# Key Notes

## Chapter 01

## Real Numbers

- For given positive integers 'a' and 'b' there exist unique whole numbers 'q' and 'r' satisfying the relation $a = bq + r,\ 0 \le r < b.$.
- **Euclid's division algorithms:** HCF of any two positive integers *a* and *b*. With *a* > *b* is obtained as follows:
  **Step 1:** Apply Euclid's division lemma to *a* and *b* to find *q* and *r* such that
  $a = bq + r\ ,\ 0 \le r < b.$
  a= Dividend
  b=Divisor
  q=quotient
  r=remainder
  **Step II:** If $r = 0,\ HCF\ (a,\ b) = b\ if\ r \ne 0,$ apply Euclid's lemma to b and r.
  **Step III:** Continue the process till the remainder is zero. The divisor at this stage will be the required HCF
- **The Fundamental Theorem of Arithmetic:** Every composite number can be expressed (factorized) as a product of primes and this factorization is unique, apart from the order in which the prime factors occur. $\text{Ex}: \ 24 = 2\times2\times2\times3 = 3\times2\times2\times2$
- Let $x = \frac{p}{q}, q' \ne 0$ to be a rational number, such that the prime factorization of 'q' is of the form 2m 5n, where m, n are non-negative integers. Then x has a decimal expansion which is terminating.
- Let $x = \frac{p}{q},\ q \ne 0$ be a rational number, such that the prime factorization of q is not of the form 2m5n, where m, n are non-negative integers. Then x has a decimal expansion which is non-terminating repeating.
- $\sqrt{p}$ is irrational, which p is a prime. A number is called irrational if it cannot be written in the form $\frac{P}{q}$ where *p* and *q* are integers and $q \ne 0$.