

國立中正大學九十二學年度哲學研究所碩士班招生考試初階邏輯考題：

(共 11 題，總計 100 分) (18 條規則附錄於第二頁)

符號說明： \bullet : and \vee : or \sim : not \supset : If... then... \equiv : ...if and only if...

(也可用相當的符號，如 \wedge , \vee , \neg , \rightarrow , \leftrightarrow)

(關於(III),(IV)大題，考生可以用類似的證明系統，但是使用 truth tree 或 semantic tableau 或 analytic tableau 等方法者，除非另行證明該方法等價於這裡使用的系統，將酌予扣分。)

(I) 問答題：

(1) 請定義語句邏輯的有效性(validity in sentential logic or propositional logic)，並加以說明。(10 points)

(2) 已知句子 A,B,C 皆為真，則論證 A,B/ \therefore C 是否健全(sound)?(8 points)

(II) 請將下列語句符號化。

(3) Anyone who is afraid of Henry does not love John. (8 points)

(John: j Henry: h Px: x is human Axy: x is afraid of y)

Lxy: x loves y Domain: unrestricted)

(4) A barking dog never bites. (8 points)

(Dx: x is a dog Bx: x is barking Tx: x bites Domain: unrestricted)

(5) If someone won the logic contest, it must be Mary. (8 points)

(Mary: m Wx: x won the logic contest Domain: all humans)

(6) Only those students who study hard will pass the final exam. (8 points)

(Sx: x studies hard Px: x passes the final exam Domain: all students)

(III) 使用 18 條規則證明下列論證。(Use the eighteen valid argument forms to prove the following arguments.)

(7) 1. $(A \bullet B) \supset (C \bullet D)$ $\therefore B \supset (A \supset C)$ (10 points)

(IV) 使用 18 條規則及 CP (Conditional Proof)、IP (Indirect Proof)、QN (Quantifier Negation)、UI (Universal Instantiation)、EI (Existential Instantiation)、UG (Universal Generalization)、EG (Existential Generalization) 證明下列論證。

(8) 1. $\sim (\exists x)[(\exists y)Pxy \vee (\exists y)Qxy]$ $\therefore (x)(y)(\sim Pxy \bullet \sim Qxy)$ (10 points)

(9) 1. $(\exists x)(y)(Pxy)$

2. $(x)(\exists y)(Pxy \supset Qxy)$ $\therefore (\exists y)(\exists x)(Qxy)$ (10 points)

(10) 1. $(\exists x)(y)(Fxy)$

2. $(y)(x)(Fyx \supset Gxy)$ $\therefore (\exists x)(\exists y)(Gxy)$ (10 points)

(V) 請造反例來說明下列論證無效。(Prove the invalidity of the following argument by constructing a counterexample.)

(11) 1. $(x)(Px \supset Qx)$

2. $(x)(Qx \supset Rx)$ $\therefore (\exists x)Rx$ (10 points)

國立中正大學九十二學年度碩士班招生考試試題

系所別：哲學系

科目：初階邏輯

第 2 頁，共 2 頁

附錄：18 條規則 (Appendix: the 18 valid argument forms)

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|------------|---|----------|---|----------|--|-------|---------------------------------------|
| 1. MP | $p \supset q$
$p / \therefore q$ | 2. MT | $p \supset q$
$\sim q / \therefore \sim p$ | 3. DS | $p \vee q$
$\sim p / \therefore q$ | 4. IS | $p \vee q$
$\sim q / \therefore p$ |
| 4. Simp | $p \bullet q / \therefore p$
$p \bullet q / \therefore q$ | 5. Conj | p
$q / \therefore p \bullet q$ | 6. HS | $p \supset q$
$q \supset r / \therefore p \supset r$ | | |
| 7. Add | $p / \therefore p \vee q$ | 8. CD | $p \supset q$
$r \supset s$
$\therefore p \vee r / \therefore q \vee s$ | | | | |
| 9. DN | $p \therefore \sim \sim p$ | 10. DeM | $\sim (p \bullet q) \therefore \sim p \vee \sim q$
$\sim (p \vee q) \therefore \sim p \bullet \sim q$ | 11. Comm | $(p \vee q) \therefore (q \vee p)$
$(p \bullet q) \therefore (q \bullet p)$ | | |
| 12. Assoc | $[p \vee (q \vee r)] \therefore [(p \vee q) \vee r]$
$[p \bullet (q \bullet r)] \therefore [(p \bullet q) \bullet r]$ | 13. Dist | $[p \bullet (q \vee r)] \therefore [(p \bullet q) \vee (p \bullet r)]$
$[p \vee (q \bullet r)] \therefore [(p \vee q) \bullet (p \vee r)]$ | | | | |
| 14. Contra | $(p \supset q) \therefore (\sim q \supset \sim p)$ | 15. Impl | $(p \supset q) \therefore \sim p \vee q$ | | | | |
| 16. Exp | $[(p \bullet q) \supset r] \therefore [p \supset (q \supset r)]$ | 17. Taut | $p \therefore (p \bullet p)$
$p \therefore (p \vee p)$ | | | | |
| 18. Equiv | $(p \equiv q) \therefore [(p \supset q) \bullet (q \supset p)]$
$(p \equiv q) \therefore [(p \bullet q) \vee (\sim p \bullet \sim q)]$ | | | | | | |