PERMUTATION & COMBINATION

Self – Evaluation Text

1. In how many ways three different rings can be in four fingers with at most in each finger?

(a) 24 (b) 12

(c) 36 (d) 120

(e) None of these

2. In how many ways can 7 soldiers stand in a queue?

(a) 5040

(b) 2880

(c) 280

(d) 285

(e) None of these

3. How many different words can be formed with the letters of the word NAINITAL such that each of the word begin with L and end with T?

(a) 90 (b) 80

(c) 88 (d) 82

(e) None of these

4. How many numbers of 5 digits can be formed with the digits 0,2,3,4 and 5 if the digits may repeat?

(a) 2500 (b) 250

(c) 120 (d) 2400

(e) None of these

5. In how many ways 4 rings of different types can be worn in 3 fingers?

(a) 49 (b) 12

(c) 24 (d) 81

(e) None of these

6. In how many ways can n balls be randomly distributed in n cells?

(a) $n!$ (b) n^n

(c) $n(n-1)$ (d) 2^n

(e) None of these

7. In a test paper there are total 10 questions. In how many different ways can you choose 6 questions to answer?

(a) 210 (b) 540

(c) 336 (d) 340

(e) None of these

8. Draupadi has 5 friends. In how many ways can she invite one or more of them to a dinner?

(a) 31 (b) 5^5

(c) 13 (d) 2^5

(e) None of these

9. A committee of 5 persons is to be formed out of 6 gents and 4 ladies. In how many ways this can be done, when at most two ladies are included?

(a) 186 (b) 168

(c) 136 (d) 169

(e) None of these

10. Find the number of ways of selecting 4 letters from the word EXAMINATION.

(a) 136 (b) 126

(c) 252 (d) 525

(e) None of these

Answer – Key

1. A	**2.** A	**3.** A	**4.** A	**5.** D
6. B	**7.** A	**8.** A	**9.** A	**10.** A

Explanation

1. Explanation

Option (A) is correct.

Since we cannot wear more than one ring in any finger means repetition is not allowed.

Hence, the first ring can be worn in any of the available 4 fingers in 4 ways and second ring can be worn in any of the remaining 3 fingers in 3 ways and third ring can be worn in any of the required number of ways in which all the 3 rings can be worn in 4 fingers $= 4 \times 3 \times 2 = 24$.

Alternatively: We have 4 places to be filled up by 3 different things (i.e., rings), which can be done in ${}^4P_3$ ways.

${}^4P_3 = 24$

2. Explanation

Option (A) is correct.

7 soldiers can be stand in a queue in 7! ways

$\therefore \quad 7! = 5040$

3. Explanation

Option (A) is correct.

When L and T are fixed as first and last letters of the word, then we have only 6 letters to be arranged. Hence required number of permutations

$= \frac{6!}{2! \times 2! \times 2!} = 90$

4. Explanation

Option (A) is correct.

Ten thousands place can assume only non-zero digits hence ten thousands place can be filled up in 4 ways and thousands place can be filled up in 5 ways since repetition is allowed (and 0 can be filled up in this place). Similarly hundreds, tens and unit places can be filled up in 5 ways each.

$\therefore$ The required number of numbers $= 4 \times 5 \times 5 \times 5 \times 5 = 2500$

5. Explanation

Option (D) is correct.

First ring can be worn in any of the 3 fingers similarly second, third and fourth ring can be worn in any of the three fingers.

$\therefore$ 4 rings can be worn in $3\times3\times3\times3=81$ ways.

6. Explanation

Option (B) is correct.

The first ball can be placed in any one of the n cells in n ways. The second ball can also be placed in any one of the n cells in n ways.

$\therefore$ The first and second balls can be placed in n cells in $n\times n$ *i.e..*, n^2 ways.

Similarly each of the rest balls can be placed in n ways. Hence the required number of ways $=\text{n}\times\text{n}\times...\times\text{n}$ times

$=n^n$,

7. Explanation

Option (A) is correct,

Out of 10 questions, 6 questions can be selected in ${}^{10}C_6$ ways

$\therefore \quad {}^{10}C_6=210$

8. Explanation

Option (A) is correct.

She may invite one or more friends by selecting either 1 or 2 or 3 or 4 or 5 friends out of 5 friends.

$\therefore$ **1** friend can be selected out of 5 in ${}^5C_1$ ways

2 friends can be selected out of 5 in ${}^5C_2$ ways

3 friends can be selected out of 5 in ${}^5C_3$ ways

4 friends can be selected out of 5 in ${}^5C_4$ ways

5 friends can be selected out of 5 in ${}^5C_5$ ways

Hence the required number of ways $={}^5C_1+{}^5C_2+{}^5C_3+{}^5C_4+{}^5C_5$

$=5+10+10+5+1=31$

Alternatively: ${}^5C_1+{}^5C_2+{}^5C_3+{}^5C_4+{}^5C_5=2^5-1=31$

since, ${}^nC_1+{}^nC_2+{}^nC_3+.....+{}^nC_n=2^n-1$

9. Explanation

Option (A) is correct.

A committee of 5 persons, consisting of at most two ladies, can be formed can the following ways.

(i) selecting 5 gents only out of 6.
(ii) selecting 4 gents only out of 6 and one lady out of 4.
(iii) selecting 3 gents only out of 6 and two ladies out of 4.

In case I, the number of ways $= {}^6C_5$

In case II, the number of ways $= {}^6C_4 \times {}^4C_2$

In case III, the number of ways $= {}^6C_5 + {}^6C_4 \times {}^4C_1 + {}^6C_3 \times {}^4C_2$

$\therefore$ Required number of ways $= 6 + 60 + 120 = 186$

10. Explanation

Option (A) is correct.

There are 11 letters in the given word of which 2 are A,s, 2 are I's 2 are N's and the remaining 5 letters are different.

Thus we have 11 letters of 8 different kinds viz., $(A, A), (I, I), (N, N),$

E, X, M, T, O.

A group of 4 letters can be classified as follows:

(i) Two alike of one kind and two alike of another kind.
(ii) Two alike and the other two different.
(iii) All four different.

In case I, the number of ways $= {}^3C_2 = 3$

Incase II, the number of ways $= {}^3C_1 \times {}^7C_2 = 63$

In case III, the number of ways $= {}^8C_4 = 63$

Hence, the required number of ways $= 3 + 63 + 70 = 136$