MATHS

BOOKS - KC SINHA ENGLISH

PERMUTATIONS AND COMBINATIONS - FOR COMPETITION

Solved Examples

1. How many ternary sequences of length 9 aare there which either begin with 210 or end with 210.

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2. In how many ways can the letters of the word ARRANGE be arranged so that the two R's are never together.

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3. In how many ways can the letters of he word ARRANGE be arranged so that the two A's are together but not two R's

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4. If all the letters of the word ARRANGE are arranged in all possible ways, in how many of words we will have the A's not together and also the R's not together?

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5. John has 'x' children by his first wife and Anglina has $'x+1'$ children by her first husband. They both marry and have their own children . The whole family has 24 children . It is given that the children of the same parents don't fight. Then find then maximum numbers of fightes that can take place in the family.

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6. There are n letters and n addressed envelopes . If the letters are placed in the envelopes at random , what is the probability that all the letters are not placed in the right evelope ?

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7. In how many ways 16 identical things can be distributed among 4 persons if each person gets atleast 3 things.

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8. Find the number of non negative integral solutons of equation `x+y+z+4t=20.

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9. Find the total number of ways of selecting five letters from the word INDEPENDENT.

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10. Number of words of 4 letters that can be formed with theletters of the word BAMBOO is (A) 52 (B) 102 (C) 82 (D) 72

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11. There are 4 oranges, 5 apples and 6 mangoes in a fruit basket and all fruits of the same kind are identical. In how many ways can a person make a selection of fruits from among the fruits in the basket?

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12. Two packs of 52 cards are shuffled together. The number of ways in which a man can be dealt 26 cards so that he does not get two cards of the same suit and same denomination is a. $\hat{} (52)C_{26}.\, 2^{26}$ b. $\hat{} 104C_{26}$ c. $\hat{} (52)C_{26}$ d. none of these

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13. An organisatiion has n employees. If a committee needs to be fformed from among the employees ncluding at least tow employees and also excluding at least two employees. The number of ways of forming the committee is (A) $2^n - n - 1$ (B) $2^n - 2n - 4$ (C) $2^n - 2n - 2$ (D) $2^n - 2n$

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14. If $a, b, c \varepsilon N$ the number of points having vector $a\overrightarrow{i} + b\overrightarrow{j} + c\overrightarrow{k}$ such that $6 \leq a + b + c \leq 10$ is (A) 90 (B) 110 (C) 105 (D) 200

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15. The least possible is integral value of x satisfying the inequality $.^{10}C_{x-1} > 2.^{10}C_x$ is (A) 8 (B) 9 (C) 10

(D) 11

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16. The number of positive integers satisfying the inequality

$C(n+1, n-2) - C(n+1, n-1) \leq 100$ is

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17. If $a_1, a_2, a_3, \ldots, a_{n+1}$ be (n+1) different prime numbers, then the number of different factors (other than 1) of $a_1^m, a_2 \cdot a_3, \ldots, a_{n+1}$ is

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18. Let $A = \{1, 2, , n\}$ and $B = \{a, b\}$. Then the number of subjections from A into B is $^nP_2$ (b) $2^n - 2$ (c) $2^n - 1$ (d) $^nC_2$

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19. m points on one straight line are joined to n points on another straight line. The number of points of intersection of the line segments thus formed is (A) $\hat{} mC - 2.^n C_2$ (B)

$\frac{mn(m-1)(n-1)}{4}$ (C) $\frac{\hat{}\ mC_2.^n C_2}{2}$ (D)

$\hat{}\ mC_2 +^n C_2$

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20. If n objects are arrange 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

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21. Consider seven digit number $x_1, x_2, ..., x_7$, where $x_1, x_2, . . , x_7 \neq 0$ having the property that

x_4 is the greatest digit and digits towards the left and right of x_4 are in decreasing order. Then total number of such numbers in which all digits are distinct is

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22. Number of ways in which three numbers in A.P. can be selected from $1, 2, 3, \ldots, n$ is a. $\left(\frac{n-1}{2}\right)^2$ if n is even b. $\left(\frac{n-2}{4}\right)$ if n is even c. $\left(\frac{n-1}{4}\right)^2$ if n is odd d. none of these

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23. There are ten points in a plane. Of these ten points, four points are in a straight line and with the exceptionof 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.

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24. There are ten points in a plane. Of these ten points, four points are in a straight line and with the exceptionof 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.

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25. There are ten points in a plane. Of these ten points, four points are in a straight line and with the exceptionof 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.

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26. A is a set containing n elemments. A subset P_1 of A is chosen. The set A is reconstructed by replacing the elements of P_1. Next, a subset P_1 to A is chosen and againn the set is reconstructed by replacing the elements of P_2. In this way $m(>1)$ subsets $P_1, P_2, \ldots, P_m$ of A are chosen. find the number of ways of choosing $P_1, P_2, \ldots, P_m$, so that

$$P_1 \cap P_2 \cap P_3 \cap \ldots \cap P_m = \phi$$

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$P_1 \cap P_2 \cap P_3 \cap \ldots \cap P_m = \phi$

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28. A is a set containing n elemments. A subset P_1 of A is chosen. The set A is reconstructed by replacing the elements of P_1. Next, a subset P_1 to A is chosen and againn the set is reconstructed by replacing the elements of P_2. In this way $m(>1)$ subsets $P_1, P_2, \ldots, P_m$ of A are chosen. find the number of ways of choosing $P_1, P_2, \ldots, P_m$, so that

$P_1 \cap P_2 \cap P_3 \cap \ldots \cap P_m = \phi$

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29. find the number of ways in which a mixed double game can be arranged from amongst 9 married couples if no husband and wife play in the same game.

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30. 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

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Exercise

1. If $.^{n+1}C_{r+1} : ^{n}C_{r} : ^{n-1}C_{r-1} = 11 : 6 : 3$, find the values of n and r.

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2. Show that $\sum_{k=m}^{n} \hat{} \, kC_r = ^{n+1}C_{r+1} - ^{m}C_{r+1}$

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3. Each of two parallel lines has a number f distinct points marked on them. on one line there are 2 points P and Q and ont eh other there are 8 points. i. Find the number of triangles formed hving three of the 10 points as vertices. ii. How many of these triangles include P but exclude Q?

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4. m women and n men are too be seated in a row so that no two men sit together. If $m > n$ then show that the number of wys in which they can be seated is $\frac{m!(m+1)!}{(m-n+1)!}$

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5. The number of words of four letters that can be formed from the letters of the word EXAMINATION is a. 1464 b. 2454 c. 1678 d. none of these

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6. Find the number of ways in which (a) a selection , (b) an arrangement of four letters can be made from the letters of the word 'PROPORTION' ?

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7. 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 ? $[r, s, \ \leq m]$

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9. Find the number of ways of selecting 10 balls out of an unlimited number of identical white, red, and blue balls.

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10. There are 3 sections in a question paper each containing 5 questions. A candidate has to solve only 5 questions, choosing at least one question from each section. In how many ways can he make his choice?

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11. A committee of 12 is to be formed from nine women and eight men. In how many ways can this be done if at least five women have to be included in a committee? In how many of these committees a. the women hold majority? b. the men hold majority?

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12. A committee of 12 is to be formed from nine women and eight men. In how many ways can this be done if at least five women have to be included in a committee? In how many of these committees a. the women hold majority? b. the men hold majority?

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13. m equispaced horizontal lines are intersected by n equispaced vartical lines. If the distance between two successive horizontal lines is same as that between two successive vertical lines, then find the number of squares formed by the lines if $(m < n)$.

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14. In how any different ways can a set A of $3n$ elements be partitioned into 3 subsets of equal number of elements? The subsets P, Q, R form a partition if $P \cup Q \cup R = A, P \cap R = \varphi, Q \cap R = \varphi, R \cap P = \varphi.$

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15. Let $N = ab$ be a two digit number (where $b \neq 0$) which is divisible by both a and b, then

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16. Show that $\lfloor kn$ is divisible by $(\lfloor n)^k$

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17. Find the number of non negative integral solutions of equation a+b+c+d=20.

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18. Find the number of non-negative integral solutions of inequation

$x_1 + x_2 + \ldots\ldots\ldots\ldots + x_k \leq n$

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19. Find the number of non -negative integrral solutions of equation $2x + 2y + z = 20$

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20. A five letter word is to be formed such that the letters appearing in the odd numbered positions are taken from the letters which appear without repetition in the word MATHEMATICS. Further the letters appearing in the even numbered positions are taken from the letters which appear with repetition in the same word MATHEMATICS. The number of ways in which the five letter word can be formed is:

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21. Box 1 contains six block lettered A,B,C,D,E and F. Box 2 contains four blocks lettered W,X,Y and Z. How many five letters codewords can be formed by using three blocks from box 1 and two blocks from box2?

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22. There are $2n$ guests at a dinner party. Supposing that eh master and mistress of the house have fixed seats opposite one another and that there are two specified guests who must not be placed next to one another, show that the number of ways in which the company can be placed is $(2n-2!)\times(4n^2-6n+4)$.

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23. In an examination, the maximum marks for each of the three papers are 50. Maximum marks for the fourth paper are 100. Find the number of ways in which the candidate can score 60% marks in aggregate.

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24. Find the number of equal positive integral solutions of equation $x_1 + x_2 + x_3 = 10.$

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25. The number of non negative integral solutions of $3x + y + z = 24$ is

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26. How many integral solutions are there to x+y+z+t=29, when $x \geq 1$, $y > 1$, $z \geq 3$ and $t \geq 0$?

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27. The number of diagonals of a polygon of 20 of sides

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28. There are four balls of different colours and four boxes of colours same as those of the balls. Find the

number of ways in which the balls, one in each box, could be placed such that a ball is not placed in the box of its own colour.

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30. In a football championship, 153 matches were played. Every two-team played one match with each other. The number of teams, participating in the championship is _______.

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31. Out of 18 points in as plane, no three points are in the same straight line except five points which are collinear. The number of straight lines formed by joining them is

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32. The number of divisors of 240 which are of the form 4m+2, is

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33. How many different nine-digit numbers can be formed from the digits of the number 223355888 by rearrangement of the digits so that the odd digits occupy even places:

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34. If ` $^{(n+1)}C_3 = 2.^n C_2,$ then n=` (A) 3 (B) 4 (C) 5 (D) 6

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35. How many numbers of five digits can be found from the numbers 2,0,4,3,8 when repetition of digits is not allowed? (A) 96 (B) 120 (C) 144 (D) 14

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36. The number of ways of dividing equally a pack of 52 playing cards among 4 players is (A) $52\frac{!}{13}!$ (B)

$52\dfrac{!}{(13!)^2}$ (C) $52\dfrac{!}{(13!)^2}$ (D) $52\dfrac{!}{((13!))^4}$

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37. Let $E = \{1, 2, 3, 4, \}$ and $F = \{1, 2\}$. Then the number of onto functions from E to F, is ______.

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38. The number of circles that can be drawn out of 10 points of which 7 are collinear is (A) 120 (B) 113 (C) 85 (D) 86

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39. A box contains 2 white balls, 3 black balls & 4 red balls. In how many ways can three balls be drawn from the box if atleast one black ball is to be included in draw (the balls of the same colour are different).

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40. The number of words that can formed by using the letters of the word MATHEMATICS that start as well as end with T is:

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41. The number of ways in which 20 one rupee coins can be distributed among 5 people such that each person, gets at least 3 rupees, is

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42. In a group of boys, two boys are brothers and six more boys are present in the group. In how many ways can they sit if the brothers are not to sit along with each other? a.$2 \times 6!$ b. $\hat{}\ 7P_2 \times 6!$ c. $\hat{}\ 7C_2 \times 6!$ d. none of these

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43. A five-digit number divisible by 3 is to be formed using the digits 0, 1, 2, 3, 4, and 5, without repetition. The total number of ways this can done is

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44. If $.^{n}C_{r} = 84, .^{n}C_{r-1} = 36 \text{ and}.^{n}C_{r+1} = 126,$ then find the value of n.

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45. The number of ways of distributing 50 identical things among 8 persons in such a way that three of them get 8 things each, two of them get 7 things each and remaining 3 get 4 things each, is equal to

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46. A committtee of three people is to be chosen from 4 married couples. The number of committees that can be made such that it consists one woman and two men except that a husbnd and wife both cannot serve on the committee is (A) 2 (B) 4 (C) 8 (D) 12

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47. Find the number of ways in which four particular persons A, B, C, D and six more persons can stand in a queue so that A always stands before B, B before and C before D.

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48. In how many ways can 10 people sit around a table so that all shall not have the same neighbours in any two arrangement ?

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49. How many different signals can be made by hoisting 6 differently coloured flags one above the other when any number of them may be hoisted at once?

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50. If $n(A) = p, n(B) = q$ and total number of functions from A to B is 343, then p-q (A) 3 (B) -3 (C) 4 (D) none of these

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51. If $n(B) = 2$ and the number of functions from A and B which are onto is 30, then number of elements in A is (A) 4 (B) 5 (C) 6 (D) none of these

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52. The number of ordered triplets of positive integers which satisfy the inequality $20 \leq x + y + z \leq 50$ is

(A) ${}^{50}C_3 - {}^{19}C_3$

(B) ${}^{50}C_2 - {}^{19}C_2$

(C) ${}^{51}C_3 - {}^{20}C_3$

(D) none of these

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53. The number of ways in which 5 boys and 4 girls can be arranged on a circular table such that no two girls sit together and two particular boys are always together is

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54. The number of six digit numbers that can be form from the digit 1,2,3,4,5,6 and 7 . So that the digit do not repeat and the terminal digits are even is

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55. Let $A = \{x_1, x_2, x_3, x_4, x_5\}, B = \{y_1, y_2, y_3, y_4\}$, Function f is defined from A to B. Such that $f(x_1) = y_1$, and $f(x_2) = y_2$ then, number of onto functions from A to B is (A) 12 (B) 6 (C) 18 (D) 27

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56. If $n(A) = 2$ and total number of relations from A to B is 1024, then number of elements in B is (A) 4 (B) 5 (C) 6 (D) none of these

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57. The sum of odd divisors of 360 is

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58. There are 6 balls of different colours and 3 boxes of different sizes. Each box can hold all the 6 balls. The balls are put in the boxes so that no box remains expty. The number of ways in which this can be done is (A) 534 (B) 543 (C) 540 (D) 28

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59. Total number of divisors of $N = 3^5 \cdot 5^7 \cdot 7^9$ that are of the form 4n+1, $n \geq 0$ is equal to

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60. If m=number of distinct rational numbers $\frac{p}{q} \in (0, 1)$ such that $p, q \in \{1, 2, 3, 4, 5\}$ and $n =$ number of onto mappings from $\{1, 2, 3\}$ onto $\{1, 2\}$, then $m - n$ is

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61. n dice are thrown and the total number of possible outcomes in which at least one die shows 1 is 671, then n= (A) 3 (B) 4 (C) 5 (D) none of these

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62. If the number of words of 4 letters formed with n different letters of an alphabet such that at least on letter is repeated in the word is 936, then n= (A) 4 (B) 5 (C) 6 (D) none of these

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63. There are n different books each having m copies . If the total number of ways of making a selection from them is 255 and $m - n + 1 = 0$ then distance of point (m,n) from the origin (A) 3 (B) 4 (C) 5 (D) none of these

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64. If $a, b, c \varepsilon N$ the number of points having vector $a\overrightarrow{i} + b\overrightarrow{j} + c\overrightarrow{k}$ such that $6 \leq a + b + c, \; = 10$ is (A) 90 (B) 110 (C) 105 (D) 200

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65. The number of ways in which a mixed double game can be arranged from amongst 5 maried couples if at least one husband and wife play in the same game (A) 200 (B) 140 (C) 60 (D) none of these

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66. n boys and n girls sit alternately along a line inx ways and along a circle in y ways such that $x = 10y$, then the number of ways in which n boyscan sit around a round table so that none of themhas same two neighbours, is

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67. A person goes for an examination in which there are four papers with a maximum of m marks from each paperr. The number of ways in which one can get 2m marks, is

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68. The number of ways of arranging seven persons (having A,B,C and D among them) in a row so that A,B,C and D are always in order A-B-C-D (not necessarily together) is (A) 24 (B) 5040 (C) 210 (D) 720

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69. The number of ways of selecting two numbers from the set $\{1, 2, \ldots\ldots\ldots\ldots\ldots\ldots.12\}$ whose sun is divisible by 3 is (A) 66 (B) 16 (C) 6 (D) 22

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70. The total number of flags with three horizontal strips in order, which can be formed using 2 identical red, 2 identical green, and 2 identical white strips is equal to a. $4!$ b. $3 \times (4!)$ c. $2 \times (4!)$ d. none of these

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72. The sum of the digits in tens place of all numbers formed with the digits $1, 2, 3, 4, 5$ taken all at a time without repetition is

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73. On a railway there are 10 stations. The number of types of tickets required in order that it may be possible to book a passenger from every station to every other is

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74. Find the total number of n -digit number $(n > 1)$ having property that no two consecutive digits are same.

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75. The number of divisors of 3630, which have a remainder of 1 when divided by 4, is

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76. The number of positive numbers of not more than 10 digits formed by using 0,1,2 and 3 is (A) 18 (B) 24 (C) $4^{10}, 3^{10}$ (D) $4^{10} - 1$

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77. Number of ways in which the number 44100 can be resolved as a product of two factors which are relatively prime is (A) 7 (B) 15 (C) 8 (D) 16

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78. If $\sum_{r=1}^{20}(r^2+1)r! = k!20$ then sum of all divisors of k of the from $7^n, n\varepsilon N$ is (A) 7 (B) 58 (C) 350 (D) none of these

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79. A bag contains n white and n red balls. Pairs of balls are drawn without replacement until the bag is empty. Show that the probability that each pair consists of one white and one red ball is $\frac{2^n}{{}^{2n}C_n}$

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80. Ten different letters of an alphabet are given. Words with five letters are formed from these given letters. Determine the number4 of words which have at least one letter repeated.

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81. A five digit number divisible by 3 is to be formed using the digits 0,1,2,3,4 and 5 without repetitioon. If the tota number of ways in which this casn bedone is $n^3, then \lfloor n =$ (A) 720 (B) 120 (C) 48 (D) 12

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82. The number of weays in which a mixed doubles tenis game can be arranged between 10 players consisting of 6 men and 4 women is (A) 180 (B) 90 (C) 48 (D) 12

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83. A number is said to be a nice number if it has exactly 4 factors (includng 1 and the number itself). Then number of divisor of 2520 which are nice numbers is (A) 7 (B) 8 (C) 9 (D) none of these

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84. If number of two-digit numbers which are of the form xy with `y

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85. The number of seven digit numbers divisible by 9 formed with the digits ,1,2,3,4,5,6,7,8,9 without repetition is (A) 7! (B) ^9P_7(C)3(7!)(D)4(7!)`

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86. Number of positive unequal integral solutions f equation $x + y + z = 6$ is (A) 4! (B) 3! (C) 6! (D) none of these

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87. $\sum_{k=1}^{m}(k^2+1)k = 2009 \times 2010!, thenm =$ (A) 2009 (B) 2010 (C) 2011 (D) none of these

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88. The number of different words (with or without meaning) of 3 letters from the word INDIA is (A) 30 (B) 27 (C) 33 (D) 60

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89. 2nd idetical coins are arrangeed in a row and the number of ways in which the number of heads is equal to the nuber of tails is 70, then n= (A) 4 (B) 5 (C) 3 (D) none of these

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90. If the number of ways of selecting r balls with replcement out of n balls numbered 1,2,3......,100 such that the largest number selected is 10 is 271, then r= (A) 4 (B) 5 (C) 3 (D) none of these

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91. Let A be a set containing n elements. If the number of elements in the set, $B = \{(x, y, z) : x \varepsilon A, y \varepsilon A, z \varepsilon A$ and x, y, z are not all distict) is equal to 280, the n= (A) 8 (B) 10 (C) 20 (D) none of these

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92. Number of ways in which three numbers in A.P. can be selected from $1, 2, 3, \ldots, n$ is a. $\left(\frac{n-1}{2}\right)^2$ if n is even b. $\left(\frac{n-2}{4}\right)$ if n is even c. $\left(\frac{n-1}{4}\right)^2$ if n is odd d. none of these

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93. Let p=2520, x=number of divisors of p which are multiple of 6, y=number of divisors of p which are multiple of 9, then

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94. Find the number of ways of selecting 10 balls out of an unlimited number of identical white, red, and blue balls.

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95. 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 $\hat{} \ 10C_5$. 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 6 As and 4 Bs in a row.

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96. Let the letters of the word SACHIN be arranged in all possible ways and these words be written as in a dictionary. If x be the serial number where the word SACHIN appears, then (A) x is a multiple of 10 (B) x is a multiple of 15 (C) x is a multiple of 105 (D) x is a multiple of 24

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97. If the total number of relations form set A to set B$is 1024,$ and $n(A) > 1, n(B) > 1,$ then (A) $n(A) = 2, n(B) = 5$ (B) $n(A) = 5, n(B) = 2$ (C) $n(A) = 10, n(B) = 1$ (D) $n(A) = 1, n(B) = 10$

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98. Number iof ways in which m men and n women can be arranged in a rwo so that no two women are together is $m!^{m=1}P_n$ Also number oif ways in which m men and n women can be seated in a row so that all the n women are together is $(m=1)!n!$ On the basis of above informatiion answer the following question: Number of ways in which 10 boys and 5 girls can be seated in a row so that no boy sits between girls is (A) $5! \times 10_P \_ 5$ (B) $5! \times 11_P \_ 5$ (C) $10! \times 11_P \_ 5$ (D) $5! \times 11$`

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99. How many number from 1 and 100 written in the decimal form have the digit 5 in them? (i)11 (ii)10 (iii) 15 (iv)20

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100. The number of ways in which we can choose 2 distinct integers from 1 to 100 such that difference between them is at most 10 is:

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101. The number of factors (excluding 1 and the expression itself) of the product of $a^7b^4c^3$ def, where a, b, c, d, e, fare all prime numbers, is

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102. The largest integer n for which 34! Is divisible by 3^n is

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103. The number of different messages produced by using five signals with three dots and two dashes is

104. Assertion: If m parallel lines are intersected by n other parallel llines, then the number of parallelograms thus formed is $\frac{mn(m-1)(n-1)}{4}$,

Reason: A selection of 4 lines 2 from m parallel lines and 2 from n parallel lines gives one parallelogram.
(A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not the correct explanation of A (C) A is true but R is false. (D) A is false but R is true.

105. Assertion: Number of different squares which can be formed on a chess board is 204. Reason : Number of ways in which r consecutive squares can be selected from n squares in a row is $(n-r)$ (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not the correct explanation of A (C) A is true but R is false. (D) A is false but R is true.

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106. Assertion: The number of different number plates which can be made if the number plte contain three letters of the English alphabet followied by athree digit number is $(26)^3 \times (900)$ (if represents are allowed) Reason: The number of permutationis of n different things taken r at time when repetitios are allowed is n^r. (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not te correct explanation of A (C) A is true but R is false. (D) A is false but R is true.

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107. Assertion:Four digit numbers with different digits is formed with the digits 1,2,3,4,5,6,7 in all possible ways. Then number of numbers which are divisible by 4 is 200. Reason: A number is divisible by 4 if the digit at units place is divisible by 4. (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not te correct explanation of A (C) A is true but R is false. (D) A is false but R is true.

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108. Assertion: The number of non -negative integral solutions of equation $x_1 + x_2 + x_3 + \dots\dots\dots + x_n = r$ is ${}^{r+n-1}C_r$, Reason: The number of ways in which r identical things can be distributed among n persons is

${}^{r+n-1}C_r$ (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not the correct explanation of A (C) A is true but R is false. (D) A is false but R is true.

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109. If $a_n = \sum_{r=0}^{n} \frac{1}{\hat{} nC_r}$, then $\sum_{r=0}^{n} \frac{r}{\hat{} nC_r}$ equals $(n-1)a_n$ b. na_n c. $(1/2)na_n$ d. none of these

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110. The number of divisors of the form $4K+2, K \geq 0$ of the integers 240 is

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111. An n-digit number is a positive number with exactly n digits. Nine hundred distinct n-digit numbers are to be formed using only the three digits 2,5 and 7. Find the smallest value of n for which this is possible.

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112. How many different nine-digit numbers can be formed from the digits of the number 223355888 by rearrangement of the digits so that the odd digits occupy even places:

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113. The number of arrangements of the letters of the word BANANA in which the two N's do not appear adjacently is a. 40 b. 60 c. 80 d. 100

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114. $\hat{} nC_r +^n C_{r+1} +^n C_{r+2}$ is equal to $(2 \leq r \leq n)$ (A) $2^n C_{r+2}$ (B) $2^{n+1} C_{r+1}$ (C) $2^{n+2} C_{r+2}$ (D) none of these

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115. about to only mathematics

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116. If $\hat{} n - 1C_r = (k^2 - 3)^n C_{r+1}, thenk \in$ $(-\infty, -2]$ b. $[2, \infty)$ c. $[-\sqrt{3}, \sqrt{3}]$ d. $(\sqrt{3}, 2]$

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117. A rectangle with sides $2m - 1 and 2n - 1$ is divided into squares of unit length by drawing parallel lines as shown in the diagram, then the number of rectangles possible with odd side lengths is fig a.$(m+n-1)^2$ b. 4^{m+n-1} c. m^2n^2 d. $m(m+1)n(n+1)$

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118. If r,s,t are prime numbers and p,q are the positive integers such that LCM of p,q, is $r^2t^4s^2$,

then the

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119. The letters of the word COCHIN are permuted and all the permutations are arranged in an alphabatical order as in english dictionary. The number of words that appear before the word COHIN is

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120. 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:

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