$$\sum_{k=0}^{N_{0}} \frac{\partial k}{\partial z} \sum_{k=1}^{N_{0}} \frac{\partial k}{\partial z}$$



# **ONGC-2014**

Q:- In a college everyone handshakes with each other exactly once. If total number of students present in the college 10. Then the number of handshakes?

 $S_1$ 

 $S_2$ 

 $S_3$ 

 $S_4$ 

**S**<sub>5</sub>

**S**<sub>6</sub>

**S**<sub>7</sub>

S<sub>8</sub>

S<sub>9</sub>

**S**<sub>10</sub>

9+8+7....+1 = n(n+1)/2 = 45

## SHORT CUT

 $^{10}C_2 = 10 \times 9/2 \times 1 = 45 \text{ (Ans.)}$ 

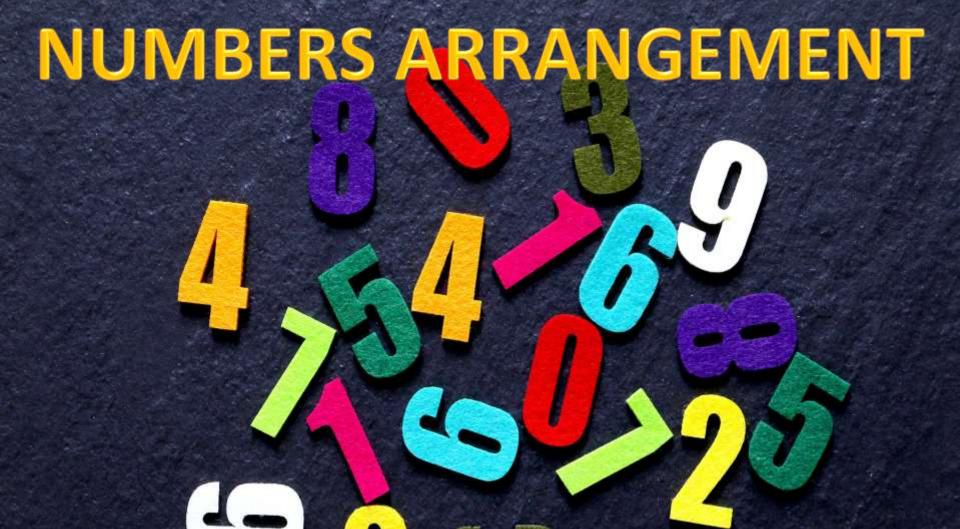
n-1 others n people (n-1)X two hands

# SSC CGL

There are n married couples at a party. Each person shakes hand with every person other than her or his spouse. Find the total number of hand shakes.

As there are n married couple so total number of persons is 2n So The number of handshake between 2n person is <sup>2n</sup>C<sub>2</sub>

But no couple handshake with each other hence subtract n from this so required answer is <sup>2n</sup>C<sub>2</sub> - n



# QUESTION

How many different (valid) 5 digit number can be formed with the digit 0,2,4,6,8.(Repetition not allowed)

- 1- Zero should not come first place.
- 2- After placing any non zero number in the first place. Then we can use zero in the remaining place according to repetition condition.

$$S = \{0,2,4,6,8\}$$

4 4 3 2 1 = 9	96
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# CAT

How many different (valid) three digit even number can be formed with the digit {0,1,2,3,4,5,6}. When the repetition of digit is not allowed.

S={0,1,2,3,4,5,6}

6	5	1 (0)	=	30
5	5	1 (2)	=	25
5	5	1 (4)	=	25
5	5	1 (6)	=	25

Total = 30 + 25 + 25 + 25 = 105 (Ans.)

#### **IB 2012**

- How many 3 digit ODD number can be formed using the digit 0,1,2,3......8,9. Such that
- I. Repetition of digit is allowed
- II. Repetition of digit is not allowed.

#### **SOLUTION**

$$S.S. = \{0,1,2,3,4,5,6,7,8,9\}$$

I. 
$$9 \times 10 \times 5 = 450$$

9

10

5(1,3,5,7,9)

II. 
$$8 \times 8 \times 5 = 320$$

8

8

5(1,3,5,7,9)

#### CAPGEMINI

How many three digit numbers can be formed by using the digit 1, 2, 3, 4, 5, 6. Such that the number formed is divisible by 5.

- I. Repetition of digit not allowed.
- II. Repetition of digit is allowed.

# SOLUTION

$$S.S. = \{1, 2, 3, 4, 5, 6\}$$

5

4

1 (5)

I. 5 X 4 X 1 = 20

6

6

1 (5)

II.  $6 \times 6 \times 1 = 36$ 

#### IB

How many different (valid) 5 digit number can be formed with the digit {0,1,2,3,4,5} so that the resultant number is exactly divisible by 3, when the repetition of digit is not allowed?

Case 1 :-  $S = \{1,2,3,4,5\}$  (Zero is removed)

Case 2 :-  $S = \{0,1,2,4,5\}$  (3 is removed)

Total = 120 + 96 = 216 (Ans.)

# UPSC

How many different (valid) number greater than 800 and less than 4000 can be formed with the digits {0,1,2,4,5,7,8,9} when the repetition of digit is not allowed

800 < X < 4000

 $S = \{0,1,2,4,5,7,8,9\}$ 

Three digit number:-

2 (8,9) 7 6 = 84

Four digit number:-

2 (1,2) 7 6 5 = 420

Total = 84 + 420 = 504

# GATE

How many 3 digit natural number can be formed so that digit '1' should never come to the immediate right of digit 2?

100 to 999 = 900 No. (Total)

**Unwanted Case:-**

1 (2)	1 (1)	10 (0 to9)	9 (1 to 9)	1 (2)	1 (1)
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$$10 + 9 = 19$$
  
=  $900 - 19 = 881$ 

# **GATE-2010**

Q:- Given digit 2, 2, 3, 3, 3, 4, 4, 4, 4 how many distinct 4 digit numbers greater than 3000 can be formed?

- (a) 50
- (b) 51
- (c) 52
- (d) 54

 $S = \{2, 2, 3, 3, 3, 4, 4, 4, 4\}$ 

	54	=	3	3	3	2 (3,4)
	1	-	3	3	3	3
	1	-	2	2	2	3
	1	-	2	2	2	4
Α	<b>F4</b> /					

**51** (Ans.)

# QUESTION

From first 5 natural number all 5 digit natural number are being formed without repetition?

2- How many such number are there in which units place exceeds the 100 place digit?

= 24

```
S = \{1,2,3,4,5\}
1-5!
2- CASE 1:- H >
              3
                           = 18
            Н
Case 2 :-
        2
             2
                  1
                           = 12
CASE 3:-
                  1
             4
```

<b>CASE 4:-</b>		Н	>	U	
	3	2	1	1	4

Total= 60 (Ans)

# QUESTION

All 6- digit natural number are being formed 1-6 natural number with out repetition how many such number are there divisible by four ?

 $S = \{1,2,3,4,5,6\}$ 

4 X 3 X 2 X 1 X 8 = 192

Т	U
1	2
1	6
2	4
3	2
3	6
5	2
5	6
6	4