

SNS COLLEGE OF ENGINEERING



TOPIC : 1 - Proposition & Connectives

Coimbatore – 641 107

Proposition A proposition (statement) is a declarative sentence which is either true or false but not both. Example (a) New Delhi is the capital of India (True) (b) chunnai is in England (False) (c) 10+6 = 16 (True) (d) For any x, x+2 = 2+x (True) (e) The sum of two and four is seven (False) The following sentences are not Propositions (a) x+4 = 2 (neither true nor false) (b) what a wonderful joke this is (Exclamatory) (c) obey my orders. (command) (d) What is the height of Himalaya? (Interogative





Atomic statements (Primary Statements) A declarative sentence which cannot be further split up into simple sentences an called primary statements. Example Ram is a boy Connectives

Connective is an operation which is used to connect two or more than two statemen

S·No.	Connectives	Name	Symbols	Type of operator
1.	Not	Negation	- (or) ~	Unary
2.	And	Conjunction	л	Binary
3.	07	Disjunction	\checkmark	Binary
4.	IF then	Conditional	\rightarrow	Binary
5.	If and only if	Biconditional	\leftrightarrow	Binary





Molecular Statement (Compound Statement) New statements can be formed from atomic statements through the use of connectives such as 'and', 'or', 'but' etc. The resulting statements are called molecular or compound statements. Example

Niranjan is a boy [and] Nirmala is a girl. Truth table

The truth value of a proposition is either true (T) or False (F). A truth table is a table that shows the

truth values of a compound proposition for all possible cases.

Negation (- or ~) (Not) The negation of a statement is generally formed by introducing the word 'not' at a proper place in the statement.





If P has the truth value I, then - P has the truth value F.

Illy If 'P' has the truth value F. then - P has the truth value 'T'.

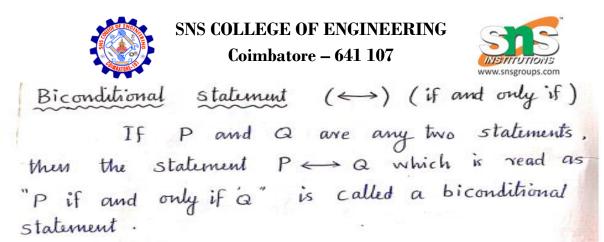
(14) (14) (14) (14) (14) (14) (14) (14)	Table
P (for M	Jegation) — P
Т	F
F	. Т

Conjuction (1) (and)

The conjunction of two statements P and Q is the statement PAQ which is read as P and Q.

Truth	Table	for	рла	
Р	Q	1	PAQ	Ť
T	Т		Т	1
Т	F		FÍ	
F	Г	{	F	

SNS COLLEGE OF ENGINEERING Coimbatore - 641 107 Disjunction (V) (or) disjunction of two statements P and The Q is the statement PVQ which is read as Por Q. Table for PVQ Truth P a PVQ T T T F T F Т T F F F Conditional statement (→) (If, ... then) P and Q be any two statements, then If the statement $P \rightarrow Q$ which is read as " if P is called a conditional statement. for Truth Table P->a P -> Q P Q T T T Т F F F T T F F T



Truth	Table f	$For P \longleftrightarrow Q$
Р	Q	$P \leftrightarrow a$
Т	т	т
Т	F	F
F	т	F
F	F	Т

Converse and contrapositive

If $P \rightarrow Q$ is an implication, then the converse of $P \rightarrow Q$ is the implication $Q \rightarrow P$, and the contrapositive of $P \rightarrow Q$ is the implication $\neg Q \rightarrow \neg P$.

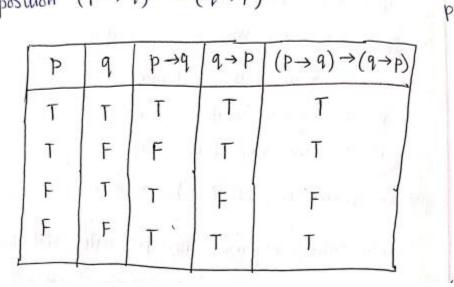
① Give the converse and contrapositive of the implication "If it is raining, then I get wet" Let P : It is raining a : I get wet Converse $(a \rightarrow P)$: If I get wet, then "it is raining Contrapositive $(\neg a \rightarrow \neg P)$ If I do not get wet, then it is not raining





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(5) Construct a truth table for the compound proposition $(P \rightarrow q) \rightarrow (q \rightarrow P)$.



		→q)←		P>		
P	q	p→q,	−р	79	٦P→¬٩	$(P \rightarrow q)$ $\leftrightarrow (\neg P \rightarrow$
T	Г	т	F	F	Г	Г
Г	F	F	F	T	Г	F
F	T	T	т	F	F	F
F	F	T	T	T	T	Т