RELATION AND FUNCTION

RELATION

Cartesian Product:- $A \times B = \{(x, y): x \in A \text{ and } y \in B\}$.

Relation:-

A relation R is a set of ordered pairs. A relation R from a set A to a set B is a subset of $A \times B$.

Mathematically, we can write $aRb\ \forall a, b \in R$.

Inverse Relation:-

If A & B be two sets and R be the relation from A to B,

then the inverse relation R^{-1} of R is a relation from B to A defined by

$R^{-1} = \{(b, a): (a, b) \in R, a \in A, y \in B\}$.

Classification of Relations:-

(1) Reflexive Relation:-

Let ρ be a relation on A. ρ is said to be reflexive if $(a, a) \in \rho \forall a \in A$.

(2) Symmetric Relation:-

A relation ρ on a set A is said to be symmetric if $(a, b) \in \rho \Longrightarrow (b, a) \in \rho$,

where, $a, b \in A$.

A relation ρ is said to be an anti $-$ symmetric relation if $(a, b) \in \rho$ & $(b, a) \in \rho$

$\Longrightarrow a = b$ when $a, b \in A$.

(3) Transitive Relation:-

A relation ρ on a set A is said to be transitive if $(a. b) \in \rho$ & $(b, c) \in \rho$

$\Longrightarrow (a. c) \in \rho\ \forall a, b, c \in A$.

(4) Equivalent Relation:-

A relation ρ is said to be an equivalent relation if ρ is reflexive, symmetric and transitive.

FUNCTION

Real Function:-

Let R be the set of all real numbers and let X and Y be any two non $-$ empty subsets of R.

Then, a rule f which associates to each $x \in X$, a unique real number $f(x) \in Y$,

is called a real function from X to Y and we write, $f: X \to Y$.

Constant Function:- $f(x) = c\ \forall x \in R$.

Identity Function:- $f(x) = x\ \forall x \in R$.

Modulus Function:- $f(x) = |x| = x$, when $x \geq 0$