

一. 是非: X X X O X O

二. 選擇: C b a C C a

三. $(B \rightarrow A) \cdot \sim (A \cdot B)$

四. 1. $\sim B \vee \sim A$

2. $\sim A \rightarrow B$

3. $\sim B \rightarrow A$

4. $(A \vee B) \cdot \sim (A \cdot B)$

5. $(C \cdot D) \rightarrow (A \vee B)$

五. (1) 1. $A \rightarrow B$

2. $A \vee C$

3. $D \rightarrow B$

4. $D \vee \sim C$ $\therefore B \vee F$

5. $\sim C \vee D$ $4, \text{Comm}$

6. $C \rightarrow D$ $5, \text{Impl}$

7. $C \rightarrow B$ $3, 6 \text{ HS}$

8. $B \vee B$ $1, 2, 7 \text{ CD}$

9. B $8, \text{Idemp}$

10. $B \vee F$ $9, \text{Add}$ *

(2) 1. $T \rightarrow G$

2. $S \rightarrow G$ $\therefore \sim(T \vee S) \vee (G \vee F)$

3. $\sim T \vee G$ $1, \text{Impl}$

4. $(\sim T \vee G) \vee F$ $3, \text{Add}$

5. $\sim T \vee (G \vee F)$ $4, \text{Assoc}$

6. $\sim S \vee G$ $2, \text{Impl}$

7. $(\sim S \vee G) \vee F$ $6, \text{Add}$

8. $\sim S \vee (G \vee F)$ $7, \text{Assoc}$

9. $[\sim T \vee (G \vee F)] \cdot [\sim S \vee (G \vee F)]$ $5, 8 \text{ Conj}$

10. $(\sim T \cdot \sim S) \vee (G \vee F)$ $9, \text{Dist}$

11. $\sim (T \vee S) \vee (G \vee F)$ $10, \text{DeM}$ *

(3) 1. $A \rightarrow B$

2. $C \rightarrow D$ $\therefore (A \vee C) \rightarrow (B \vee D)$

3. $\sim A \vee B$ $1, \text{Impl}$

4. $\sim C \vee D$ $2, \text{Impl}$

1. $A \rightarrow B$

$C \rightarrow D$ $\therefore (B \vee D) \rightarrow (A \vee C)$

使用簡易真值表法

$A \rightarrow B$

F T T

$C \rightarrow D$

F T T

$\sim[(B \vee D) \rightarrow (A \vee C)]$

T T T T

F F F F

當 A, F C: F 時

B: T D: T

前題為真而結論為假

\therefore 無效

2.

$A \rightarrow B$ $\therefore (A \cdot B) \leftrightarrow A$

使用簡易真值表法

$A \leftrightarrow B$

T F F

$\sim[(A \cdot B) \leftrightarrow A]$

T T F F

T F F T

不會發生前題為真而結論為假

\therefore 有效

(3)

5. $(\sim A \vee B) \vee D$ $3, \text{Add}$

6. $(\sim C \vee D) \vee B$ $4, \text{Add}$

7. $\sim A \vee (B \vee D)$ $5, \text{Assoc}$

8. $\sim C \vee (D \vee B)$ $6, \text{Assoc}$

9. $\sim C \vee (B \vee D)$ $8, \text{Comm}$

10. $[\sim A \vee (B \vee D)] \cdot [\sim C \vee (B \vee D)]$

$8, 9 \text{ Conj}$

11. $(\sim A \cdot \sim C) \vee (B \vee D)$ $10, \text{Dist}$

12. $\sim(A \vee C) \vee (B \vee D)$ $11, \text{DeM}$

13. $(A \vee C) \rightarrow (B \vee D)$ $12, \text{Impl}$

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7. (4)

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|----|---|------------------------------|
| 1. | $\sim A \Rightarrow (D \cdot C)$ | |
| 2. | $\sim (B \cdot A)$ | $\therefore B \Rightarrow C$ |
| 3. | $\sim B \vee \sim A$ | 2. DeM |
| 4. | $B \Rightarrow \sim A$ | 3. Impl |
| 5. | $B \Rightarrow (D \cdot C)$ | 1, 4. HS |
| 6. | $\sim B \vee (D \cdot C)$ | 5. Impl |
| 7. | $(\sim B \vee D) \cdot (\sim B \vee C)$ | 6. Dist |
| 8. | $\sim B \vee C$ | 7. Simp |
| 9. | $B \Rightarrow C$ | 8. Impl |

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