TOPIC –PERMUTATIONS AND COMBINATIONS

JEE-MAINS (PREVIOUS YEAR)

MCQ-Single Correct

1. A man X has 7 friends, 4 of them are ladies and 3 are men. His wife Y also has 7 friends, 3 of them are ladies and 4 are men. Assume X and Y have no common friends. Then the total number of ways in which X and Y together can throw a party inviting 3 ladies and 3 men, so that 3 friends of each of X and Y are in this party, is :

   (1) 485   (2) 468

   (3) 469   (4) 484   **[2017]**

2. If all the words (with or without meaning) having five letters, formed using the letters of the word SMALL and arranged as in a dictionary; then the position of the word SMALL is :

   (1) 59th (2) 52nd

   (3) 58th (4) 46th **[2016]**

3. The number of points, having both co-ordinates as integers, that lie in the interior of the triangle with vertices (0,0) , (0,41) and (41,0), is :

   (1) 861   (2) 820

   (3) 780   (4) 901   **[2015]**

4. The number of integers greater than 6,000 that can be formed, using the digits 3, 5, 6, 7 and 8, without repetition, is :

   (1) 192   (2) 120

   (3) 72   (4) 216   **[2015]**

5. Let T_n be the number of all possible triangles formed by joining vertices of an n-sided regular polygon. If $T_{n+1} - T_n = 10$, then the value of n is

   (1) 5   (2) 10

   (3) 8   (4) 7   **[2013]**

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6. 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

(1) 630

(2) 879

(3) 880

(4) 629   **[2012]**

7. Let X = {1, 2, 3, 4, 5}. The number of different ordered pairs (Y,Z) that can be formed such that $Y \subseteq X$, $Z \subseteq X$, and $Y \cap Z$ is empty, is

(1) 2^5

(2) 5^3

(3) 5^2

(4) 3^5.   **[2012]**

8. 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

(1) 140 < N ≤ 190

(2) N > 190

(3) N ≤ 100

(4) 100 < N ≤140   **[2011]**

9. 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

(1) less than 500

(2) at least 500 but less than 750

(3) at least 750 but less than 1000

(4) at least 1000   **[2009]**

10. How many different words can be formed by jumbling the letters in the word MISSISSIPPI in which no two S are adjacent?

(1) $8.^6C_4.^7C_4$

(2) $6.7.^8C_4$

(3) $6.8.^7C_4$

(4) $7.^6C_4.^8C_4$ **[2008]**

11. The set S = {1, 2, 3, ..., 12} is to be partitioned into three sets A, B, 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

(1) $\dfrac{12!}{3!(4!)^3}$

(2) $\dfrac{12!}{3!(3!)^4}$

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(3) $\dfrac{12!}{(4!)^3}$ (4) $\dfrac{12!}{(3!)^4}$ **[2007]**

12. 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 at least one candidate, then the number of ways in which he can vote is

(1) 5040   (2) 6210

(3) 385   (4) 1110   **[2006]**

13. If the letters of word SACHIN are arranged in all possible ways and these words are written out as in dictionary, then the word SACHIN appears at serial number

(1) 601   (2) 600

(3) 603   (4) 602   **[2005]**

14. How many ways are there to arrange the letters in the word GARDEN with the vowels in alphabetic order?

(1) 120   (2) 480

(3) 360   (4) 240   **[2004]**

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

(1) 5   (2) $^8C_3$

(3) 3^8 (4) 21   **[2004]**

16. A student is to answer 10 out of 13 questions in an examination such that he must choose at least 4 from the first five questions. The number of choices available to him is

(1) 140   (2) 196

(3) 280   (4) 346   **[2003]**

17. The number of ways in which 6 men and 5 women can dine at a round table if no two women are to sit together is given by

(1) 6!×5!   (2) 30

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(3) 5!×4!   (4) 7!×5!   **[2003]**

18.   If $^{n}C_{r}$ denotes the number of combinations of n things taken r at a time, then the expression
$^{n}C_{r+1} +^{n}C_{r-1} + 2\times^{n}C_{r}$ equals

(1) $^{n+2}C_{r}$ (2) $^{n+2}C_{r+1}$

(3) $^{n+1}C_{r}$ (4) $^{n+1}C_{r+1}$ **[2003]**

19.   If f(x) = x^{n}, then the value of $f(1) - \dfrac{f'(1)}{1!} + \dfrac{f''(1)}{2!} - \dfrac{f'''(1)}{3!} + ... + \dfrac{(-1)^{n} f^{n}(1)}{n!}$ is

(1) 2^{n} (2) 2^{n-1}

(3) 0   (4) 1   **[2003]**

20.   Number of numbers greater than 1000 but less than 4000 formed using the digits 0, 2, 3, 4 with repetition allowed is

(1) 125   (2) 105

(3) 128   (4) 625   **[2002]**

21.   Five digit number divisible by 3 is formed using 0, 1, 2, 3, 4, 6 and 7 without repetition. Total number of such numbers are

(1) 312   (2) 3125

(3) 120   (4) 216   **[2002]**

22.   The sum of integers from 1 to 100 that are divisible by 2 or 5 is

(1) 3000   (2) 3050

(3) 3600   (4) 3250   **[2002]**

23.   Total number of four digit odd numbers that can be formed using 0, 1, 2, 3, 5, 7 are

(1) 216   (2) 375

(3) 400   (4) 720   **[2002]**

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Assertion – Reason Type

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

    Statement – I : The number of different ways the child can buy the six ice-creams is $^{10}C_5$.

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

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