DPP

DAILY PRACTICE PROBLEMS

CLASS : XIth
DATE :

Solutions

SUBJECT : MATHS
DPP NO. :9

Topic :-PERMUTATIONS AND COMBINATIONS

1 **(c)**

We have the following possibilities:

Number of selections	*Number of Arrangements*
$^3C_1 \times {}^2C_2$	$^3C_1 \times {}^2C_2 \times \frac{5!}{3!} = 60$
$^3C_2 \times {}^1C_1$	$^3C_2 + {}^1C_1 \times \frac{5!}{2!2!} = 90$

Three bottles of one type and two distinct. Two bottles of one type, two bottles of second type and one from the remaining.

Hence, required number of ways $= 60 + 90 = 150$

2 **(a)**

Six '+' signs can be arranged in a row in $\frac{6\,!}{6\,!} = 1$ way. Now, we are left with seven places in which 4 minus signs can be arranged in

$^7C_4 \times \frac{4\,!}{4\,!} = 35$

3 **(b)**

$\because$ The candidate is unsuccessful, if he fails in 9 or 8 or 7 or 6 or 5 papers.

$\therefore$ Numbers of ways to be unsuccessful

$= {}^9C_9 + {}^9C_8 + {}^9C_7 + {}^9C_6 + {}^9C_5$

$= {}^9C_0 + {}^9C_1 + {}^9C_2 + {}^9C_3 + {}^9C_4$

$= \frac{1}{2}({}^9C_0 + {}^9C_1 + \ldots\ldots + {}^9C_9)$

$= \frac{1}{2}(2^9) = 2^8 = 256$

4 **(d)**

Using the digits 0, 1, 2, …… ,9 the number of five digits telephone numbers which can be formed is 10^5(since repetition is allowed).

The number of five digits telephone numbers, which have none of digits repeated $= {}^{10}P_5 = 30240$

$\therefore$ The required number of telephone number

$= 10^5 - 30240 = 69760$

5 **(d)**

The number of words beginning with $'a'$ is same as the number of ways of arranging the remaining 4 letters taken all at a time. Therefore $'a'$ will occur in the first place 4 ! times. Similarly, b or c will occur in the first place the same number of times. Then, d occurs in the first place. Now, the number of words beginning with $'da, db$ or dc' is 3 !. Then, the words beginning with $'de'$ must follow. The first one is $'de\ abc'$, the next one is $'de\ acb'$ and the next to the next comes $'de\ bac'$.

So, the rank of $'de\ bac' = 3 \cdot 4\,! + 3 \cdot 3\,! + 3 = 93$

6 **(b)**

Required number $= 2\ {}^{20}C_2$

7 **(c)**

The total number of combinations which can be formed of five different green dyes, taking one or more of them is $2^5 - 1 = 31$. Similarly, by taking one or more of four different red dyes $2^4 - 1 = 15$ combinations can be formed. The number of combinations which can be formed of three different red dyes, taking none, one or more of them is $2^3 = 8$

Hence, the required number of combinations of dyes

$= 31 \times 15 \times 8 = 3720$

8 **(b)**

We observe that

4 lines intersect each other in ${}^4C_2 = 6$ points

4 circles intersect each other in ${}^4C_2 \times 2 = 12$ points

A line cuts a circle in 2 points

$\therefore$ 4 lines will cut four circles into $2 \times 4 \times 4 = 32$ points

Hence, required number of points $= 6 + 12 + 32 = 50$

9 **(a)**

From the given relation it is evident that ${}^nC_r$ is the greatest among the values ${}^nC_0, {}^nC_1, \ldots, {}^nC_n$

We know that ${}^nC_r$ is greatest for $r = \frac{n}{2}$. Hence, $r = \frac{n}{2}$

10 **(d)**

A committee may consists of all men and no women or all women and no men or 3 men and 1 women whose is not among wives of 3 chosen men or, 2 men and 2 women who are not are not among the wives of 2 chosen men or 1 men and 3 women none of whom is wife of chosen men

$\therefore$ Required number of committees

$= {}^4C_4 + {}^4C_4 + {}^4C_3 \times {}^1C_1 + {}^4C_2 \times {}^2C_2 + {}^4C_1 \times {}^3C_3 = 16$

11 **(d)**

The women choose the chairs amongst the chairs marked 1 to 4 in ${}^4P_2$ways and the men can select the chairs from remaining in ${}^6P_3$ ways

Total number of ways $= {}^4P_2 \times {}^6P_3$

12 **(a)**

Let n be the number of diagonals of a polygon.

Then, ${}^{n}C_{2} - n = 44$

$\Rightarrow \frac{n(n-1)}{2} - n = 44$

$\Rightarrow n^2 - 3n - 88 = 0$

$\Rightarrow n = -8$ or 11

$\therefore n = 11$

13 **(b)**
In the word $'exercises'$ there are 9 letters of which 3 are e's and 2 are s's
So, required number of permutations $= \frac{9\,!}{3\,!\,2\,!} = 30240$
14 **(b)**
Total number of functions

=Number of dearrangement of 5 objects

$= 5!\left(\frac{1}{2!} - \frac{1}{3!} + \frac{1}{4!} - \frac{1}{5!}\right) = 44$

15 **(a)**
The total number of ways in which words with five letters are formed from given 10 letters $= 10^5$
$= 100000$

Total number of ways in which words with five letters are formed (no repetition)
$= 10 \times 9 \times 8 \times 7 \times 6 = 30240$

$\therefore$ Required number of ways $= 100000 - 30240 = 69760$

17 **(d)**
We have,
Required number of numbers = Number of three digit numbers divisible by 5 + number of 4 digit numbers divisible by 5
$= {}^{3}C_{2} \times 2\,! \times 1 + \left({}^{3}C_{3} \times 3\,!\right) \times 1 = 6 + 6 = 12$
19 **(c)**
In 8 squares $6x$ can be placed in 28 ways but there are two methods in which there is no x in first or last row.
$\therefore$ required number of ways=28-2=26
20 **(d)**
Total number of points on a three lines are $m + n + k$
$\therefore$ maximum number of triangles
$= {}^{m+n+k}C_{3} - {}^{m}C_{3} - {}^{n}C_{3} - {}^{k}C_{3}$
(subtract those triangles in which point on the same line)

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	C	A	B	D	D	B	C	B	A	D
Q.	11	12	13	14	15	16	17	18	19	20
A.	D	A	B	B	A	B	D	C	C	D