NUMBER SYSTEMS

- KOUSTAV

CONCEPT – DIVISIBILITY RULES

1 - All natural numbers.
2 - If last digit is 0, 2, 4, 6, or 8.
3 - If the sum of the digits is divisible by 3.
4 - If the last two digits are divisible by 4.
5 - If the last digit is 0 or 5.
6 - If the number is divisible by 2 and 3.
7 - Remove the last digit, double it and subtract from the rest of the number. Repeat if you need. If the difference is divisible by 7, the original number is divisible by 7.
8 - If last 3 digits are divisible by 8.
9 - If the sum of the digits is divisible by 9.
10 - If the last digit is 0.
11 - If the difference between the sum of the odd numbered digits and the sum of the even numbered digits is 0 or a multiple of 11.
12 - If the number is divisible by 3 and 4.

1. Which one of the numbers is exactly divisible by 11?

A. 235641 B. 245642

C. 315624 D. 415624

2. Which one of the following numbers is divisible by 8 and 11 simultaneously?

A. 12496 B. 414206

C. 999000 D. 38400

3. Which of the following numbers is divisible by each one of 3, 7, 9 and 11?

A. 639 B. 2079

C. 37911 D. 7911

4. What is the value of M and N respectively if M39048458N is divisible by 8 and 11? M and N being single digit integers.

A. 7, 8 B. 8, 6 C. 6, 4 D. 5, 4

5. What is the number of digits in the smallest number consisting of only 1's and 0's and divisible by 45?

A. 9 B. 10 C. 12 D. 45

6. $10^{25} - 7$ is divisible by _____.

A. 3 B. 9 C. 2 D. A & B

7. How many factors does 48 have, excluding 1 and 48?

A. 12 B. 4 C. 8 D. 10

CONCEPT – REMAINDERS

1. On dividing a number by 5, we get 3 as remainder. What will be the remainder when the square of this number is divided by 5?

A. 0 B. 1 C. 2 D. 4

2. On dividing a number by 774, we get 35 as remainder. What will be the remainder when the same number is divided by 18?

A. 14 B. 17 C. 18 D. 19

3. What is the remainder when 2^{25} is divided by 3?

A. 2 B. 1 C. 0 D. 3

4. What is the remainder when ($1^1 + 2^2 + 3^3 + \ldots + 100^{100}$) is divided by 4?

A. 3 B. 1 C. 2 D. 0

5. Find the remainder when 53^{12} is divided by 17.

A. 8 B. 0 C. 1 D. 16

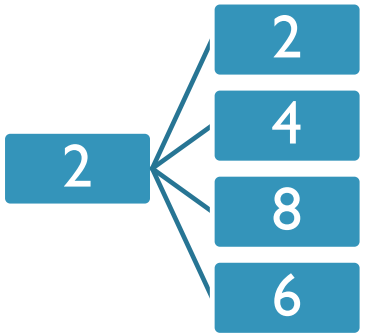
6. The remainder when ($7^{21}+7^{22}+7^{23}+7^{24}$) is divided by 25:

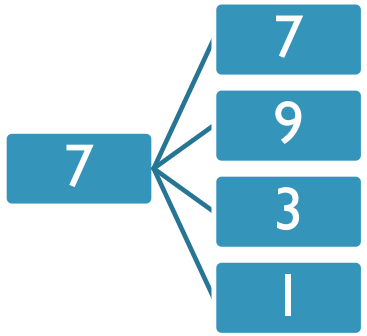
A. 1 B. 24 C. 0 D. 12

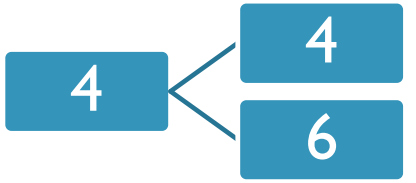
7. $P = (1!)^2 + (2!)^2 + (3!)^2 + \ldots + (100!)^2$.
The remainder when 5^{2P} is divided by 13 is:

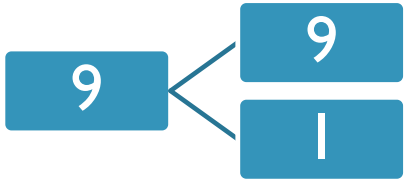
A. 1 B. 12 C. 0 D. 2

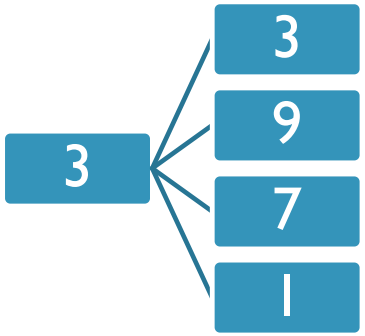
CONCEPT – CYCLICITY (UNIT'S PLACE)

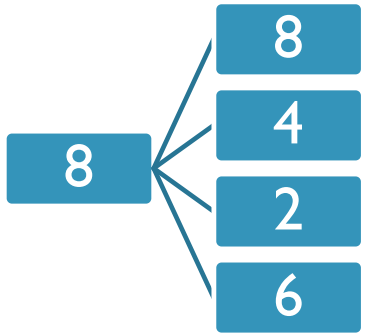


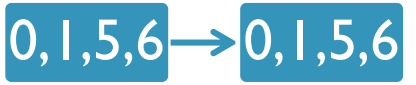












1. What is the last digit of the following expressions:

1.i) 2^5

1.ii) 2^{25}

1.iii) 2^{125}

1.iv) 432^{1234}

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

A. 3 B. 1 C. 7 D. 9

3. The unit's digit of the product $3^{1001} \times 7^{22002} \times 13^{333003}$ is:

A. 3 B. 1 C. 5 D. 9

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

A. 3 B. 1 C. 5 D. 9

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

A. 3 B. 2 C. 1 D. 0

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

A. 4 B. 8 C. 1 D. 6

7. $1234567890^{1234567890}$

ANSWER KEY – NUMBER SYSTEMS

DIVISIBILITY		REMAINDERS		CYCLICITY	
QUESTION	ANSWER	QUESTION	ANSWER	QUESTION	ANSWER
1	D	1	D	1	2, 2, 2, 4
2	A	2	B	2	C
3	B	3	A	3	D
4	C	4	D	4	A
5	B	5	D	5	A
6	A	6	C	6	D
7	C	7	B	7	-