07/11. Placement Training (Vijay kumar)

Aptitude.

Quantitative aptitude
- Percentage
- Profit, loss, discount
- Time, Speed & distance
- Time & work
- Permutations & Combinations
- Probability
- Mixtures & Alligations
- Numbers System.

Reasoning.
- Blood Relations
- Coding & de-coding
- Clocks
- Callendars
- Syllogism
- Seating arrangement

Number System:

1) HCF & LCM:

(1) The LCM & HCF of two numbers are 54 and 3 respectively. If one of the numbers is 27 find the other.

Let the unknown number be x.

= HCF x LCM = multiples of numbers.

$$54 \times 3 = 27 \times x$$

$$x = \frac{54 \times 3}{27}$$

$$x = 6$$

The Product of two numbers is equal to its product of its HCF and LCM. i.e $a \times b = LCM(a,b) \times HCF(a,b)$.

② Three bells ring once in every 12 minutes, 20 minutes and 36 minutes respectively. If all the bells started together at 9:00AM, when will they all ring together on the same day.

= $x = 12$ $y = 20$ $z = 36$

2	12, 20, 36
2	6, 10, 18
3	3, 5, 9
	1, 5, 3

LCM = 12, 20, 36 = 180 = $2 \times 2 \times 3 \times 5 \times 3$

The next time it will ring is after 180 minutes.

i.e 3 hours. ∴ At 12:00PM

Method used above is the prime factorization method below.

③ 210 oranges, 252 apples and 294 oranges are equally packed in boxes so that no fruit is left. What is the minimum possible number of boxes required

= $x = 210$ $y = 252$ $z = 294$

Using prime factorization method to find the HCF

2	210, 252, 294
3	105, 126, 147
7	35, 42, 49
	5, 6, 7

HCF = $2 \times 3 \times 7$

$= 6 \times 7 = 42$

∴ The minimum possible number of boxes required is 42.

④ Ram goes to a swimming pool on every 9th day, Rahim goes on every 12th day. Joseph goes on every 24th day. If all the 3 met at the pool on sunday. On which day will they all meet next.

= $x = 9$ $y = 12$ $z = 24$

3 | 9, 12, 24
2 | 3, 4, 8
2 | 3, 2, 4
2 | 3, 1, 2
| 3, 1, 1

LCM = 3×2×2×2×3
= 9×8 = 72

∴ All three meet after 72 days. Since 7 days in a week after 70 days it will be sunday.

∴ 72nd day will be tuesday.

(II) Power Cycle (cyclicity)

The number of powers after which the units digits repeat is considered or called its power cycle.

$3^1 = 3$, $3^2 = 9$, $3^3 = 27$, $3^4 = 81$, $3^5 = 243$, $3^6 = 729$, $3^7 = 2187$...

∴ The power cycle of 1 is 1, 2 is 4, 3 is 4, 4 is 2, 5 is 1, 6 is 1, 7 is 4, 8 is 4, 9 is 2, 10 is 1.

No	Power cycle	No. in the unit digit
1	1	1
2	4	2, 4, 8, 6
3	4	3, 9, 7, 1
4	2	4, 6
5	1	5
6	1	6
7	4	7, 9, 3, 1
8	4	8, 4, 2, 6
9	2	9, 1
10	1	0

Concept of Unit digit

① What is the unit digit of the expression 2023^{209}.

= Since the power cycle of 3 is 4 we can say that the

unit digit is $\frac{2019}{4(PC)} = 3$ = The third number in the power cycle i.e 7. or $3^3 = 27$. The unit digit here is 7.

∴ The unit digit of 2023^{2019} is 7

⑥ The unit digit of $2022^{1947} \times 2015^{123467}$

= The unit digit of 2022^{1947} is 2^{1947}. PC of 2 is 4.

∴ $\frac{1947}{4} = 3$ ∴ $2^3 = 8$.

The unit digit of 2015^{123467} is 5^{123467} - PC of 5 is 1

∴ The unit digit is 5

∴ The unit digit of $2022^{1947} \times 2015^{123467}$ is $8 \times 5 = 40$.

i.e 0.

If the powers is odd for 4 it is 4 and even is 6 (unit digit)

9. 9 1

⑦ The unit digit of $2019^{13489} \times 2024^{7856}$.

= The unit digit for 2019^{13489} is. 9^{13489}

which is odd ∴ unit digit = 9

The unit digit for 2024^{7856} is 4^{7856}

which is even ∴ unit digit = 6.

∴ unit digit of $2019^{13489} \times 2024^{7856}$ is $9 \times 6 = 54$.

∴ unit digit is 4

(8). When you divide the numbers, what if the remainder is 0.

$2016^{2024} \times 2023^{2024}$

- The unit digit of 2016^{2024} is $6^{2024} = 6$

The unit digit of 2023^{2024} is $3^{2024} = \frac{2024}{4} = 0$

$\therefore 3^0 = 1$ $\therefore$ The unit digit is 1.

$\therefore$ The unit digit is $6 \times 1 = 6$.

(9) $2018^{2016} \times 2013^{2024}$

= The unit digit of 2018^{2016} is 8^{2016}.

$\Rightarrow \frac{2016}{4} = 0$. $\therefore 8^0 \Rightarrow 8^4 = 6$

The unit digit of 2013^{2024} is 3^{2024}

$\Rightarrow \frac{2024}{4} = 0$ $\therefore 3^4 = 1$.

$\therefore$ The unit digit is $6 \times 1 = 6$

$\therefore$ The unit digit of $2018^{2016} \times 2013^{2024} = 6$