DIVISIBILITY

FACTS TO REMEMBER:

1. **Divisibility by 2** : Any no. Whose last digit is 0 or divisible by 2
2. **Divisibility by 3** : If sum of the digits is divisible by 3 then the number is also divisible by 3
3. **Divisibility by 4 :** If last two digits are divisible by 4 .Also the numbers having 2 or more zeroes at the end
4. **Divisibility by 5 :** All the numbers ending with 5 or 0
5. **Divisibility by 6 :** The numbers divisible by both 2 & 3
6. **Divisibility by 8 :** If the last three digits are divisible by 8. Also if the last three digits are zeros then the number is divisible by 8
7. **Divisibility by 9 :** If the sum is divisible by 9
8. **Divisibility by 10 :** All the numbers ending with 0
9. **Divisibility by 11 :** If the sums of digits at odd and even places are equal or their difference is divisible by 11 then the number is divisible by 11.
10. **Divisibility by 12 :** The numbers divisible by both 4 & 3
11. **Divisibility by 14 :** The numbers divisible by both 2 & 7
12. **Divisibility by 15 :** The numbers divisible by both 5 & 3
13. **Divisibility by 16 :** If the last four digits are divisible by 16 or zero
14. **Divisibility by 18 :** Any number which is divisible by 9 and has its unit digit even (or zero) is divisible by 18.
15. **Divisibility by 7 /13 / 17 / 19 : Method of Negative osculator / "One more" osculator**

(a) Divisibility by 7 - Negative Osculator (For 7 negative osculator is 2)

We look for that multiple of 7 which is either less or more by 1 than a multiple of 10.

e.g. $7\times 3=21$ And 21 is one greater than 20 $(2\times 10=20)$ hence 2 is the negative osculator for 7

[i.e. there is a multiple on 7, from which when we subtract 1 **(-)** we get **2** times 10]

Similarly $7\times 7=49$ And 49 is one less than 50 $(5\times 10=50)$ hence 5 is the "one more" osculator for 7

[i.e. there is a multiple on 7, to which when we add 1 **(+)** we get **5** times 10]

(b) Divisibility by 13 – One more osculator (For 13 one more osculator is 4) + 4

(c) Divisibility by 17 - Negative Osculator (For 17 negative osculator is 5)

(d) Divisibility by 19 - One more osculator (For 19 one more osculator is 2)

**** "One more" osculator – The number needs to be added 1 to be a multiple of 10**

Negative osculator – The number should be reduced by 1 to be a multiple of 10

16. Let $n=p_1^{(n_1)}.p_2^{(n_2)}.p_3^{(n_3)}.....p_k^{(n_k)}$ **where** $p_1,p_2,p_3,.....p_k$ **are distinct primes**

and $n_1,n_2,n_3.....n_k$ **are positive integers**

Then the total number of divisors of 'n' (including 1 & 'n') are

$$(n_1+1)(n_2+1)(n_3+1).....(n_k+1)$$

and the total number of divisors of 'n' (excluding 1 & 'n') are

$$[(n_1+1)(n_2+1)(n_3+1).....(n_k+1)]-2$$