DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth
DATE :

Solutions

SUBJECT : MATHS
DPP NO. :3

Topic :-PERMUTATIONS AND COMBINATIONS

1 **(b)**
Word MEDITERRANEAN has 2A, 3E, 1D, 1I, 1M, 2N, 2R, 1T
In out of four letters E and R is fixed and rest of the two letters can be chosen in following ways
Case I Both letter are of same kind *ie*, ${}^3C_2$ ways, therefore number of words = ${}^3C_2 \times \frac{2!}{2!} = 3$
Case II Both letters are of different kinds *ie*, ${}^8C_2$ ways, therefore number of words= ${}^8C_2 \times 2! = 56$
Hence, total number of words=56+3=59
2 **(c)**
Required number of ways
=coefficient of x^{2m}in $(x^0 + x^1 + \ldots + x^m)^4$
=coefficient of x^{2m} in $\left(\frac{1-x^{m+1}}{1-x}\right)^4$
=coefficient of x^{2m} in $(1 - 4x^{m+1} + 6x^{2m+2} + \ldots)(1-x)^{-4}$
$={}^{2m+3}C_{2m} - 4\,{}^{m+2}C_{m-1}$
$$= \frac{(2m+1)(2m+2)(2m+3)}{6} - \frac{4m(m+1)(m+2)}{6}$$
$$= \frac{(m+1)(2m^2+4m+3)}{3}$$
3 **(c)**
The number of times he will go to the garden is same as the number of selecting 3 children from 8.
Therefore, the required number of ways = ${}^8C_3 = 56$
4 **(c)**
The number of ways that the candidate may select
(i) if 2 questions from A and 4 question from B
$= {}^5C_2 \times {}^5C_4 = 50$
(ii) 3 question from A and 3 questions from B
$= {}^5C_3 \times {}^5C_3 = 100$
and (iii) 4 questions from A and 2 questions from B
$= {}^5C_4 \times {}^5C_2 = 50$
Hence, total number of ways $= 50 + 100 + 50 = 200$
5 **(a)**
Since, $240 = 2^4 . 3 . 5$
$\therefore$ Total number of divisors $= (4+1)(1+1)(1+1) = 20$
Out of these 2, 6, 10 and 30 are of the form $4n + 2$
7 **(a)**
Required number of arrangements
$$= \frac{6!}{2!\,3!} - \frac{5!}{3!} = 60 - 20 = 40$$
8 **(b)**
As we know the last two digits of 10! and above factorials will be zero-zero
$\therefore \quad 1! + 4! + 7! + 10! + 12! + 13! + 15! + 16! + 17!$
$= 1 + 24 + 5040 + 10! + 12! + 13! + 15! + 16! + 17!$
$= 5065 + 10! + 12! + 13! + 15! + 16! + 17!$in this series, the digit in the ten palce is 6 which is divisible by

3!

9 **(c)**

As the players who are to receive the cards are different

So, the required number of ways $= \frac{52\,!}{(13\,!)^4}$

10 **(c)**

We have, in all 12 points. Since 3 points are used to form a triangle, therefore the total number of triangles, including the triangles formed by collinear points on AB, BC and CA, is $^{12}C_3 = 220$. But, this includes the following:

The number of triangles formed by 3 points on AB

$= {}^3C_3 = 1,$

The number of triangles formed by 4 points on BC

$= {}^4C_3 = 4,$

The number of triangles formed by 5 points on CA

$= {}^5C_3 = 10,$

Hence, required number of triangles $= 220 - (10 + 4 + 1) = 205$

11 **(b)**

Given, $\quad {}^nP_r = 3024$

$\Rightarrow \quad \dfrac{n!}{(n-r)!} = 3024$

And $\quad {}^nC_r = \frac{n!}{r!(n-r)!}$

$\Rightarrow \quad 126 = \dfrac{3024}{r!}$

$\Rightarrow \quad r! = 24 = 4!$

$\Rightarrow \quad r = 4$

12 **(d)**

We have,

$${}^{35}C_8 + \sum_{r=1}^{7} {}^{42-r}C_7 + \sum_{s=1}^{5} {}^{47-s}C_{40-s}$$

$= {}^{35}C_8 + \{{}^{41}C_7 + {}^{40}C_7 + {}^{39}C_7 + {}^{38}C_7 + \cdots + {}^{35}C_7\}$

$+\{{}^{46}C_{39} + {}^{45}C_{38} + \cdots + {}^{42}C_{35}\}$

$= {}^{35}C_8 + \{{}^{35}C_7 + {}^{36}C_7 + \cdots + {}^{41}C_7\}$

$+\{{}^{42}C_7 + {}^{43}C_7 + \cdots + {}^{46}C_7\} \qquad [\because {}^nC_r = {}^nC_{n-r}]$

$= ({}^{35}C_8 + {}^{35}C_7) + ({}^{36}C_7 + \cdots + {}^{41}C_7 + \cdots + {}^{46}C_7)$

$= ({}^{36}C_8 + {}^{36}C_7) + {}^{37}C_7 + \cdots + {}^{46}C_7$

$= {}^{37}C_8 + {}^{37}C_7 + {}^{38}C_7 + \cdots + {}^{46}C_7$

$= \ldots\ldots\ldots\ldots\ldots$

$= {}^{46}C_8 + {}^{46}C_7 = {}^{47}C_8$

13 **(b)**

Taking A_1, A_2 as one group we have 9 candidates which can be ranked in 9! ways. But A_1 and A_2 can be arranged among themselves in 2 ! ways

Hence, the required number $= (9\,!)(2\,!) = 2(9\,!)$

14 **(c)**

Considering $A\mathcal{U}$ as one letter, we have 4 letters, namely $L, A\mathcal{U}, G, H$ which can be permuted in 4! ways. But, A and $\mathcal{U}$ can be put together in 2! Ways.

Thus, the required number of arrangements $= 4\,! \times 2\,! = 48$

155 **(c)**

Total number of ways in which all letters can be arranged in 6! ways.

There are two vowels in the word GARDEN

Total number of ways in which these two vowels can be arranged= 2!

$\therefore$ Total number of required ways$= \frac{6!}{2!} = 360$

16 **(a)**

The possible cases are

Case I A man invites 3 ladies and woman invites 3 gentleman

$\Rightarrow \; {}^4C_3\, {}^4C_3 = 16$

Case II A man invites (2 ladies, 1 gentlemen) and woman invites (2 gentlemen, 1 lady)

$\Rightarrow \; ({}^4C_2 .\, {}^3C_1).({}^3C_1 .\, {}^4C_2) = 324$

Case III A man invites (1 lady, 2 gentlemen) and woman invites (2 ladies, 1 gentlemen)

$\Rightarrow \; ({}^4C_1 .\, {}^3C_2).({}^3C_2 .\, {}^4C_1) = 144$

Case IV A man invites (3 gentlemen) and woman invites (3 ladies)

$\Rightarrow \; {}^3C_3 .\, {}^3C_3 = 1$

$\therefore$ Total number of ways

$= 16 + 324 + 144 + 1 = 485$

18 **(a)**

A number between 5000 and 10,000 can have any of the digits 5,6,7,8,9 at thousand's place. So, thousand's place can be filled in 5 ways. Remaining 3 places can be filled by the remaining 8 digits in ${}^8P_3$ ways

Hence, required number $= 5 \times {}^8P_3$

20 **(d)**

Two circles intersect maximum at two distinct points. Now, two circles can be selected in ${}^6C_2$ ways.

$\therefore$ Total number of points in intersection are

${}^6C_2 \times 2 = 30$

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