OTHER CONNECTIVES

Exclusive OR : $P \bar{\vee} Q$; true whenever either P or Q true but not both

NAND : ($\uparrow$) Combination of "NOT" and "AND"

NOT - Negation ; AND - Conjunction.

Notation: $P \uparrow Q$ defined as $P \uparrow Q \Leftrightarrow \neg(P \wedge Q)$

NOR : ($\downarrow$) Combination of "NOT" and "OR".

NOT - Negation ; OR - disjunction

Notation $P \downarrow Q$ defined as $P \downarrow Q \Leftrightarrow \neg(P \vee Q)$

Truth Table:

P	Q	$P \bar{\vee} Q$	$P \uparrow Q$	$P \downarrow Q$
T	T	F	F	F
T	F	T	T	F
F	T	T	T	F
F	F	F	T	T

Note: 1) $P \uparrow Q \Leftrightarrow Q \uparrow P$ and $P \downarrow Q \Leftrightarrow Q \downarrow P$ (commutative)

2) $P \uparrow (Q \uparrow R) \not\Leftrightarrow (P \uparrow Q) \uparrow R$ (Not Associative.

DUALITY:

The dual of a compound proposition is the proposition obtained by replacing each $\vee$ by $\wedge$; each $\wedge$ by $\vee$, each T by F and each F by T. The dual proposition A is denoted by A^*.

Example: 1) The dual of $(P \wedge \neg Q) \vee R$ is $(P \vee \neg Q) \wedge R$

2) The dual of $(T \vee \neg P) \wedge Q$ is $(F \wedge \neg P) \vee Q$

3) The dual of $(P \rightarrow Q) \wedge (R \vee F) \Leftrightarrow (\neg P \vee Q) \wedge (R \vee F)$ is $(\neg P \wedge Q) \vee (R \wedge T)$

Functionally Complete Set of Connectives

Any set of connectives in which every formula can be expressed as another equivalent formula containing connectives from this set is called functionally complete set of connective.