DPP

DAILY PRACTICE PRODUCTS

CLASS : XIth

DATE :

Solutions

SUBJECT : MATHS

DPP NO. :7

Topic :-PERMUTATIONS AND COMBINATIONS

1 **(c)**

Since, no two lines are parallel and no three are concurrent, therefore n straight lines intersect at ${}^{n}C_2 = N$ (say) points. Since, two points are required to determine a straight line, therefore the total number of lines obtained by joining N points is ${}^{N}C_2$. But in this each old line has been counted ${}^{n-1}C_2$times. Since, on each old line there will be $n-1$ lines.

Hence, the required number of fresh lines.

$$= {}^{N}C_2 - n\,{}^{n-1}C_2$$

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

$$= \frac{{}^{n}C_2({}^{n}C_2 - 1)}{2} - \frac{n(n-1)(n-2)}{2} \quad (\because N = {}^{n}C_2)$$

$$= \frac{\frac{n(n-1)}{2}\left(\frac{n(n-1)}{2} - 1\right)}{2} - \frac{n(n-1)(n-2)}{2}$$

$$= \frac{n(n-1)}{8}[(n^2 - n - 2) - 4(n-2)]$$

$$= \frac{n(n-1)}{8}[n^2 - 5n + 6]$$

$$= \frac{n(n-1)(n-2)(n-3)}{8}$$

2 **(c)**

The required number of ways

$$= ({}^{2}C_1 \times {}^{4}C_2 + {}^{2}C_2 \times {}^{4}C_1) \times 3!$$

$$= (2 \times 6 + 1 \times 4)6 = 96$$

3 **(a)**

The factor of $216 = 2^3.3^3$

The odd divisors are the multiple of 3

$\therefore$ The number of divisors=3+1=4

4 **(c)**

We have,

$E_3(100\,!) = \left[\frac{100}{3}\right] + \left[\frac{100}{3^2}\right] + \left[\frac{100}{3^3}\right]\left[\frac{100}{3^4}\right] = 33 + 11 + 3 + 1 = 48$

5 **(b)**

Case I When number in two digits.

Total number of ways $= 9 \times 9 = 81$

Case II When number in three digits

Total number of ways $= 9 \times 9 \times 9 = 729$

$\therefore$ Total number of ways $= 81 + 729 = 810$

6 **(b)**

We have,

${}^{56}P_{r+6} : {}^{54}P_{r+3} = 30800 : 1$

$\Rightarrow \frac{56\,!}{(50-r)\,!} = 3800\left(\frac{54\,!}{(51-r)\,!}\right)$

$\Rightarrow 56 \times 55 = \frac{3800}{51-r}$

$\Rightarrow 51 - r = 10 \Rightarrow r = 41$

7 **(c)**

We have,

Required number of numbers

$=$ Total number of numbers formed by the digits 1,2,3,4,5

$-$ Number of numbers having 1 at ten thousand's place

$-$ Number of numbers having 2 at ten thousand's place and 1 at thousand's place

$-$ Number of numbers having 2 at ten thousand's place and 3 at thousand's place

$= 5\,! - 4\,! - 3\,! - 3\,! = 120 - 24 - 6 - 6 = 84$

8 **(c)**

The number of ways of selecting 3 points out of 12 points is ${}^{12}C_3$. Three points out of 7 collinear points can be selected in ${}^{7}C_3$ ways

Hence, the number of triangles formed $= {}^{12}C_3 - {}^{7}C_3 = 185$

9 **(d)**

Required sum=(sum of the digits) $(n-1)!\left(\frac{10^n - 1}{10 - 1}\right)$

$= (1 + 2 + 3 + 4 + 5)(5 - 1)!\left(\frac{10^5 - 1}{10 - 1}\right)$

$= 360\left(\frac{100000 - 1}{9}\right) = 40 \times 99999 = 3999960$

10 **(c)**

Total number of words formed by 4 letters form given eight different letters with repetition $= 8^4$ and number of words with no repetition $= {}^8P_4$

$\therefore$ Required number of words $= 8^4 - {}^8P_4$

11 **(d)**

Given number of flags = 5

Number of signals formed using one flag $= {}^5P_1 = 5$

Similarly, using 2 flags $= {}^5P_2$

Using 3 flags $= {}^5P_3$

Using 4 flags $= {}^5P_4$

Using 5 flags $= {}^5P_5$

$\therefore$ Total number of signals that can be formed

$= {}^5P_1 + {}^5P_2 + {}^5P_3 + {}^5P_4 + {}^5P_5$

$= 5 + 20 + 60 + 120 + 120$

$= 325$

12 **(d)**

Required number of permutations $= \frac{6!}{3!2!} = 60$

13 **(c)**

Out of 22 players 4 are excluded and 2 are to be included in every selection. This means that 9 players are to be selected from the remaining 16 players which can be done in ${}^{16}C_9$ ways

234 **(b)**

The letters in the word 'CONSEQUENCE' are 2C, 3E, 2N, 1O, 1Q, 1S, 1U

$\therefore$ Required number of permutations $= \frac{9!}{2!2!}$

15 **(c)**

The number of different sums of money Sita can form is equal to the number of ways in which she can select at least one coin out of 5 different coins

Hence, required number of ways $= 2^5 - 1 = 31$

16 **(a)**

For the first player, distribute the cards in ${}^{52}C_{17}$ ways. Now, out of 35 cards left 17 cards can be put for second player in ${}^{35}C_{17}$ ways. Similarly, for third player put them in ${}^{18}C_{17}$ways. One card for the last player can be put in ${}^1C_1$ way. Therefore, the required number of ways for the proper distribution

$= {}^{52}C_{17} \times {}^{35}C_{17} \times {}^{18}C_{17} \times {}^1C_1$

$$= \frac{52!}{35!17!} \times \frac{35!}{18!17!} \times \frac{18!}{17!1!} \times 1! = \frac{52!}{(17!)^3}$$

17 **(b)**

Suppose $x_1\ x_2\ x_3\ x_4\ x_5\ x_6\ x_7$ represents a seven digit number. Then x_1 takes the value 1,2,3,...,9 and $x_2, x_3, \ldots, x_7$ all take values 0,1,2,3,...,9

If we keep $x_1, x_2, \ldots, x_6$ fixed, then the sum $x_1 + x_2 + \ldots + x_6$ is either even or odd. Since x_7 takes 10 values 0,1,2,...9, five of the numbers so formed will be even and 5 odd

Hence, the required number of numbers

$= 9 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 5 = 4500000$

19 **(a)**

The required number of ways is equal to the number of dearrangements of 10 objects.

$\therefore$ Required number of ways

$$= 10!\left\{1 - \frac{1}{1!} + \frac{1}{2!} - \frac{1}{3!} + \ldots + \frac{1}{10!}\right\}$$

20 **(a)**

The number of words starting from A are =5!=120

The number of words starting from I are =5!=120

The number of words starting from KA are =4!=24

The number of words starting from KI are =4!=24

The number of words starting from KN are =4!=24

The number of words starting from KRA are =3!=6

The number of words starting from KRIA are =2!=2

The number of words starting from KRIN are =2!=2

The number of words starting from KRISA are=1!=1

The number of words starting from KRISNA are=1!=1

Hence, rank of the word KRISNA

$= 2(120) + 3(24) + 6 + 2(2) + 2(1) = 324$

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