← ULTIMATE MATHEMATICS : BYAJAY MITTAL →

CHAPTER : PERMUTATION & COMBINATION

CLASS No: 4

DIGITS   0 to 9

Q.1   ✓ digit: 0 to 9 (if not given)
    ✓   Four digit number
    ✓   Repetition of digits allowed (if not mention)

| 9 | 10 | 10 | 10 | $= 9 \times 10 \times 10 \times 10 = 9000$

   ✓ Repetition of digits not allowed

| 9 | 9 | 8 | 7 | $= 9 \times 9 \times 8 \times 7 = 81 \times 56$
$$= \boxed{}$$

Qu 2   digits = 0 to 9

    Four digit odd number.

(i) Rep allowed   1,3,5,7,9

| 9 | 10 | 10 | 5 | $= 9 \times 10 \times 10 \times 5 = 4500$

(ii) Rep not allowed   1,3,5,7,9

| 8 | 8 | 7 | 5 | $= 8 \times 8 \times 7 \times 5$
$$= \boxed{}$$

Qu 3   digits   0 to 9

    Find five digit "even" number

(i) Rep of digits allowed   0,2,4,6,8

| 9 | 10 | 10 | 10 | 5 | $= 45000$

(2) Repitition of digits not allowed

9 2, 4, 6, 8

$\times$ | 8/9 | | | 5 |

Case I : number ending with 0

| 9 | 8 | 7 | 6 | 1 | = [   ]
                  0

Case II. number not ending with zero

                    2, 4, 6, 8
| 8 | 8 | 7 | 6 | 4 | = [   ]

Req. no. of ways = Case I + Case II = [   ] Ans

Qn.4 How many numbers are there between 100 and 1000 which have exactly one of their digit as 7 ?

✓ 0 to 9
✓ 3-digit No
✓ Rep. allowed

Soln.

I | 7̶/1̶ | 9 | 9 | = 81
       7

II = | 8 | 1̶ | 9 | = 72
           7

IV = | 8̶ | 9 | 1̶ | = 72
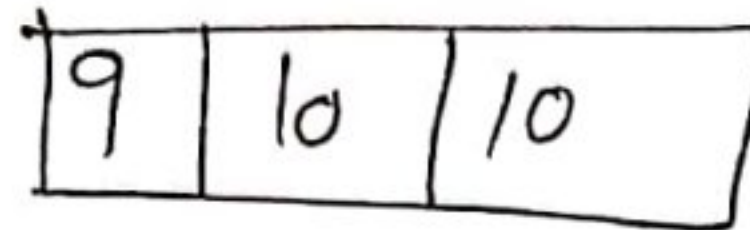   7

Req no. of way = 225

Qn.5 How many numbers are there between 100 and 1000 such that atleast one of their digits is 7 ?
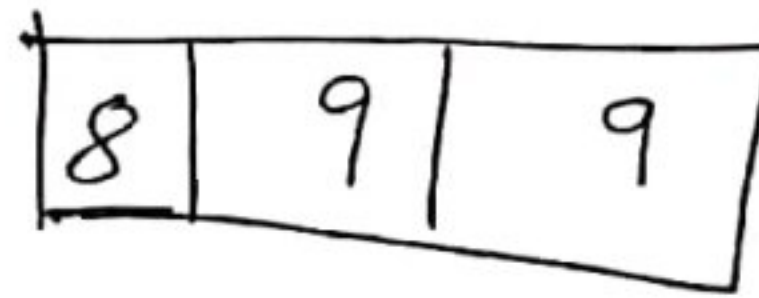
note   [atleast one = total - none]

total no of way

9	10	10

$= 9 \times 10 \times 10 = 900$

nony : any none of the digit is 7

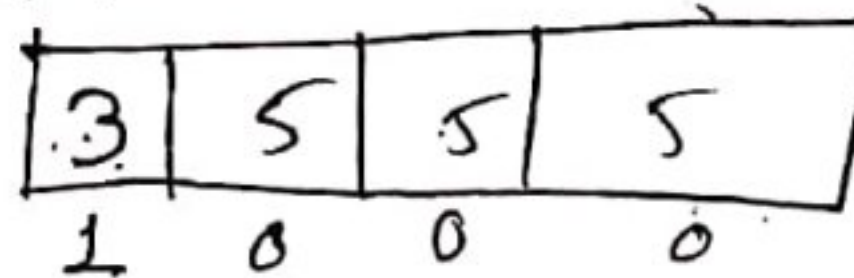| 8	9	9

$= 8 \times 9 \times 9 = 8 \times 81$
$= 648$

no of ways = $900 - 648 = 252$

Qn 6 How many numbers greater than 1000 but not greater than 4000 can be formed with the digits 0,1,2,3,4 (i) Rep allowed (ii) Rep not allowed.
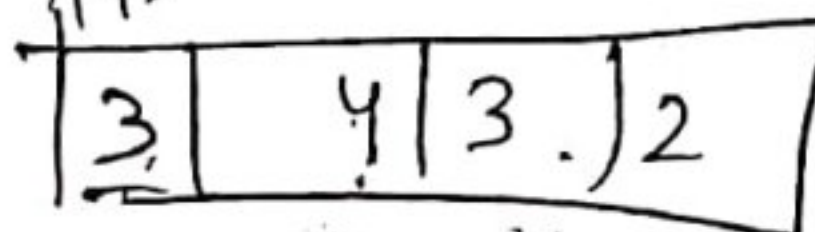
Sol 0,1,2,3,4

(i) Rep allowed

1,2,3

3	5	5	5
1	0	0	0

$= 3 \times 5 \times 5 \times 5$
$= 3 \times 125$
$= 375$

Req no of wys = $375 - 1$ (for 1000) $+ 1$ (for 4000)

$= 375$ **An**

(ii) Rep not allowed

1,2,3

3	4	3.	2

$= 3 \times 4 \times 3 \times 2$
$= 72$ **An**

Qn 7 In how many ways can 4 prizes be distributed among 5 students, when

(1) no boy gets more than one prize

(2) a student may get any number of prizes
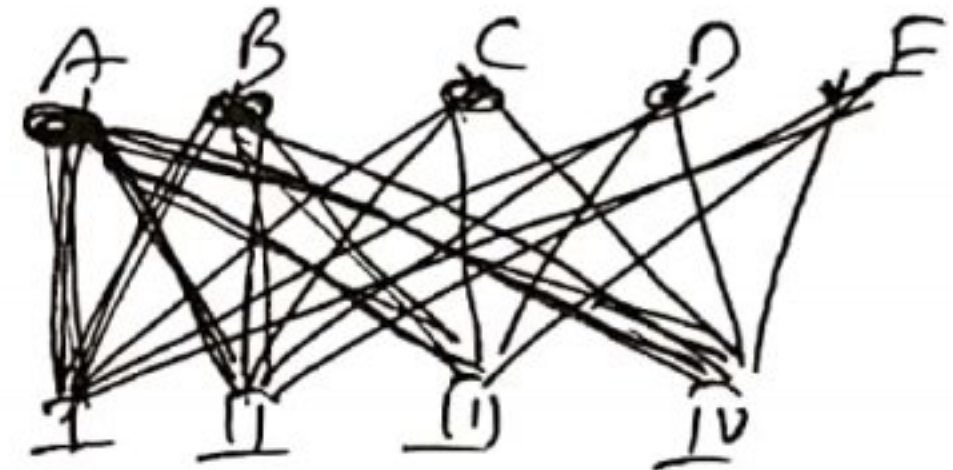
(3) no student gets all the prizes.

(1)
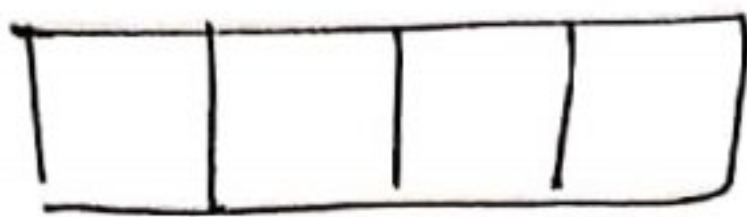
$$5 \times 4 \times 3 \times 2 = 20 \times 6 = 120$$
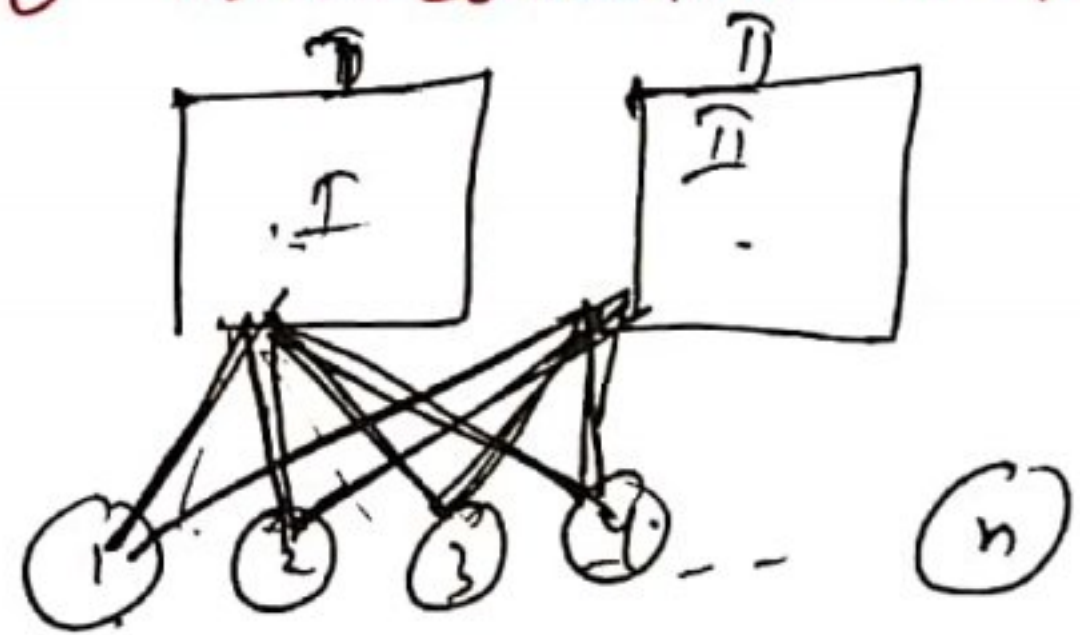
(2) $5 \times 5 \times 5 \times 5 = 5^4 = 625$

(3) $5 \times 5 \times 5 \times 5 = 625$
$$\frac{-5}{620}$$

Qu. 8 → find the total number of ways in which 'n' distinct objects can be put in to two different boxes so that no box remains empty.

S/ $2 \times 2 \times 2 \times 2 \cdots$ n term
$$= 2^n$$
$$= -2$$
$$= \underline{2^n - 2} \quad \underline{A_s}$$

Qns 9 find the **sum** of all the numbers that can be formed with the digits 2,3,4,5 taken all at a time.

S/ ✓ 2,3,4,5
    ✓ Rep not allowed (Since use all at a time)

| 4 | 3 | 2 | 1 | = (24)

~~HTTEEU~~ θ
2, 3, 4, 5

(8)

(2,4)

Q. TH   H   T   U

9   (a)
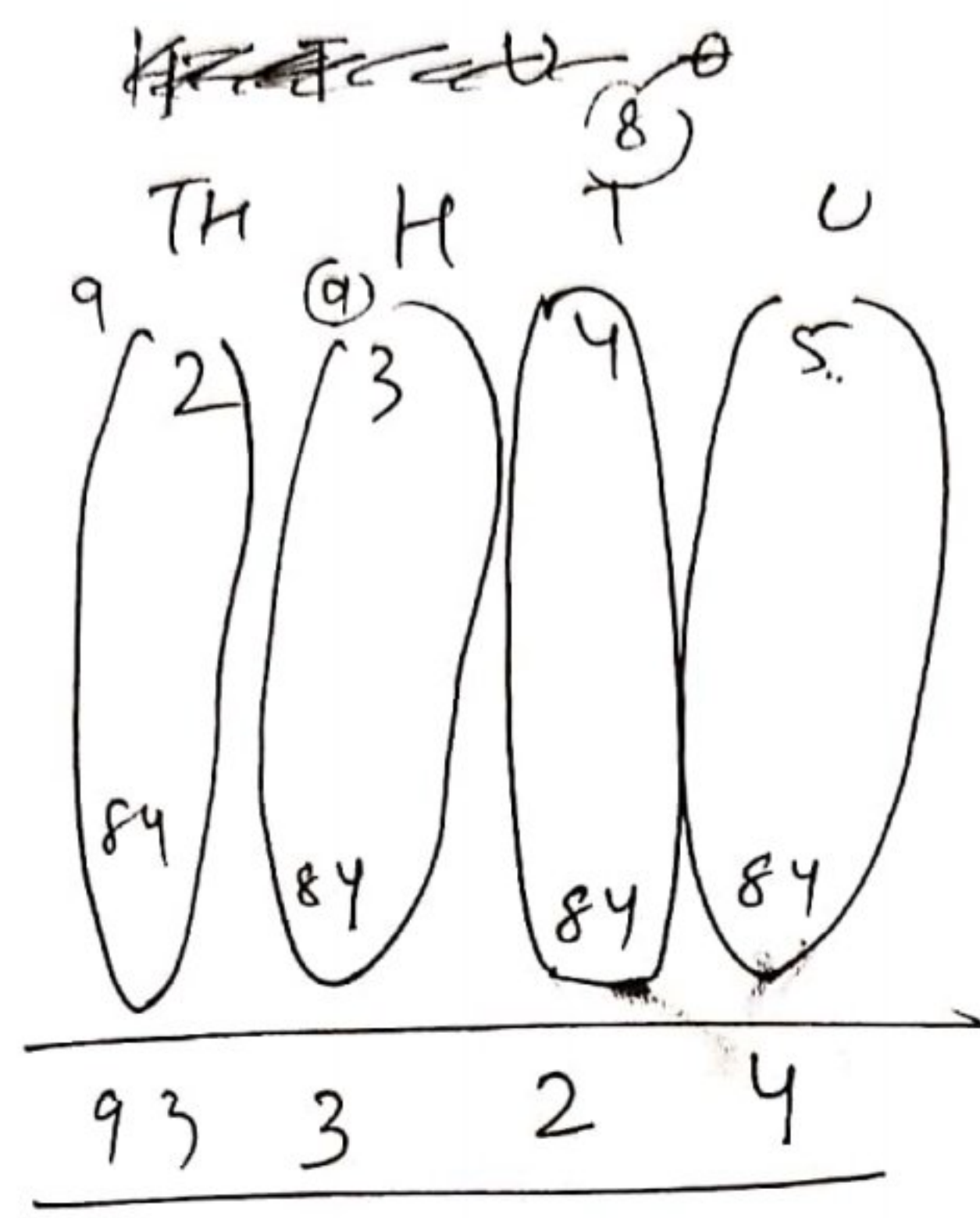
(2) (3) (4) (5)   2×6 = 12
                       3×6 = 18
                       4×6 = 24
                       5×6 = 30
84   84 84 84   84

9 3   3   2   4

(WORD)   ~~MATH~~ MATHEMATICS

Q.No 10   How many Four letter words?

M = 2   ✓   M   A   C   S
A = 2
~~T~~ = 2   ✓   M   M   A   S
C = 1
S = 1   ✓   M   M   A   A
I = 1
H = 1   Case I   all 4 letters are distinct
E = 1
          = $8C_4 \times 4!$

Case II   1 pair, 2 different
          = $3C_1 \times 7C_2 \times \dfrac{4!}{2!}$

Case III   2 pairs
          = $3C_2 \times \dfrac{4!}{2! \, 2!}$

Req ways   Case I + Case II + Case III

Qn 1)   INVOLUTE

5 letter words containing 2 vowels & 3 Consonants ? ?

Sol   4 - V

4 - C

$$= {}^4C_2 \times {}^4C_3 \times 5!$$