2 LCM AND HCF

Importance : Questions based on L.C.M and H.C.F concepts (in addition involved in other questions) are independently asked in certain competitive exams. A little practice with full 'concentration' will enable you to learn how to solve these questions.

Scope of questions : Most asked questions are related to finding out L.C.M. or H.C.F. for numbers special questions are based on remainder on dividing. difference ratio of L.C.M./H.C.F. to make complete square/cube of different number etc.

Way to success : TRICKS in addition to formulae help in most of L.C.M. & H.C.F. questions.

IMPORTANT DEFINITIONS :

Highest Common Factor (H.C.F) : It is also called Greatest common Diviser (G.C.D). When a greatest number divides perfectly the two or more given numbers then that number is called the H.C.F. of two or more given numbers. e.g.

The H.C.F of 10, 20, 30 is 10 as they are perfectly divided by 10,5 and 2 and 10 is highest or greatest of them.

Least common Multiple (L.C.M.) : The least number which is divisible by two or more given numbers, that least number is called L.C.M. of the numbers.

L.C.M. of 3,5,6 is 30, because all 3 numbers divide 30, 60, 90, ... and so on perfectly and 30 is minimum of them.

Factor and Multiple : If a number m, divides perfectly second number n, then m is called the factor of n and n is called the multiple of m.

Rule 1 : 1st number × 2nd number = L.C. M. × H.C.F.

- **There are two methods for calculating the H.C.F and L.C.M.**

  (i) Factor Method

  (ii) Division Method

- **If the ratio of two numbers is a:b, (lowest form i.e. indivisible to each other) then**

Numbers are ak and bk, where k is a constant and hence,

H.C.F. is K and L.C.M. is abk.

Rule 2 : L.C.M of fractions

$$= \frac{\text{L.C.M. of numerators}}{\text{H.C.F. of denominators}}$$

Rule 3 : H.C.F. of fractions

$$= \frac{\text{H.C.F of numerators}}{\text{L.C.M. of denominators}}$$

IMPORTANT POINTS

- If there is no common factor between two numbers, then L.C.M. will be the product of both numbers.
- If there are 'n' numbers in a set and H.C.F. of any two numbers is H and L.C.M. of all 'n' numbers is L, then product of all 'n' numbers is $\left[(H)^{n-1} \times L\right]$

Rule 4 : When a number is divided by a, b or c leaving same remainder 'r' in each case then that number must be k + r where k is LCM of a, b and c.

Rule 5 : When a number is divided by a, b or c leaving remainders p, q or r respectively such that the difference between divisor and remainder in each case is same i.e., (a – P) = (b – q) = (c – r) = t (say) then that (least) number must be in the form of (k – t), where k is LCM of a, b and c

Rule 6 : The largest number which when divide the numbers a, b and c the remainders are same then that largest number is given by H.C.F. of (a – b), (b – c) and (c – a).

Rule 7 : The largest number which when divide the numbers a, b and c give remainders as p, q, r respectively is given by H.C.F. of (a – p), (b – q) and (c – r).

Rule 8 : Greatest n digit number which when divided by three numbers p,q,r leaves no remainder will be

Required Number = (n – digit greatest number) – R

R is the remainder obtained on dividing greatest n digit number by L.C.M of p.q,r.

Rule 9 : The n digit largest number which when divided by p, q, r leaves remainder 'a' will be

Required number = [n – digit largest number – R] + a

where, R is the remainder obtained when

n – digit largest number is divided by the L.C.M of p, q, r.

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