Permutation & Combination

Date Planned : __ / __ / __	Daily Tutorial Sheet - 1	Expected Duration : 90 Min
Actual Date of Attempt : __ / __ / __	Level - 1	Exact Duration :_____

Note (A) : Questions having asterisk marked against them may have more than one correct answer.

(B) : Questions having (▶) (Symbol) marked against them have a video solution.

1. Total 5-digit numbers divisible by 4 can be formed using 0, 1, 2, 3, 4, 5, when the repetition of digits is allowed is:

(A) 1250 **(B)** 875 **(C)** 1620 **(D)** 1000

2. Total 5-digit numbers divisible by 3 can be formed using 0, 1, 2, 3, 4, 5 if repetition of digits is not allowed is:

(A) 216 **(B)** 120 **(C)** 96 **(D)** 432

3. Total 5-digit numbers divisible by 6 can be formed using 0, 1, 2, 3, 4, 5 if repetition of digits is not allowed is:

(A) 60 **(B)** 48 **(C)** 108 **(D)** 216

4. The total number of numbers that can be formed by using all the digits 1, 2, 3, 4, 3, 2, 1 so that the odd digits always occupy the odd places, is:

(A) 3 **(B)** 6 **(C)** 9 **(D)** 18

5. The number of numbers divisible by 3 that can be formed by four different even digits are:

(A) 18 **(B)** 36 **(C)** 20 **(D)** 38

6. The number of possible outcomes in a throw of n ordinary dice in which at least one of the dice shows an odd number are:

(A) $6^n - 1$ **(B)** $3^n - 1$ **(C)** $6^n - 3^n$ **(D)** $6^n - 2^n$ (▶)

7. The number of times the digit 5 will be written when listing integers from 1 to 1000 is:

(A) 271 **(B)** 272 **(C)** 300 **(D)** 200

8. The number of five-digit telephone numbers having atleast one of their digits repeated is: (▶)

(A) 90000 **(B)** 100000 **(C)** 30240 **(D)** 69760

9. Six identical coins are arranged in a row. The total number of ways in which the number of heads is equal to the number of tails is:

(A) 9 **(B)** 20 **(C)** 40 **(D)** 120

10. How many numbers greater than 1000 or equal to, but less than 4000 can be formed with the digits 0, 1, 2, 3, 4 repetition of digits being allowed:

(A) 374 **(B)** 375 **(C)** 376 **(D)** 378

11. The least positive integer n for which ${}^{n-1}C_5 + {}^{n-1}C_6 < {}^{n}C_7$ is:

(A) 14 **(B)** 15 **(C)** 16 **(D)** 28

12. The exponent of 15 in 100! is:

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

13. The number of ways to select 2 numbers from {0, 1, 2, 3, 4} such that the sum of the squares of the selected numbers is divisible by 5 are (repetition of digits is allowed).

(A) 13 **(B)** 11 **(C)** 5 **(D)** 4

14. Let $A = \{x : x \text{ is a prime number and } x < 30\}$. The number of different rational numbers whose numerator and denominator belong to A is:

(A) 90 **(B)** 180 **(C)** 91 **(D)** 92

15. The number of six-digit numbers that can be formed using 1, 2, 3, 4, 5, 6, 7 so that digits do not repeat, and first and last digits are even, is:

(A) 144 **(B)** 72 **(C)** 288 **(D)** 720

16. Eight chairs are numbered 1 to 8. Two women and three men wish to occupy one chair each. First the women choose the chairs from amongst the chairs marked 1 to 4, and then the men select the chairs from amongst the remaining. The number of possible arrangements is:

(A) ${}^4C_3 \times {}^4C_2$ **(B)** ${}^4C_2 \times {}^4P_3$ **(C)** ${}^4P_2 \times {}^4P_3$ **(D)** ${}^4P_2 \times {}^6P_3$

17. The number of 4-digit numbers that can be made with digits 1, 2, 3, 4 and 5 in which at least two digits are identical, is:

(A) $4^5 - 5!$ **(B)** 505 **(C)** 600 **(D)** 500

18. A variable name in a certain computer language must be either an alphabet or an alphabet followed by a decimal digit. Total number of different variable names that can exist in that language is equal to:

(A) 280 **(B)** 290 **(C)** 286 **(D)** 296

19. The number of diagonals of a polygon of 15 sides is:

(A) 105 **(B)** 90 **(C)** 75 **(D)** 60

20. The value of the expression ${}^{47}C_4 + \sum_{j=1}^{5} {}^{52-j}C_3$ is:

(A) ${}^{51}C_4$ **(B)** ${}^{52}C_4$ **(C)** ${}^{52}C_3$ **(D)** None of these

21. If ${}^nC_r$ denotes the number of combinations of n things taken r at a time, then the expression ${}^nC_{r+1} + {}^nC_{r-1} + 2 \times {}^nC_r$ equal to:

(A) ${}^{n+2}C_r$ **(B)** ${}^{n+2}C_{r+1}$ **(C)** ${}^{n+1}C_r$ **(D)** ${}^{n+1}C_{r+1}$

22. The range of the function ${}^{7-x}P_{x-3}$ is:

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

23. The solution set of ${}^{10}C_{x-1} > 2 \ . \ {}^{10}C_x$ is:

(A) {1, 2, 3} **(B)** {4, 5, 6} **(C)** {8, 9, 10} **(D)** {9, 10, 11}

24. If $\frac{1}{{}^4C_n} = \frac{1}{{}^5C_n} + \frac{1}{{}^6C_n}$, then value of n is:

(A) 3 **(B)** 4 **(C)** 1 **(D)** 2

25. The least value of natural number n satisfying $C(n, 5) + C(n, 6) > C(n+1, 5)$ is:

(A) 11 **(B)** 10 **(C)** 12 **(D)** 13