lecture 3   Implication. $P \xrightarrow{1} \overset{1}{q}$. $(P \to q) \xrightarrow{1} r$.

1)   Converse $q \to P$.
                             $r \to (P \to q)$

2)   Contrapositive. $\neg q \to \neg P$.
                             $\neg r \to \neg(P \to q)$.

3)   Inverse. $\neg P \to \neg q$.

For   Complicated   Expressions   How to Compile   truth table.

P 20 Ex 11 :- $(P \vee \neg q) \to (P \wedge q)$. $2^{\text{Variables}}$

P	q	$\neg q$	$P \vee \neg q$	$P \wedge q$	$(P \vee \neg q) \to (P \wedge q)$
T	T	F	T	T	T
T	F	T	T	F	F
F	T	F	F	F	T
F	F	T	T	F	F .

Applications   of   Propositional logic.
        1-   System   Specification.   (1 Question from there).
        2-   Puzzles
        3-   Searching.

P 12 | EK 15 :-   "The diagnostic   message is stored in buffer (or)
                      it is   retransmitted".

              " The   diagnostic   message   is (not) stored in

buffer ".

"(If) – the diagnostic message is stored in buffer (Then) it is retransmitted".

Let.
p = "The diagnostic message is stored in buffer"
q = "The diagnostic message is retransmitted"

$p \lor q = T$ —— ①✓   from ② $p = F$. —— ④✓
$\neg p = T$ —— ②✓   from ① ④ $q = T$ —— ⑤✓
$p \to q = T$ —— ③✓   from ⑤ ③ it holds

$$P \qquad q \qquad P \to q.$$

P	q	P → q
~~T~~	~~T~~	~~T~~
~~F~~	~~F~~	~~F~~
(F)	(T)	(T)
~~F~~	~~F~~	~~T~~

Rough work.

P	q	P∨q
T	T	T
T	~~F~~	T
~~F~~	T	T

~~F F F~~

P	¬P
~~T~~	~~F~~
F	T

P	q	P∨q
~~T~~	~~T~~	~~T~~
~~T~~	~~F~~	~~T~~
~~F~~	T	T
F	F	F

Ex 16 / P 12 :– "The diagnostic message is stored in buffer (or) it is retransmitted".

" – the diagnostic message is (not) stored in

buffer ".

"(If) - the diagnostic message is stored in buffer (Then) it is retransmitted".

" - the diagnostic message is not retransmitted".

Let. $p =$. The diagnostic message is stored in buffer
$q =$ The diagnostic message is retransmitted "

$p \lor q = T$ —— ①

$\neg p = T$ —— ② ✓

$p \rightarrow q = T$ —— ③

$\neg q = T$ —— ④ ✓

from ② $p = F$ —— ⑤

from ④ $q = F$ —— ⑥

from ⑤⑥, ①

$p \lor q = T$

$F \lor F \neq T$

$F \neq T$.

p	q	p ∨ q
T	T	T
T	F	T
F	T	F
F	F	F

$F \neq T$.

Quiz # 1.

if 2+3 = 5   then I will not teach you.
Converse.

a) Implication.
b) Contrapositive.
c) Inverse.