Subject:Discrete Mathematics
Topic:Laws of logic

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LAWS OF LOGIC

IDENTITY LAW

$P \vee T \equiv T$

$P \wedge T \equiv P$

$P \vee F \equiv P$

$P \wedge F \equiv F$

COMPLIMENT LAW

PV~P ≡ T

P^~P≡F

~T≡F

~F≡T

INVOLUTION LAW

~(~P)≡P

DEMORGAN'S LAW

~(PVQ)≡~P^~Q

~(P^Q)≡~PV~Q

TRUTH TABLE FOR DEMORGAN'S LAW

p	q	pvq	~p	~q	~(pvq)	~p^~q
T	T					
T	F					

CONDITIONAL STATEMENTS

If you listen my lecture carefully,then you will definitely understand this topic

Condition -> outcome

if you listen my lecture carefully:p

then you will definitely understand this topic:q

We can represented as “if p then q”

p->q(implication of p)

CONDITIONAL STATEMENTS

A compound statement using the connective **if….then** is called a conditional statement or implication .A conditional statement is used as a guarantee for the conclusion to be true provided,condition is true.If p and q are two statements then compound statement if p then q denoted by p⇒q is an implication and the connective if …..then is the conditional connective.The connective if…..then is denoted by ⇒/➡️and can be read as

- p implies q
- p is sufficient for q
- p only if q
- q is necessary for p
- q is consequence of p

Note: p implies q and q implies p are completely different statements.

Truth Table for $p \Rightarrow q$

p	q	$p \Rightarrow q$
T	T	T
T	F	F
F	T	T
F	F	T

CONVERSE STATEMENT

The converse of a given conditional statement $p \Rightarrow q$ is a new statement found by interchanging the hypothesis p and the conclusion q of the given conditional statement.

If $p \Rightarrow q$ then converse of it is $q \Rightarrow p$

Eg: if i understood this topic,then i listened the lecture carefully.

if i understood this topic:q

then i listened the lecture carefully:p

TRUTH TABLE FOR Q⇒P

p	q	q⇒p
T	T	T
T	F	T
F	T	F
F	F	T