CHAPTER-8

H.C.F AND L.C.M

STUDY NOTES

Least Common Multiple (abbreviated L.C.M.) of two natural numbers is the smallest natural number which is a multiple of both the numbers.

Highest Common Factor (abbreviated H.C.F.) of two natural numbers is the largest common factor (or divisor) of the given natural numbers. In other words, H.C.F. is the greatest element of the set of common factors of the given numbers.

H.C.F. is also called Greatest Common Divisor (abbreviated G.C.D.)

HCF

HCF or Highest Common Factor of two or more given numbers is the greatest number (factor) which divides each given number completely.

<u>Common Factor Method:</u>

Step 1: Find all possible factors of each given number.

Step 2: From the factors, obtained in Step 1, find the common factors.

Step 3: Out of the common factors, obtained in Step 2, take the highest factor which is the HCF of the given numbers.
Example:
Factors of 36 = 1, 2, 3, 4, 6, 9, 12, 18 and 36
Factors of 48 = 1, 2, 3, 4, 6, 8, 12, 16, 24 and 48
Factors common to both 36 and 48 = 1, 2, 3, 4, 6 and 12
HCF of 36 and 48 = 12

Prime Factor Method:

Step 1: Split each given number into its prime factors.
Step 2: Take out the common prime factors.
Step 3: Multiply the common prime factors obtained in Step 2. The product so obtained is the HCF of the given numbers.
Example:
Prime factors of 15 are 5 and 3.
Prime factors of 25 are 5 and 5.
Since common factor is only 5, HCF of 15 and 25 is 5.

LCM

LCM or Least Common Multiple of two or more given numbers is the lowest number which is multiple of each given number. In fact, it is the smallest number which is exactly divisible by each of the given numbers.

Prime Factor Method:

Step 1: Split each of the given numbers into their prime factors and then express them in index form.
Step 2: Find the product of all the factors (with their highest

powers) obtained in Step 1. The product so obtained is the LCM of the given numbers.

Example:

$18 = 2 \times 3 \times 3 = 2 \times 32$

$24 = 2 \times 2 \times 2 \times 3 = 23 \times 3$

$36 = 2 \times 2 \times 3 \times 3 = 22 \times 32$

LCM of 18, 24 and $36 = 23 \times 32 = 72$

Common Division Method:

Step 1: Write all the given numbers in a row, separating them by commas.

Step 2: Divide by a suitable number, which exactly divides at least two of the given numbers.

Step 3: Write down the quotients and the undivided numbers obtained in Step 2, in a row below the first row.

Step 4: Repeat the process until we get a row of numbers which are prime to one another.

Step 5: The product of all the divisors and the numbers obtained in the last row will be the required LCM.