RBI PHASE 1 RECAP

3rd JULY '18

QUANT – NUMBER SYSTEM

NUMBER SYSTEM

DIVISIBILITY

When a number 'X' is divided by another number 'Y' and the remainder is zero, then the number 'X' is said to be divisible by 'Y'. to check divisibility of numbers, we have certain divisibility tests as mentioned below:

DIVISIBILITY TEST OF '2':

A number is divisible by '2', when its unit digit is divisible by 2 or 0.
For ex. 179 is not divisible by 2 as the unit digit is odd.

DIVISIBILITY TEST OF '3':

A number is divisible by '3', when the sum of its digits is divisible by 3.
For ex. 123 (sum of digits is 6) is divisible by 3.

DIVISIBILITY TEST OF '4':

A number is divisible by '4', when the number formed by the last two digits is divisible by 4, or if the last two right hand digits are 0's.
For ex. 1902 is not divisible by 4 (as the last two right hand digits i.e. 02, are not divisible by 4

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<u>DIVISIBILITY TEST OF '5':</u>

A number is divisible by 5, when its unit's digit is divisible by 5 or 0.

<u>DIVISIBILITY TEST OF '6':</u>

A number is divisible by 6, when it is divisible by 2 as well as by 3.
For ex. 123 is divisible by 3 but not 2, therefore it is not divisible by 6.

<u>DIVISIBLE TEST OF '8':</u>

A number is divisible by 8 when the number formed by the last three right hand digits is divisible by 8, or when the last three digits are o's.
For ex. 1728 is divisible by 8 as 728 is divisible by 8.

<u>DIVISIBILITY TEST OF '9':</u>

A number is divisible by 9, when the sum of its digits is divisible by 9.
For ex. 729729 (sum of digits 36) is divisible by 9.

DIVISIBILITY TEST OF '10':

A number is divisible by 10, when its unit's digit is 0.

DIVISIBILITY TEST OF '11':

A number is divisible by 11, when the difference between the sum of the digits in the odd places and the sum of the digits in the even places is 0 or a multiple of 11.

For ex. 74537 is not divisible by 11 because

Sum of digits in odd places = 7+5+7=19

Sum of digits in even places = 4+3=7

Difference = 19 – 7 = 12, which is not a multiple of 11.

DIVISIBILITY TEST OF '12':

A number is divisible by 12, when it is divisible by 3 and 4 both.

DIVISIBILITY TEST OF '13':

Any number is divisible by 13, if the number of tens added to four times the units digits is divisible by 13.

For ex. 6058 is divisible by 13 because,

Number of tens = 605

4 times unit digits = 32

605 + 32 = 637 which is divisible by 13.

DIVISIBILITY TEST OF '15':

A number is divisible by 15, when it is divided by 3 and 5 both.

DIVISIBILITY TEST OF '25':

A number is divisible by 25, when the number formed by the last two right hand digits is divisible by 25 or if the last two right hand digits are zero.

HCF AND LCM OF INTEGERS

HCF (highest common factor) OR GCD (greatest common divisor):

HCF is the largest integer that perfectly divides two or more given numbers.
Let us take two numbers 15 and 20.
Factors of 15 = 15, 5, 3, 1
Factors of 20 = 20, 10, 5, 4, 2, 1
To find the HCF of 15 and 20, identify the highest factor common to both the numbers. In this case, it is 5.

LCM (least common multiple):

LCM of two or more given numbers is the least number which is exactly divisible by each of the given numbers.
Let us take two number 15 and 20.
Multiples of 15 = 15, 30, 45, 60, 75, 90, etc.
Multiples of 20 = 20, 40, 60, 80, etc.
To find the LCM OF 15 and 20, identify the lowest number common to the sets of multiples of both the numbers. In this case, it is 60.

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RELATION BETWEEN HCF AND LCM:

Product of two numbers = LCM of these numbers X HCF of these numbers

LCM should always a multiple of HCF and HCF is always a factor of LCM.

LCM AND HCF OF FRACTIONS:

LCM of fractions = LCM of numerators / HCF of denominators

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PERFECT SQUARE:

A number is said to be a perfect square if and only if the square root of that number is an integer.

*the square of an even number is always even.

*the square of an odd number is always odd.

*square of an integer cannot end in 2, 3, 7 or 8.

*the square of a real number (negative or positive) is always positive.

Q.1) Which largest number of five digits is divisible by 99?
[a] 99999
[b] 99981
[c] 99909
[d] 99990

Solution (d)
In order to be divisible by 99, number should be divisible by both 11 and 9.
Only option [d] can follow this rule.

Q.2) The number which is formed by writing any digit 6 times (e.g. 111111, 444444, etc.) is always divisible by

[a] 7

[b] 1001

[c] 13

[d] all of these

Solution (b)

aaaaaa = a x 111 x 1001

so, any number which is formed by writing a digit 6 times is divisible by 1001.

Hence, [d] is the correct choice.

Q.3) The ratio between a two-digit number and the sum of the digits of the number is 4:1. If the digit in the unit place is 3 more than the digit in the ten's place, what is the number?

[a] 24

[b] 63

[c] 48

[d] 36

Solution (d)

Let ten's digit be X. Then, unit's digit = (X+3)

Sum of the digits = X+(X+3) = 2X+3

Number = 10X + (X+3) = 11X + 3

11X + 3 /2X +3

= 4/1

11X +3 = 4(2X +3)

X=3

Required number = (11X+3) = 36

Q.4) How many numbers between 200 and 600 are divisible by each of 4, 5, and 6?

[a] 5

[b] 6

[c] 7

[d] 8

Solution (b)

Every such number must be divisible by LCM of 4, 5 and 6, i.e., 60

Such numbers are 240, 300, 360, 420, 480, 540. There are 6 such numbers.

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Q.5) What is the least number which leaves the remainder 25 on division by 35 and leaves the remainder 35 on division by 45 and leaves the remainder 45 on division by 55?

[a] 3455
[b] 3485
[c] 3465
[d] 3475

Solution (a)
Difference between divisor and remainder
=35 – 25 = 45 – 35 = 55 – 45 = 10
LCM of 35,45, 55 = 5 x 7 x 9 x 11 = 3465
Required number = 3465 – 10 = 3455

Alternative method:
3455 is the only option from which when we subtract 35, we get 3420 which is divisible by 45.

Q.6) Find the minimum number of coins required to pay three persons 67 paise, RS. 1.03 and 83 paise, using coins in the denominations of 2 paise, 5 paise, 10 paise, 25 paise and 50 paise.

[a] 17

[b] 21

[c] 19

[d] 18

Solution (d)

Combination of coins to pay:

To pay 67 paise = 50 paise x 1, 10 paise x 1, 5 paise x 1, 2 pasie x 1

To pay RS. 1.03 = 50 paise x 1, 25 paise x 1, 10 paise x 2, 2 paise x 4

To pay 83 paise = 50 paise x 1, 25 paise x 1, 2 paise x 4

Hence, a total of 4 + 8 + + 6 = 18 coins are required.

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Q.7) Four blocks of chocolate of weight 2 $^{1}/_{3}$ kg, 4 $^{1}/_{5}$ kg, 5 $^{5}/_{6}$ kg, 6 $^{1}/_{8}$ kg respectively were bought for a birthday party. The four blocks must be divided into equal parts such that each part is as heavy as possible. What is the number of pieces obtained?

[a] 307

[b] 309

[c] 313

[d] 317

Solution (d)

The weight of each equal part is equal to the HCF of 7/3, 21/5, 35/6, 49/8

So HCF = HCF of (7, 21, 35, 49) / LCM of (3, 5, 6, 8)

= 7/120 kg

Total number of pieces = (7/3 + 21/5 + 35/6 + 49/8) / 7/120

= 280 + 504+ 700+ 735 / 7

= 2219/7

= 317

Q.8) Progressive school distributes chocolates to its children every on the Independence Day. This year the number of chocolates it purchased was a perfect square and it could distribute these chocolates among its 1183 students equally. Which of the following could be the number of chocolates purchased?

[a] 8281
[b] 9409
[c] 9801
[d] 8481

Solution (a)
To solve this question we have to find out the factors of 1183
Factors are 7 and 13.
If above number is multiplied by 7 then it becomes perfect square
i.e., 1183 x 7 = 8281 is a perfect square
total number of chocolates purchased can be 8281.

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Q.9) Raju has a certain number (less than 1000) of chocolates with him. If he distributes them equally among a group of 12 or 15 or 18 children, he would be left with 1 chocolate in each case. If he distributes the chocolates equally among 19 children, he would be left with no chocolates. How many chocolates does Raju have?

[a] 52

[b] 181

[c] 551

[d] 361

Solution (d)

Let the number of chocolates with Raju be N.

N= LCM (12, 15, 18) k_1 + 1 = 180 k_1 + 1 = 19 k_2 i.e., a multiple of 19 where k_2 is a constant.

The number of the form $180k_1 + 1$ less than 1000 are 1, 181, 360, 541, 721 and 901.

Of these only 361 is divisible by 19.

Q.10) N is a perfect square having at least 3 digits. Its last two digits are equal and not equal to 0. The last digit of N must be?

[a] 1
[b] 6
[c] 5
[d] 4

Solution (d)

N is a perfect square. So, the last digit must be 0, 1, 4, 5, 6 or 9. Since, the last two digits in N are equal, they must be

(A) 00 (B) 11 (C) 44 (D) 55 (E) 66 (F) 99

Now, if a perfect square ends in an odd digit the preceding digit must be even.

So, (B) (D) and (F) can be ruled out. Again if a perfect square ends in 6 , the preceding digit must be an odd number like 16, 36, 256, 196. So, (E) is also ruled out.

(A) is ruled out as N does not end in o. this leaves us with only (C) as the possible last two digits of N. so, choice [d] is the answer.