CHAPTER – 1
Set Theory

1.1 Introduction

A set is well defined class or collection of objects.

A set is often described in the following two ways.

(1) **Roster method or Listing method:** In this method a set is described by listing elements, separated by commas, within braces {}. The set of vowels of English alphabet may be described as {*a*, *e*, *i*, *o*, *u*}.

(2) **Set-builder method or Rule method:** In this method, a set is described by a characterizing property $P(x)$ of its elements x. In such a case the set is described by $\{x : P(x) \text{ holds}\}$ or $\{x \mid P(x) \text{ holds}\}$, which is read as 'the set of all x such that $P(x)$ holds'. The symbol '|' or ':' is read as 'such that'.

The set $A = \{0, 1, 4, 9, 16, ...\}$ can be written as $A = \{x^2 \mid x \in Z\}$.

❑ Symbols

Symbol	**Meaning**
$\Rightarrow$	Implies
$\in$	Belongs to
$A \subset B$	A is a subset of B
$\Leftrightarrow$	Implies and is implied by
$\notin$	Does not belong to
s.t.(: or |)	Such that
$\forall$	For every
$\exists$	There exists
iff	If and only if
&	And
$a \mid b$	a is a divisor of b
N	Set of natural numbers
I *or* Z	Set of integers
R	Set of real numbers
C	Set of complex numbers
Q	Set of rational numbers