Chapter 01

Real Numbers

- For given positive integers 'a' and 'b' there exist unique whole numbers 'q' and 'r' satisfying the relation $=bq+r,\ 0\le r<b.$.
- **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
  $=bq+r\ ,\ 0\le r<b.$
  a= Dividend
  b=Divisor
  q=quotient
  r=remainder
  Step II: If $r = 0,\ HCF\ (a,\ b) = b\ if\ r \neq 0,$ 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 $x=\frac{p}{q}, q'\neq 0$ 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 $x=\frac{p}{q},\ q\neq 0$ 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 $\frac{\ }{q}$ where *p* and *q* are integers and $\neq 0.$