

Problem Set 1: PHIL 1068 Elementary Logic: **Due 4:00PM 28 January 2011**

Student ID Number _____ Name _____

1. (15 marks)

*True or false? Circle 'T' if the statement is true. Circle 'F' if the statement is false.
For this question, you should assume that φ is a WFF of SL.*

- T F "Be careful Yoda!" is a statement.
- T F The conclusion of a valid argument must be true.
- T F If an argument is not sound, then that argument is not valid.
- T F Some sound arguments have false conclusions.
- T F " \sim " is the main connective of " $\sim \sim (D \leftrightarrow \sim A)$ ".
- T F Whenever " $(A \& B)$ " is true, " $(D \vee A)$ " is also true.
- T F If φ contains the symbol " \rightarrow " then φ contains a two-place connective.
- T F Logic describes how people reason.
- T F Some WFF of SL contains exactly 46 symbols.
- T F The word "drawer" is lexically ambiguous.
- T F φ might not be an expression of SL.
- T F φ is either a disjunction or a conjunction.
- T F The scope of "&" in " $(\sim(\sim P \& Q) \rightarrow P)$ " is " $(\sim P \& Q)$ ".
- T F Every SL WFF contains at least one connective.
- T F The antecedent of " $(\sim P \rightarrow Q)$ " is " P ".

/15

2. (10 marks) *Which of the following is a valid argument?*

Circle "Yes" if it is a valid argument. Circle "No" if it is not a valid argument.

- Yes No Some birds cannot fly.
So, not all birds can both fly and swim.
- Yes No He wants to be rich.
Every rich person is unhappy.
So, he wants to be unhappy.
- Yes No English is not widely spoken in Jakarta.
English is widely spoken in Jakarta.
Therefore, English is widely spoken.
- Yes No If Plato knew Picasso then Socrates never smiled.
Socrates never smiled.
Therefore, either Plato knew Picasso or Plato.
- Yes No If red is a color, then red is a color.

/10

3. (4 marks) Which of the following five expressions is not a WFF of SL?

$$(A \rightarrow B)$$

$$(((A \leftrightarrow A) \leftrightarrow ((\sim B \vee A) \vee \sim(B \leftarrow D))))$$

$$\sim \sim (((D \leftrightarrow A) \& A)$$

$$((A \& B) \& \sim A)$$

$$\sim(\sim B)$$

/4

4. (16 marks)

Fill in the blanks with an SL WFF to make correct truth tables.

Each WFF must contain exactly three two-place connectives.

a.

Q	R	P	
T	T	T	F
T	T	F	T
T	F	T	F
T	F	F	F
F	T	T	F
F	T	F	T
F	F	T	T
F	F	F	T

b.

P	Q	R	
T	T	T	T
T	T	F	F
T	F	T	T
T	F	F	F
F	T	T	T
F	T	F	T
F	F	T	T
F	F	F	T

c.

P	Q	
T	T	F
T	F	F
F	T	F
F	F	T

d.

B	
T	F
F	T

/16

5. (15 marks) Make a correct truth table for each of the following WFFs of SL.

a. $((A \& B) \leftrightarrow A_3)$

b. $(\sim \sim B \vee (A \rightarrow \sim D))$

c. $((B \vee A) \rightarrow (A \& \sim D))$

d. $((B \vee \sim A) \leftrightarrow \sim(\sim B \& A))$

e. $((B \leftrightarrow \sim B) \rightarrow \sim B)$