



PROBLEM SET-02

Q.1 A student solves the equation ${}^nC_2 = 10$ using the following steps, but finds the solution yields decimal answer and therefore he must not be correct which step did he make the mistake?

- (A) Step-1: $\frac{n!}{(n-2)!} = 10$
- (B) Step-2: $n! = 10(n-2)!$
- (C) Step-3: $n(n-1)(n-2)! = 10(n-2)!$
- (D) Step-4: $n(n-1) = 10 \Rightarrow n^2 - n - 10 = 0$

Q.2 Number of natural numbers between 100 and 1000 such that at least one of their digits is 7 , is

- (A) 225
- (B) 243
- (C) 252
- (D) none

Q.3 For some natural N, the number of positive integral 'x' satisfying the equation,

$$1! + 2! + 3! + \dots + (x!) = (N)^2 \text{ is}$$

- (A) none
- (B) one
- (C) two
- (D) infinite

Q.4 All possible three digits even numbers which can be formed with the condition that if 5 is one of the digit, then 7 is the next digit is :

- (A) 5
- (B) 325
- (C) 345
- (D) 365

Q.5 How many of the 900 three digit numbers have at least one even digit?

- (A) 775
- (B) 875
- (C) 450
- (D) 750



- Q.6** The number of different seven digit numbers that can be written using only three digits 1,2&3 under the condition that the digit 2 occurs exactly twice in each number is :
- (A) 672
 - (B) 640
 - (C) 512
 - (D) none
- Q.7** Out of seven consonants and four vowels, the number of words of six letters, formed by taking four consonants and two vowels is (Assume that each ordered group of letter is a word):
- (A) 210
 - (B) 462
 - (C) 151200
 - (D) 332640
- Q.8** Find the number of natural numbers less than 1000 and divisible by 5 can be formed with the ten digits, each digit not occurring more than once in each number.
- Q.9** The set of values of r simultaneously satisfying the system of equations $P(5, r) = 2 \cdot P(6, r - 1)$ and $5 \cdot P(4, r) = 6 \cdot P(5, r - 1)$, is
- (A) an empty set
 - (B) a singleton set
 - (C) a set consisting of two elements
 - (D) a set consisting of three elements.
- Q.10** Let P_n denotes the number of permutations of n distinct things taken all at a time and
- $$x_n = {}^{n+5}C_4 - \left(\frac{143}{96}\right) \left(\frac{P_{n+5}}{P_{n+3}}\right) \quad (\text{where } n \in \mathbb{N}).$$
- The possible value of n for which x_n is negative, can be
- (A) 1
 - (B) 2
 - (C) 3
 - (D) 4
- Q.11** 10 people are sitting around a circular table, each one shaking a hand with everyone else except from the people sitting on either side of him. Find the number of handshakers.



ANSWER KEY

1. (A) 2. (C) 3. (C) 4. (D) 5. (A) 6. (A) 7. (C)
8. 154 9. (B) 10. (A,B,C) 11. 35

