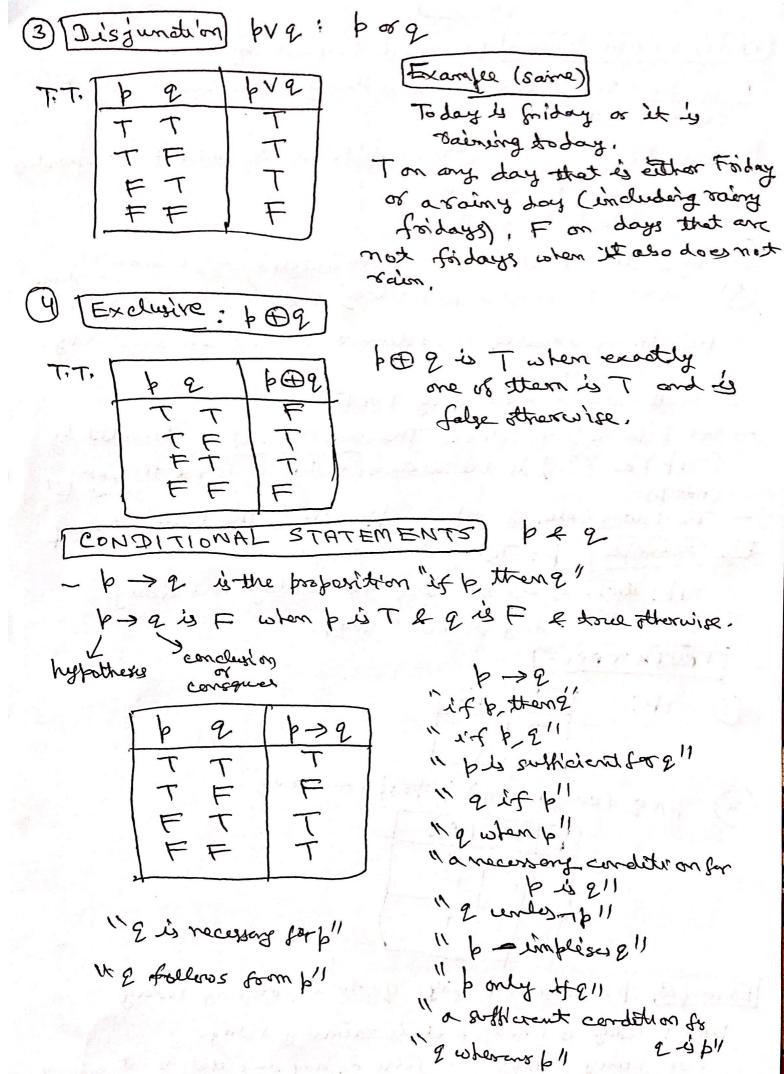
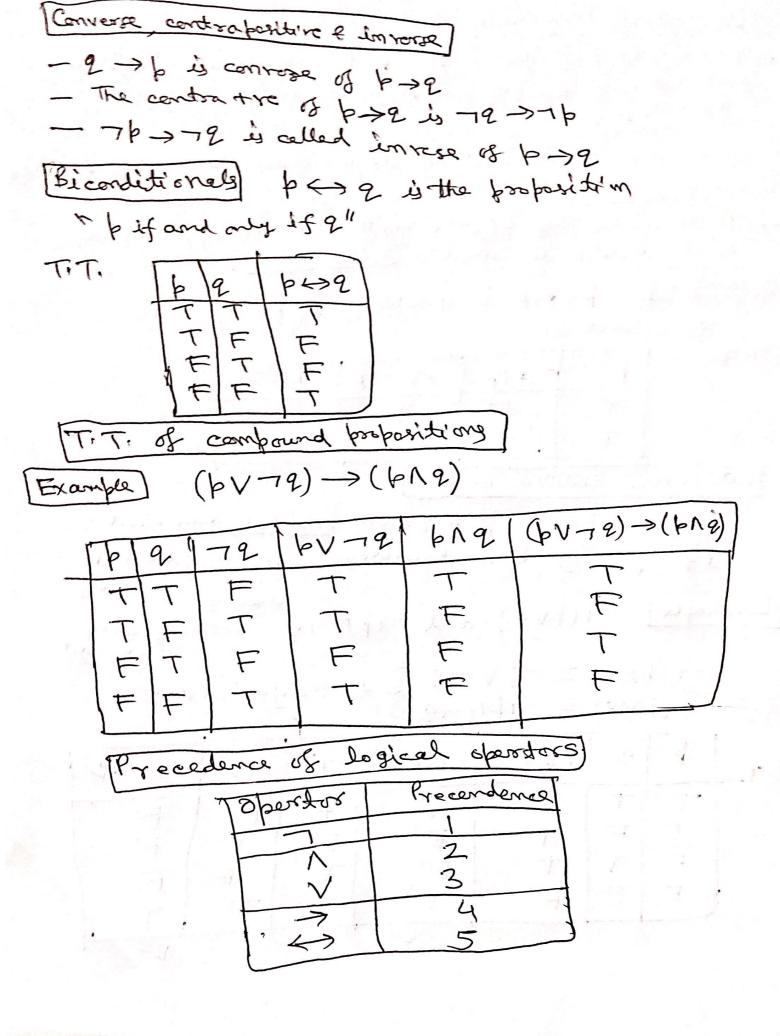
LOGIC
PROPOSITIONAL LOGIC (Deals with proportions)
-Proposition: It's a declarative sentence that is either 1 18 F
Example (1) Toronto is the capital of carrada + (100 fositing) 3 1+1=2 +
(B) $\alpha+1=2$ (nota proposition) neither Transfalle
- Propositional variables or extension vonables are denoted by
- Touth value is demoted by Tor F - Set b be a proposition. The regation of b demoted by (¬b) or (b) is the state out 11-4 The not the case that b'
of prostrate aft or streetho is of to so subor the touth radie of
This Ist is not the case that boday is Friday!
TRUTH TABLE
D 7P: FT F
2) prop (conjuction) proposition party
TTT F FFFF
Example p: Today is Folday q: It is raining today

prof: Today is Friday & it is saining today.

Ton rainy fridays & is false on any day that is not a filley.

I on fridays when it does not rain.





Propositional Equivalences A compound prop, that is always true no matter what the touth values of the prop. 5 that occur in it is called tautalogy. A compound prop. that is always false to matter is ealed centradiction A compound prop that is neither standale gy nor a contradiction is called a contingency. 15xample bV 17 p is tautology a pr 7 p is a constadiction. LOGICAL EQUIVALENCES Compound props & & 2 are logically equivalent if perq is a tautology. p = 2 (denoted 6× 2 [Example] 7(bV9) and 7p1-19 are logically equalit -1 (FR2) = 76V-12 } Demosgan's Law m(þvを) 三 7 þn n2 1-1(bv2) 76 -12 76V-12 1 bv2

T.T. | P | 2 | bv 2 | ¬(bv 2) ¬b | ¬2 | ¬bv ¬2 |

T.T. | T | T | F | F | F |

T | T | T | F | T | F |

F | F | T | T | T |

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Example	>2 =	= つりと	Ā	1/2					
T p 2	1-1/	, 7 p V 9		o → 2					
TT	F		il ex	T					
T F	\ -								
FF		T T							
[Example] $V(2NY) = (bV2) \Lambda (bVY)$									
16 2 8 T	218	bv(211)	pv 2	bv8](
TTT	T	T	7	7					

P 2 Y 2NY bV(2NY) bV 8 (bV 2)N(bVY) TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT	A STATE OF THE STA		The second secon			
	6 2 ×	218	bv(21r)	pv 2	PVR	(pr 2) V (pr L)
	ナナドナドナドナド	サキナチャ		T T	アアアア	

 $\begin{array}{l}
\neg (b_1 \lor b_2 \lor \cdots \lor b_n) \equiv (\neg b_1 \land \neg b_2 \land \cdots \land \neg b_n) \\
\neg (b_1 \land b_2 \land \cdots \land b_n) \equiv (\neg b_1 \lor \neg b_2 \lor \cdots \lor \neg b_n) \\
\hline
SOME LOGICAL EQUIVALENCES$

PNT≡P } Identity laws
PVF≡P }

PVT≡T } Domination laws
PNF≡F }

PVb≡P } Tdempotent laws
PNÞ≡P }

T(¬P)≡P } Double negation law

5) note 14

bv9 = 9Vb } Commutative laws $(PV2)VY \equiv PV(9V8)$ Associative laws $(PN2)NY \equiv PN(2N8)$ $bV(2NY) \equiv (bV2) \wedge (bVY)$ Distributive lows $bN(2VY) \equiv (bN2) V(bNY)$ 7(b/2) = 76/72] De Mosgan's laws b V(b12) = b Eval middes 2017 br(bv 2) = b bV7b=T } Negation Laws brab=F Biconditiona = Conditional Logi Equi) pa> 2= (b→2) N(2→b) b>2=76V2 p 43 2 = 7 b € > 72 b→2=72→7b b 67 2 = (b N 2) V (¬b N ¬2) b V2 = 76→2 7(b (>2) = b (>) 72 b12 = 7(2→7b) -1(p>2)= p1-12 (p→2) n (p→8) = b > (218) (b→8) N (2>8) = (bve) →8 (b>2) V(b>r) = b→(2VY) (b-> x) v(2->x) = (bn2)-> x Example Show that -1(1)= 1172

(6) noto 14

D ¬(b→2) = ¬(¬b∨2) = ¬(¬b) 1 ¬2

= b1-12