinct objects can be put into two different boxes so that no box remains empty, is:

**(A)** $2^n - 1$ **(B)** $n^2 - 1$ **(C)** $2^n - 2$ **(D)** $n^2 - 2$

**64.** The number of five-digit numbers that can be formed by using digits 1, 2, 3 only, such that exactly three digits of the formed number are identical, is:

**(A)** 30 **(B)** 120 **(C)** 90 **(D)** 60

**65.** Let $a_n = 10^n/n!$ for $n \ge 1$. Then $a_n$ takes the greatest value when $n$ equals:

**(A)** 20 **(B)** 18 **(C)** 6 **(D)** 9

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

**(A)** 269 **(B)** 300 **(C)** 271 **(D)** 302

**67.** The number of ways in which three numbers in *AP* can be selected from 1, 2, 3, ...., $2n + 1$ is:

**(A)** $n^2$ **(B)** $(n+1)^2$ **(C)** $2(n+1)^2$ **(D)** $2n^2$

**68.** The unit digit of $17^{2009} + 11^{2009} + 7^{2009}$ is:

**(A)** 1 **(B)** 8 **(C)** 2 **(D)** 5

**69.** Let A and B be two sets containing 2 elements and 4 elements, respectively. The number of subsets of $A \times B$ having 3 or more elements is:

**(A)** 256 **(B)** 220 **(C)** 219 **(D)** 211

**70.** The set S = {1, 2, 3, ...., 12} is to be partitioned into three sets A, B and C of equal size.
Thus, $A \cup B \cup C = S$, $A \cap B = B \cap C = A \cap C = \phi$
The number of ways to partition S is:

**(A)** $12!/3!(4!)^3$ **(B)** $12!/3!(3!)^3$ **(C)** $12!/(4!)^3$ **(D)** $12!/(3!)^4$

**71.** There are $(n + 1)$ white and $(n + 1)$ black balls each set numbered 1 to $n + 1$. The number of ways in which the balls can be arranged in a row so that the adjacent balls are of different colours is:

**(A)** $(2n+2)!$ **(B)** $(2n+2)! \times 2$ **(C)** $(n+1)! \times 2$ **(D)** $2\{(n+1)!\}^2$

**72.** The number of intersection points of diagonals of 2018 sides regular polygon, which lie inside the polygon.

**(A)** ${}^{2018}C_4$ **(B)** ${}^{2009}C_2$ **(C)** ${}^{2008}C_4$ **(D)** ${}^{2017}C_4$

**73.** A parallelogram is cut by two sets of $m$ lines parallel to the sides, the number of parallelograms thus formed is:

**(A)** $\frac{m^2}{4}$ **(B)** $\frac{(m-1)^2}{4}$ **(C)** $\frac{(m+2)^2}{4}$ **(D)** $\frac{(m+2)^2(m+1)^2}{4}$

**74.** The number of n-digits number which contain the digits 2 and 7, but not the digits 0, 1, 8, 9 is:

**(A)** $2^n + 2^{n/2} - 2^{n/4}$ **(B)** $6^n - 2.5^n + 4^n$
**(C)** $6^n - 2.4^n + 5^n$ **(D)** $6^n - 2.4^n + 5^n$

***75.** The number of ways of choosing triplet $(x, y, z)$ such that $z \geq \max\{x, y\}$ and $x, y, z \in \{1, 2, ...., n\}$ is:

**(A)** $^{n+1}C_3 + ^{n+2}C_3$ **(B)** $n(n+1)(2n+1)/6$

**(C)** $1^2 + 2^2 + .... + n^2$ **(D)** $2\left(^{n+2}C_3\right) - ^{n+1}C_2$

***76.** Given that the divisors of $n = 3^p.5^q.7^r$ are of the form $4\lambda + 1, \lambda \geq 0$. Then:

**(A)** $p + r$ is always even **(B)** $p + q + r$ is always odd

**(C)** $q$ can be any integer **(D)** if $p$ is odd then $r$ is even

***77.** If $10! = 2^p.3^q.5^r.7^s$, then:

**(A)** $2q = p$

**(B)** $pqrs = 64$

**(C)** Number of divisors of $10!$ is 280

**(D)** Number of ways of putting $10!$ as a product of two natural numbers is 135

**78.** There are 12 points in a plane of which 5 are collinear on line $L_1$, 4 collinear on another line $L_2$ and no other three points are collinear. The maximum number of distinct quadrilaterals which can be formed with vertices at these points is:

**(A)** 384 **(B)** 385 **(C)** 392 **(D)** 387

***79.** If $x$ be the number of 5-digit numbers, sum of whose digits is even, and $y$ be the number of 5-digit numbers sum of whose digits is odd, then:

**(A)** $x = y$ **(B)** $x + y = 90000$ **(C)** $x = 45000$ **(D)** $x < y$

***80.** Number of ways of selecting three integers from $\{1, 2, 3, ...., n\}$ if their sum is divisible by 3 is:

**(A)** $3\left(^{n/3}C_3\right) + (n/3)^3$ if $n = 3k, k \in N$

**(B)** $2\left(^{(n-1)/3}C_3\right) + \left(^{(n+2)/3}C_3\right) + ((n-1)/3)^2(n+2)$, if $n = 3k+1, k \in N$

**(C)** $2\left(^{(n+1)/3}C_3\right) + \left(^{(n-2)/3}C_3\right) + ((n+1)/3)^2(n-2)$, if $n = 3k+2, k \in N$

**(D)** Independent of $n$

***81.** The maximum number of permutations of $2n$ letters in which there are only $a$'s and $b$'s, taken all at a time is given by:

**(A)** $^{2n}C_n$ **(B)** $\frac{2}{1}.\frac{6}{2}.\frac{10}{3}......\frac{4n-6}{n-1}.\frac{4n-2}{n}$

**(C)** $\frac{n+1}{1}.\frac{n+2}{2}.\frac{n+3}{3}.\frac{n+4}{4}.......\frac{2n-1}{n-1}.\frac{2n}{n}$ **(D)** $\frac{2^n.\left[1.3.5.........(2n-3)(2n-1)\right]}{n!}$

**82.** The number of ways of choosing a committee of two women and three men from five women and six men, if Mr. *A* refuses to serve on the committee if Mr. *B* is a member and Mr. *B* can only serve, if miss *C* is the member of the committee is:

**(A)** 60 **(B)** 84 **(C)** 124 **(D)** None of these

**83.** In a polygon no three diagonals are concurrent. If the total number of points of intersection of diagonals interior to the polygon be 70 then the number of diagonals of the polygon is:

**(A)** 20 **(B)** 28 **(C)** 8 **(D)** None of these

**84.** Find the number of ways of distributing 5 different balls in three boxes of different sizes so that no box is empty and each box being large enough to accommodate all the five balls.

**85.** In how many ways we can divide 52 playing cards

**(a)** among 4 players equally? **(b)** in 4 equal parts?

**86.** The number of ways in which 14 identical toys can be distributed among three boys so that each one gets atleast one toy and no two boys get equal number of toys is:

**(A)** 45 **(B)** 48 **(C)** 60 **(D)** None of these

**87.** If the number of ways of selecting K coupons out of an unlimited number of coupons bearing the letters A, T, M so that they cannot be used to spell the word MAT is 93, then K equals to:

**(A)** 32 **(B)** 31 **(C)** 5 **(D)** None of these

**88.** If a set A has m elements and another set B has n elements then number of functions from A to B:

**(A)** $m^n$ **(B)** $nm$ **(C)** $n^m$ **(D)** $2^{nm}$

***89.** The minimum marks required for clearing a certain screening paper is 210 out of 300. The screening paper consists of '3' sections each of Physics, Chemistry, and Maths. Each section has 100 as maximum marks. Assuming there is no negative marking and marks obtained in each section are integers, the number of ways in which a student can qualify the examination is: (Assuming no cut-off limit):

**(A)** 129766 **(B)** ${}^{93}C_3$ **(C)** ${}^{213}C_3$ **(D)** $(210)^3$

**90.** In how many ways we can place 7 different balls in 3 different boxes such that in every box at least 2 balls are placed?

***91.** If n objects are arranged in a row, then the number of ways of selecting three of these objects so that no two of them are next to each other is:

**(A)** $\frac{(n-2)(n-3)(n-4)}{6}$ **(B)** ${}^{n-2}C_3$ **(C)** ${}^{n-3}C_3 + {}^{n-3}C_2$ **(D)** None of these

**92.** Find the number of triangles whose angular points are at the angular points of a given polygon of $n$ sides, but none of whose sides are the sides of the polygon.

**93.** Find the number of solutions of the equation $2x + y + z = 20$ where $x, y, z \geq 0$.

**94.** Find the number of integral solutions of $x + y + z + w = 20$ under the following conditions:

**(i)** All variables are non-negative
**(ii)** All variables are non-positive
**(iii)** No variable may exceed 10; zero values excluded.
**(iv)** Each variable is an odd number.
**(v)** Each variable has distinct positive values

**95.** 5 balls are placed in 3 boxes. Each box can hold all 5 balls. Number of ways in which the balls can be placed if :

| | **List 1** | | **List 2** |
|---|---|---|---|
| **(P)** | Balls are identical, but boxes are different, and no box remains empty | **1.** | 2 |
| **(Q)** | Balls are different, but boxes are identical, and no box remains empty | **2.** | 25 |
| **(R)** | Balls as well as boxes are identical, and no box remains empty | **3.** | 243 |
| **(S)** | Balls are different, and boxes are different, and boxes can remain empty | **4.** | 6 |

**Codes:**

| | **P** | **Q** | **R** | **S** | | **P** | **Q** | **R** | **S** |
|---|---|---|---|---|---|---|---|---|---|
| **(A)** | 2 | 4 | 3 | 1 | **(B)** | 4 | 2 | 1 | 3 |
| **(C)** | 1 | 2 | 3 | 4 | **(D)** | 2 | 3 | 4 | 1 |