

Solution to Practice Problems

Type-1

(i) 6, 5, 2, 3, 0 ~~total = 5! = 120~~ ⁽¹¹⁾
~~total = 5! = 120~~

6, 5, 2, 0, 3 \leftarrow odd

6, 3, 2, 0, 5 \leftarrow odd

when 3 is ~~at~~ the end, ~~total = 4! = 24~~

total odd numbers that can be created = $4P_4$

~~total = 4! = 24~~

when 5 is at the end;

total odd numbers that can be created = $4P_4$

~~total = 4! = 24~~

But if we keep 0 at the beginning

it becomes a 4th digit number. So we need to

subtract those from the total number.

So

when 3 at the end;

$$24 - 3P_3 = 24 - 6 = 18$$

when 5 at the end;

$$24 - 3P_3 = 24 - 6 = 18$$

\therefore total number = $18 + 18 = 36$ (Ans)

(ii) when 0 is at the end;

total number = ${}^4P_4 = 24$

when, 2 is at the end;

total number = ${}^4P_4 = 24$

but for 0 being at the beginning = ${}^4P_4 - {}^3P_3$

= $24 - 6 = 18$

when, 6 is at the end;

total number = ${}^4P_4 = 24$

but for 0 being at the beginning = ${}^4P_4 - {}^3P_3$

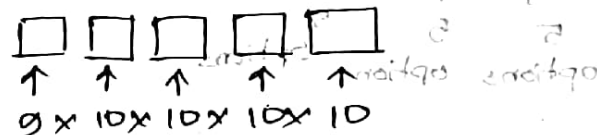
= 18

\therefore total number = $24 + 18 + 18$

= 60 (Ans)

Type-2:

(i)



$9 \times 10 \times 10 \times 10 \times 10$

we can fill each box with any number from

0-9 (10 types)

But and only for the first box we can't use 0.

because telephone number doesn't start with 0.

therefore our options are 1-9 on 9 types.

\therefore total connections = 9×10^4 (Ans)

(ii)



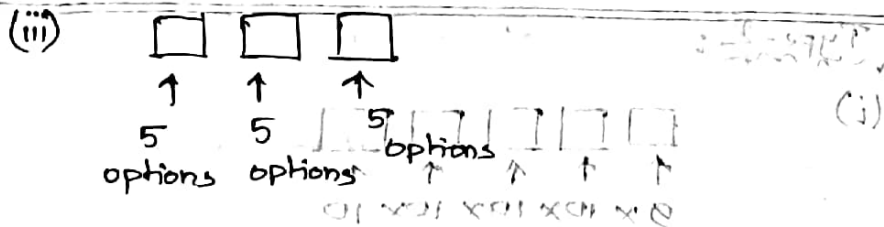
options options options

total combinations possible = $15 \times 15 \times 15$

permutations = 15^3

\therefore wrong number of wrong permutation

= $15^3 - 1$ (Ans)



∴ Total numbers possible = $5 \times 5 \times 5$

Number of pass output where no numbers are

the same = ${}^5P_3 = 60$

Numbers which have the same digit

twice or thrice = $5^3 - 60 = 65$ (Ans).

Type-3:

(i) Number of arrangements = 8P_6

∴ ${}^8P_6 = 40320$ (Ans).

(ii) Let "I, A, E" be one letter. (Let's consider it as K)

therefore total number of letters;

TRNGK → 6

∴ They can be arranged in ${}^6P_6 = 720$ ways

For taking all letters they can be arranged

${}^8P_8 = 40320$ (total sent prints)

∴ Total number = $40320 - 720$

Again,

The 3 letters can be arranged in ${}^3P_3 = 6$ ways

∴ Number of permutations where the vowels are at the together = 720×6

= 4320 (Ans)

Now,

Taking all letters they can be arranged

= ${}^8P_8 = 40320$ way.

∴ Number of permutations where vowels are not together = $40320 - 4320$

= 36000 (Ans).

(14) Total arrangements = $\frac{8!}{2! \times 2!}$
 (letting the vowels as one letter)
 = 10080

Again,

The vowels can arrange among them = $\frac{4!}{2! \times 2!}$

12

\therefore finally = 10080×12

= 120960

(Ans)

(iv) Part (i);

total arrangements = $\frac{10!}{2! \times 2! \times 2! \times 2!}$ = 226800
 (Ans)

Part (ii);

When M is both at the beginning and at the end;
 the arrangements = $\frac{8!}{2! \times 2! \times 2!}$ = 5040
 (Ans)

(v) Permutation + combination

changable letters $\rightarrow P n m t t n$

\therefore arrangements = $\frac{6!}{2!}$ = 360

But the vowels can be arranged among them as well, which is = $\frac{5!}{2!}$

But permutation itself is an arrangement.

Therefore, re-arrangement = $360 - 1$
 = 359 (Ans)

Type-4:

(i) (embroid) (aie)

selection = ${}^6C_2 \times {}^3C_2$
 = 15

total number of words = $15 \times 5!$

= 1800 (Ans)

(ii) selection of consonants = ${}^{12}C_3$

selection of vowels = 5C_2

\therefore total number of words = ${}^{12}C_3 \times {}^5C_2 \times 5!$
 $= 264000$ (Ans).

(iii) consonants \Rightarrow (p, n, m, t, t, n, s) 7 letters
 vowels \Rightarrow (e, u, a, i, o) 5 letters

t is repeated, therefore we will consider 6 letters

\therefore taking 2 of 6 = 6C_2

taking 1 of 5 = 5C_1

\therefore total way of selecting = ${}^6C_2 \times {}^5C_1 = 15$

the consonants can arrange between them as the vowel is stays in the middle

\therefore The consonants can arrange, 2P_2 , 2 ways

\therefore Total arrangements = $15 \times 2 = 30$ ways.

Now, for

If we selected both t's then,

total arrangements = ${}^2C_2 \times {}^5C_1 \times 1P_1$
 $= 1 \times 5 \times 1 = 5$ ways

Finally total arrangements = $30 + 5 = 35$ ways.

Type-5:

(i) Experienced bowlers (6) rest of the players (8)
 $6 + 8 = 14$
 $6 + 5 = 11$
 $6 = {}^6C_5 \times {}^8C_1$
 $5 = {}^6C_1 \times {}^8C_5$
 $14 = 6 + 5 = 11$
 224

\therefore Total teams that can be created = 224

(ii) Group of 6

$4+7=11 \Rightarrow$	4	$\Rightarrow {}^6C_4 \times {}^8C_7$
$5+6=11 \Rightarrow$	5	$\Rightarrow {}^6C_5 \times {}^8C_6$
$6+5=11 \Rightarrow$	6	$\Rightarrow {}^6C_6 \times {}^8C_5$

344

(iii) Math (6) Physics (4)

$4+2=6 \Rightarrow$	4	$\Rightarrow {}^6C_4 \times {}^4C_2$
$5+1=6 \Rightarrow$	5	$\Rightarrow {}^6C_5 \times {}^4C_1$
$6+0=6 \Rightarrow$	6	$\Rightarrow {}^6C_6 \times {}^4C_0$

118

(Ans)

Type 6:

(i) ${}^5C_4 \times {}^6C_2 = 105$ (Ans)

(ii) Group 1 Group 2

$4+2=6 \Rightarrow$	4	$\Rightarrow {}^5C_4 \times {}^5C_2$
$3+3=6 \Rightarrow$	3	$\Rightarrow {}^5C_3 \times {}^5C_3$
$2+4=6 \Rightarrow$	2	$\Rightarrow {}^5C_2 \times {}^5C_4$

200

(Ans)

Type 7:

(i) (a) 1 'e' and 3 different letters $= {}^3C_3$

(b) 2 'e' " " " $= {}^3C_2$

(c) 3 'e' " " " $= {}^3C_1$

${}^3C_3 + {}^3C_2 + {}^3C_1 = 1 + 3 + 3 = 7$ (Ans)

(ii) (a) 1 's' and

(a) Assuming only 1 's' selection $= {}^5C_4$ (i)

(b) keeping 2 's' always in the word and taking the other 2 from the next 4 letters $= {}^4C_2$

\therefore total selection $= {}^5C_4 + {}^4C_2 = 11$ (Ans)

(iii) (a) Assuming only 1 'a' total letter stand 6 types.

\therefore total words that can be formed $= {}^6P_3 = 120$

(b) Keeping 2 'a' in the word,

selection = ${}^5C_1 \times {}^5C_2 = 5 \times 10 = 50$ (i)

arrangements = $5 \times \frac{3!}{2!} = 15$ (ii)

Finally,

$$\therefore \text{total words} = 15 + 120 = 135 \quad (\text{Ans})$$

Type-8:

(i) We need 3 points for a triangle (iii)

We have 17 points (iv)

\therefore Number of triangles = ${}^{17}C_3$

(v) ${}^{17}C_3 + {}^{17}C_2 = 680$ (Ans)

(ii) ${}^{12}C_3 = 220$ (Ans) (vi)

${}^{12}C_2 = 66$ (Ans) (vii)

${}^{12}C_1 = 12$ (viii)