

## NUMBER SYSTEMS



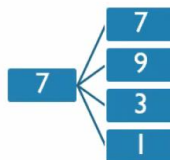
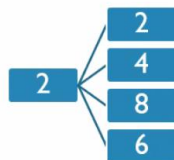
- KOUSTAV

### CONCEPT – CYCLICITY (UNIT'S PLACE)

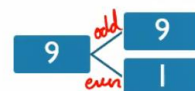
$$\begin{array}{r} 123 \times 456 \times 789 \\ \hline 3 \times 6 \times 9 \\ \hline 8 \times 9 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 987 \times 654 \times 321 \\ \hline 7 \times 4 \times 1 \\ \hline 8 \times 1 \\ \hline \underline{\underline{9}} \end{array}$$

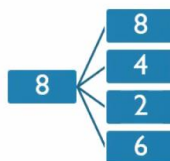
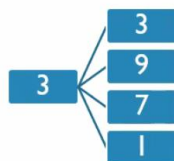
### CONCEPT – CYCLICITY (UNIT'S PLACE)



$$\begin{array}{l} 12345 \\ 4 \Rightarrow 4 \\ 4 \Rightarrow 6 \end{array}$$



$$\begin{array}{l} 789 \\ 789 \Rightarrow 9 \\ 789 \Rightarrow 1 \end{array}$$



$$0,1,5,6 \rightarrow 0,1,5,6$$

1. What is the last digit of the following expressions:

1.a)  $2^5$

$$\frac{5}{4} \text{ R } 1 \\ 2^1 = 2$$

1.b)  $2^{25}$

$$\frac{25}{4} \text{ R } 1 \\ \Rightarrow 2^1 = 2$$

$$2 \sqrt{2} \\ \quad \sqrt{4} \\ \quad \quad \sqrt{8} \\ \quad \quad \quad \sqrt{16}$$

1.c)  $2^{125}$

$$\frac{125}{4} \Rightarrow \frac{25}{4} \text{ R } 1 \\ 2^{25} \Rightarrow 2^1 = 2$$

1.d)  $432^{1234}$

$$\frac{1234}{4} \Rightarrow \frac{308}{4} \text{ R } 2 \\ \frac{34}{4} \text{ R } 2 \\ \Rightarrow 2^2 = 4$$

2. What is the last digit of the expression  $777^{777}$ ?

A. 3

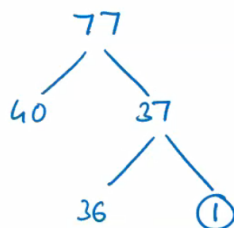
B. 1

☒ C. 7

D. 9

$$777^{777} \\ \Rightarrow 7^{777} \Rightarrow 7^{77} \\ \frac{77}{4} \text{ R } 1 \\ 7^1 = 7$$

$$7 \sqrt{7} \\ \quad \sqrt{9} \\ \quad \quad \sqrt{13} \\ \quad \quad \quad \sqrt{17}$$



3. The unit's digit of the product  $3^{1001} \times 7^{22002} \times 3^{333003}$  is:

A. 3

B. 1

C. 5

☒ D. 9

$$3^{01} \times 7^{02} \times 3^{03} \\ 3 \times 9 \times 7 \\ 7 \times 7 \\ 9$$

$$3 \sqrt{3} \quad 7 \sqrt{7} \\ \quad \sqrt{9} \quad \quad \sqrt{9} \\ \quad \quad \sqrt{13} \quad \quad \sqrt{13} \\ \quad \quad \quad \sqrt{17} \quad \quad \sqrt{17}$$

4. The unit's digit of the sum  $22^{222} + 33^{333} + 44^{444}$  is:

A. 3

B. 1

C. 5

D. 9

$$2^{222} + 3^{333} + 4^{444}$$

$$2^{22} + 3^{33} + 4^{\text{even}}$$

$$\frac{22}{4} \rightarrow 2 \quad \frac{33}{4} \rightarrow 1$$

$$2^2 + 3^1 + 6$$

$$4 + 3 + 6$$

$$\underline{\underline{3}}$$

$$2 \sqrt{4} \begin{matrix} 2 \\ 8 \\ 6 \end{matrix}$$

$$3 \sqrt{9} \begin{matrix} 3 \\ 7 \\ 1 \end{matrix}$$

$$4 \sqrt{4} \begin{matrix} 4 \\ 6 \end{matrix}$$

5.  $N = 1! + 2! + 3! + \dots + 2010!$ . What is the digit in the unit's place of N?

A. 3

B. 2

C. 1

D. 0

$$1! + 2! + 3! + 4! + 5! + \dots + 2010!$$

$$1 + 2 + 6 + 4 +$$

$$0$$

$$\underline{\underline{3}}$$

$n \geq 5$ ;  $n!$  ends with '0'

6. The unit's place of the product  $34^{123!} \times 3456^{123456!}$  is:

A. 4

B. 8

C. 1

D. 6

$$4^{123!} \times 6^{123456!}$$

$$4^{\text{even}} \times 6$$

$$6 \times 6$$

$$\underline{\underline{6}}$$

$$4 \sqrt{4} \begin{matrix} 4 \\ 6 \end{matrix}$$

$$6 - 6$$

$n \geq 5$ ;  $n!$  ends with '0'

$n \geq 2$ ;  $n!$  = even

7.

I 234567890 I 234567890

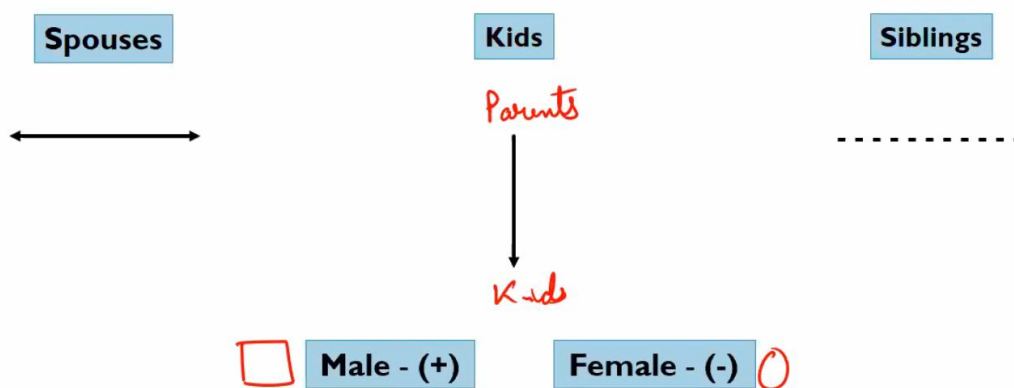
8/ 8  
4  
2  
6

123456789  
12345678

## BLOOD RELATIONS

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## CONCEPT



**Q1.** Pointing to a girl Sandy said, "She is the daughter of the only sister of my father." How is Sandy related to the girl?

A. Uncle

B. Cousin

C. Father

D. Grandfather



1<sup>st</sup> → I, me, my, mine  
 2<sup>nd</sup> → You, your, yours  
 3<sup>rd</sup> → He, she, his, her

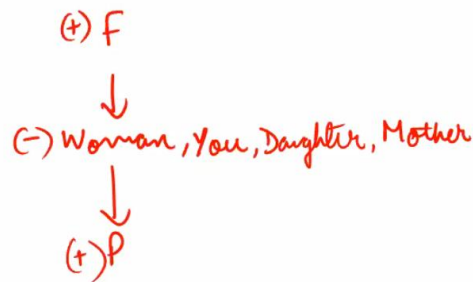
**Q2.** Pointing to a person, a man said to a woman, "his mother is the only daughter of your father." How was the woman related to the person?

A. Aunt

✓ B. Mother

C. Wife

D. Daughter



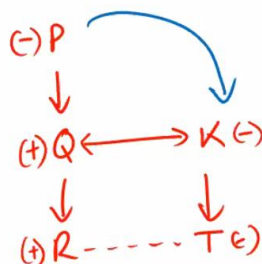
**Q3.** If  $M \times N$  means M is the daughter of N;  
 $M + N$  means M is the father of N;  
 $M \% N$  means M is the mother of N, and  
 $M - N$  means M is the brother of N; then,  
 $P \% Q + R - T \times K$  indicates which relation of P to K?

A. Daughter-in-law

✓ B. Mother-in-law

C. Aunt

D. None of these



**Q4. P is the brother of Q and R. S is R's mother. T is P's father. Which of the following statements cannot be definitely true?**

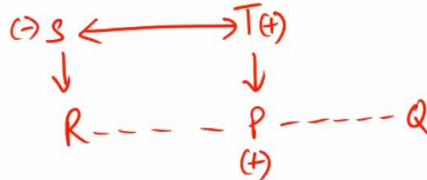
- I. Q is T's son ✗
- II. T is Q's father ✓
- III. S is P's mother ✓
- IV. P is S's son ✓
- V. T is S's husband ✓

A. I and II

B. II and IV

✓ C. I only

D. None of these



**Q5. In a family, there are six members A, B, C, D, E and F.**

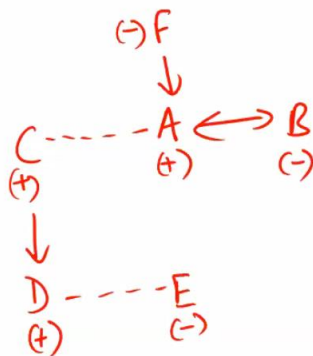
**A and B are a married couple, A being the male member. D is the only son of C, who is the brother of A. E is the sister of D. B is the daughter-in-law of F, whose husband has died. How is E related to F?**

A. Grandmother

B. Daughter

C. Granddaughter

D. Mother



**Q6. There is a family of six persons A, B, C, D, E and F. They are Lawyer, Doctor, Teacher, Salesman, Engineer and Accountant. There are two married couples in the family. D, the Salesman is married to the Lady Teacher. The Doctor is married to the Lawyer. F, the Accountant is the son of B and brother of E. C, the Lawyer is the daughter-in-law of A. E is the unmarried Engineer. A is the grandmother of F.**

**i. How is D related to C?**

A. Uncle

B. Father

✓ C. Father-in-law

D. Grandfather

**ii. How is E related to F?**

A. Brother

B. Sister

C. Cousin

✓ D. Can't be determined

**iii. How is C related to E?**

A. Father

B. Aunt

C. Cousin

✓ D. Mother

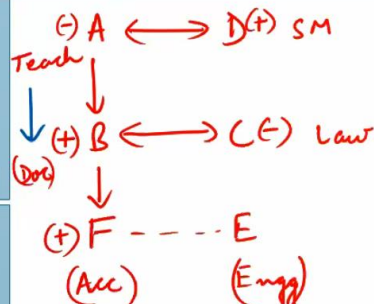
**iv. How is the doctor related to the teacher?**

A. Son-in-law

✓ B. Son

C. Mother

D. Nephew



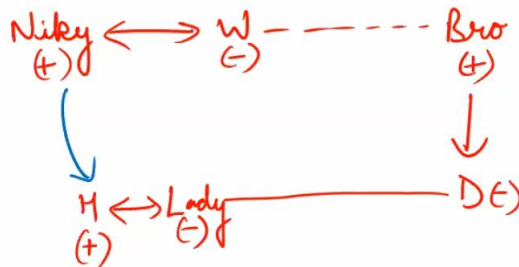
**Q7.** Niky said to a lady sitting in a car, "The only daughter of the brother of my wife is the sister-in-law of the brother of your sister." How is the husband of the lady related to Niky?

A. Maternal uncle

B. Uncle

C. Father

✓ D. Son-in-law



**Q13.** Read the information carefully and answer the question given below it.

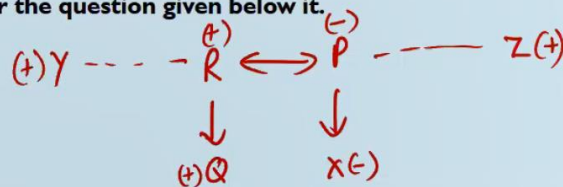
A family consists of 6 members P, Q, R, X, Y, Z.

Q is the son of R but R is not mother of Q.

P and R are a married couple.

Y is the brother of R; X is the daughter of P.

Z is the brother of P.



i. Who is the brother in law of R?

A. P

B. Q

C. Y

✓ D. Z

ii. How many female members are there in the family?

A. 1

✓ B. 2

C. 3

D. 4