BHATTER COLLEGE, DANTAN
Deptt. of Philosophy

4th Semester Hons.

LOGIC

FROM: ARUN DAS

The Rules of Inference :- [অনুমানের সূত্র]

1. **M.P.**

$p \supset q$
p
$\therefore q$

2. **M.T.**

$p \supset q$
$\sim q$
$\therefore \sim p$

3. **H.S.**

$p \supset q$
$q \supset r$
$\therefore p \supset r$

4. **D.S.**

$p \vee q$
$\sim p$
$\therefore q$

5. **C.D.**

$(p \supset q) \cdot (r \supset s)$
$p \vee r$
$\therefore q \vee s$

6. **Abs.**

$p \supset q$
$\therefore p \supset (p \cdot q)$

7. **Simp.**

$p \cdot q$
$\therefore p$

8. **Conj.**

p
q
$\therefore p \cdot q$

9. **Add.**

p
$\therefore p \vee q$

Proved Valid argument :-

①
1. $(E \vee F) \cdot (G \vee H)$
2. $(E \supset G) \cdot (F \supset H)$
3. $\sim G \;/\therefore H$
4. $E \vee F$ 1, Simp.
5. $G \vee H$ 2, 4, C.D.
6. H, 5, 3, D.S.

②
1. $W \supset X$
2. $(W \supset Y) \supset (Z \vee X)$
3. $(W \cdot X) \supset Y$
4. $\sim Z \;/\therefore X$
5. $W \supset (W \cdot X)$ 1, Abs.
6. $W \supset Y$ 5, 3, H.S.
7. $Z \vee X$ 2, 6, M.P.
8. X 7, 4, D.S.

(3) 1. G

2. $H \;/\therefore (G \cdot H) \vee I$

3. $G \cdot H$ 1, 2, Conj.

4. $(G \cdot H) \vee I$ 3, Add

(4) 1. $(A \supset B) \cdot (C \supset D)$

2. $(E \supset F) \cdot (G \supset H)$

3. $A \vee E \;/\therefore B \vee F$

4. $A \supset B$ 1, Simp.

5. $E \supset F$ 2, Simp.

6. $(A \supset B) \cdot (E \supset F)$ 4, 5, Conj.

7. $B \vee F$ 6, 3, C.D.

Proof in Validity:

(5) 1. $(P \supset Q) \cdot (R \supset S)$

2. $(T \supset U)$

3. $(P \vee T) \cdot (R \vee O) \;/\therefore Q \vee U$

(6) 1. $Q \supset P$

2. $P \vee O$

3. $(O \cdot \sim Q) \supset (N \cdot \sim Q)$

4. $\sim P \;/\therefore N$

(7) 1. $I \supset J$

2. $J \supset K$

3. $L \supset M$

4. $I \vee L \;/\therefore K \vee M$

(8) 1. $(A \vee B) \supset C$

2. $(C \vee B) \supset [A \supset (D \equiv E)]$

3. $A \cdot D \;/\therefore D \equiv E$

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* The Rules of Replacement:

প্রতিস্থাপনামূলক সূত্র

10. De M.

$\sim(P \cdot q) \equiv (\sim P \vee \sim q)$

$\sim(P \vee q) \equiv (\sim P \cdot \sim q)$

11. Com.

$(P \vee q) \equiv (q \vee P)$

$(P \cdot q) \equiv (q \cdot P)$

12. Assoc.

$[p \vee (q \vee r)] \equiv [(p \vee q) \vee r]$

$[p \cdot (q \cdot r)] \equiv [(p \cdot q) \cdot r]$

13. Dist.

$[p \cdot (q \vee r)] \equiv [(p \cdot q) \vee (p \cdot r)]$

$[p \vee (q \cdot r)] \equiv [(p \vee q) \cdot (p \vee r)]$

14. D.N.

$p \equiv \sim\sim p$

15. Trans.

$p \supset q \equiv (\sim q \supset \sim p)$

16. Impl.

$p \supset q \equiv (\sim p \vee q)$

17. Equiv.

$(p \equiv q) \equiv (p \supset q) \cdot (q \supset p)$

$(p \equiv q) \equiv [(p \cdot q) \vee (\sim p \cdot \sim q)]$

18. Exp.

$[(p \cdot q) \supset r] \equiv [p \supset (q \supset r)]$

19. Taut.

$p \equiv (p \vee p)$

$p \equiv (p \cdot p)$

Examples of arguments :-

(1) 1. $(\sim M \vee \sim N) \supset (O \supset \sim\sim P)$

2 $/ \therefore \sim (M \cdot N) \supset (O \supset \sim\sim P)$

2. $\sim (M \cdot N) \supset (O \supset \sim\sim P)$ 1, DeM.

②. 1. $Z \supset (A \supset B)$ / ∴ $Z \supset (\sim\sim A \supset B)$

2. $Z \supset (\sim\sim A \supset B)$ 1, D.N.

③. 1. $[(R \vee \sim S) \cdot \sim T] \vee [(R \vee \sim S) \cdot U]$

/ ∴ $(R \vee \sim S) \cdot (\sim T \vee U)$

2. $(R \vee \sim S) \cdot (\sim T \vee U)$ 1, Dist.