

Case Study 1:

Rohan is preparing a math model for his school exhibition based on the concept of prime factorization. While demonstrating the Fundamental Theorem of Arithmetic, he selects numbers such as 36, 48, and 60 and expresses them as products of prime numbers. He then tries to explore the HCF and LCM of these numbers using their prime factorizations. Rohan realizes that understanding this theorem helps in solving many real-life problems related to divisibility and factorization.

MCQ Questions:

1. What is the prime factorization of 60?

(a) $2 \times 2 \times 3 \times 5$

(b) $2 \times 5 \times 6$

(c) $3 \times 4 \times 5$

(d) $2 \times 3 \times 10$

Answer: (a)

Solution: $60 = 2^2 \times 3 \times 5$

2. Find the HCF of 36 and 60 using prime factorization.

(a) 6

(b) 12

(c) 18

(d) 24

Answer: (b)

Solution: $36 = 2^2 \times 3^2$, $60 = 2^2 \times 3 \times 5$, $HCF = 2^2 \times 3 = 12$

3. Find the LCM of 36 and 60 using prime factorization.

(a) 180

(b) 360

(c) 120

(d) 240

Answer: (b)

Solution: $LCM = 2^2 \times 3^2 \times 5 = 360$

4. Which of the following numbers is a composite number?

(a) 13

(b) 19

(c) 21

(d) 17

Answer: (c)

Solution: 21 has more than two factors: 1, 3, 7, 21

5. If $\text{HCF}(48, x) = 12$ and x is a multiple of 12, what can be a possible value of x?

(a) 96

(b) 12

(c) 40

(d) 72

Answer: (b)

Solution: $48 = 2^4 \times 3$, $12 = 2^2 \times 3$, $\text{HCF} = 2^2 \times 3 = 12$