Sets & Number Systems - Definitions

**Sets**

A Set is a group of things, these things are called elements.

ξ is the universal set — the set of all elements. Eg. ξ = {1, 2, 3, 4, 5, 6}.

Ø is the *empty* or *null set*. This set contains no elements. Ø = {}.

An upper case letter, such as *A*, represents a set. Eg. *A* = {1, 3, 5} and *B* = {1, 2, 3, 4}.

∈ means ‘is an element of’. Eg. 3 ∈ *A*.

∉ means ‘is not an element of’. For example, 2 ∉ *A*.

⊂ means ‘is a subset of’. Eg. {1, 3} ⊂ *A*.

⊄ means ‘is not a subset of’. Eg. {6} ⊄ *A*.

⊆ means ‘is a subset or equal to’

*A*′ is the complement of *A*. This set contains all the elements not in *A* .

Eg. given ξ = {1, 2, 3, 4, 5, 6}, if *A* = {1, 3, 5}, then *A*′= {2, 4, 6}.

*A* ∪ *B* is the union of *A* and *B*. This set contains all the elements in sets *A* and *B*.

Eg. *A* ∪ *B* = {1, 2, 3, 4, 5}.

*A* ∩ *B* is the intersection of *A* and *B*. This set contains all the elements in both *A* and *B*.

Eg. *A* ∩ *B* = {1, 3}.

*C* \ *D* is read as ‘*C* slash *D*’. This set contains all the elements in *C* that are not in *D*.

Eg. If *C* = {1, 2, 5, 6} and *D* = {2, 5}, then *C* \ *D* = {1, 6}.

A *Venn diagram* may be used to illustrate sets.



ξ

**Sets of Numbers**

*R* is the set of real numbers.

*Q* is the set of rational numbers. These numbers can be written as a fraction.

*Q -* is the negative rational numbers. ie. {..., -3, -2, -1.5, -1}

*Q +* is the positive rational numbers. ie. {1, 2, 2.8, 3, .....}

*Z* is the set of integers. ie. {..., -3, -2, -1, 0, 1, 2, 3, .....}

*Z -* is the negative integers. ie. {..., -3, -2, -1}

*Z +* is the positive integers. ie. {1, 2, 3, .....}

*N* is the set of natural numbers. ie. {1, 2, 3, 4, ....}

*C* is the set of complex numbers. ie. a + b*i*