

**中正大學 106 學年度碩士班甄試
哲學系-邏輯**

- In the following questions, we will use (1) \sim as “negation”, (2) \wedge as “conjunction”, (3) \vee as “or”, (4) \rightarrow as “implication”, and (5) \leftrightarrow as “equivalence”, (6) (x) as “for all x ”, (7) $(\exists x)$ as “for some x ”, and \therefore for “therefore” in an argument.
 - If you want to answer the questions with the symbols you are familiar with, explicitly state the intended meaning of the symbols you are using.
 - When proving, you can use the proof system that you are familiar with, but specify the source of your proof system (from which book and who is the author).
1. Translate the following English sentences into well-formed formulas of sentential logic, with English alphabets standing for *atomic sentences* - that is, those sentences that are not built up out of other sentences. (20pts)
 - (a) Mary likes John.
 - (b) Mary doesn't like John.
 - (c) If Mary likes John, then Betty likes Paul.
 - (d) Mary likes John, and if Betty likes Paul, then either Paul likes Sue, or Sue likes Paul.
 2. Use truth table method to show the validity of the following arguments. (20pt)
 - (a) 1. $A \rightarrow B$ 2. $\sim B$ $\therefore \sim A$.
 - (b) 1. $(A \vee B) \vee C$ 2. $\sim B$ $\therefore A \vee C$.
 3. Prove that the following argument is a valid argument (no semantic method).(20pt)
 - (a) 1. $A \rightarrow \sim B$ $\therefore \sim A \rightarrow B$.
 - (b) 1. $\sim(A \vee B)$ 2. C $\therefore \sim(A \vee \sim C)$.
 4. Translate the following sentences into well-formed formulas in first-order logic. (15pts)
 - (a) Some candies taste sweet.
 - (b) Either every one is mortal, or no one is mortal.
 - (c) Every boy like some girl.
 5. Prove the validity of the following argument. (10pt)
 1. $(x)[Fx \rightarrow Gx]$
 2. $(\exists x)\sim Gx/\therefore (\exists x)\sim Fx$
 1. $(x)(\exists y)Fxy \rightarrow (x)(\exists y)Gxy$
 6. Show that the following argument is invalid (5pt)
 1. $(\exists x)(Px \rightarrow Qx)/\therefore (x)(Px \wedge Qx)$
 7. Let A, B be two sets. Explain that the intersection of A and B is a subset of B . (10pt)