PROBLEM SET-03

Q.1 Find the number of ways in which letters of the word VALEDICTORY be arranged so that the vowels may never be separated.

Q.2 How many numbers between 400 and 1000 (both exclusive) can be made with the digits 2,3,4,5,6,0 if

(a) repetition of digits not allowed.

(b) repetition of digits is allowed.

Q.3 The interior angles of a regular polygon measure 150° each. The number of diagonals of the polygon is

(A) 35 (B) 44 (C) 54 (D) 78

Q.4 The number of ways in which 5 different books can be distributed among 10 people if each person can get at most one book is:

(A) 252 (B) 10^5 (C) 5^{10} (D) ${}^{10}C_5 \cdot 5!$

Q.5 The 9 horizontal and 9 vertical lines on an 8×8 chessboard form ' r ' rectangles and 's' squares. The ratio $\frac{s}{r}$ in its lowest terms is

(A) $\frac{1}{6}$ (B) $\frac{17}{108}$ (C) $\frac{4}{27}$ (D) none

Q.6 There are 720 permutations of the digits 1,2,3,4,5,6. Suppose these permutations are arranged from smallest to largest numerical values, beginning from 123456 and ending with 654321.

(a) What number falls on the 124^{th} position?

(b) What is the position of the number 321546?

Q.7 Number of 4 digit numbers of the form N = abcd which satisfy following three conditions

(i) $4000 \leq N < 6000$ (ii) N is a multiple of 5 (iii) $3 \leq b < c \leq 6$ is equal to

(A) 12 (B) 18 (C) 24 (D) 48

Q.8 Find the number of 3 digit numbers in which the digit at hundredth's place is greater than the other two digit.

Q.9 Find the number of 6 digit numbers of the form abcdef if the digits satisfy the condition

$a + b + c + d + e + f = a^2 + b^2 + c^2 + d^2 + e^2 + f^2$.

Q.10 Number of permutations of 1,2,3,4,5,6,7,8 and 9 taken all at a time, such that the digit

1 appearing somewhere to the left of 2

3 appearing to the left of 4 and

5 somewhere to the left of 6 , is

(e.g. 815723946 would be one such permutation)

(A) $9 \cdot 7!$ (B) $8!$ (C) $5!\,4!$ (D) $8!\,4!$

Q.11 A convex polygon has 44 diagonals. The polygon is

(A) nonagon (B) decagon (C) undecagon (D) Dodecagon

Q.12 The number of ways in which 10 candidates $A_1, A_2, \ldots\ldots, A_{10}$ can be ranked, so that A_1 is always above A_2 is

(A) $\frac{10!}{2}$ (B) $8! \times {}^{10}C_2$ (C) ${}^{10}P_2$ (D) ${}^{10}C_2$

ANSWER KEY

1. (967680) **2.** ((a) 60; (b) 107) **3.** (C) **4.** (D) **5.** (B)

6. ((a) 213564, (b) 267th) **7.** (C) **8.** (285) **9.** (32) **10.** (A)

11. (C) **12.** (AB)