Name : 福山友美加 Maya Student# ：B1255001

Type B:

1. Key terms description: (25%)
   1. What is logic? (Chapter 1)

Logic is mean the branch of philosophy that treats forms of thinking or arguing. It is divided into two parts: **inductive** and **deductive** reasoning. Inductive reasoning draws conclusions based on specific examples whereas deductive reasoning draws conclusions from definitions and axioms.

* 1. Set Theory (Chapter 1)

Set Theory is mean the branch of mathematics which deals with the study of sets. The language of sets can be used to define nearly all mathematical “objects” such as functions.

* 1. Probability (Chapter 1)

Probability is the branch of mathematics which is a way of expressing knowledge (or belief) that an event will or will not occur numerically, a form of empirical inductive reasoning leading to statistical inferences.

* 1. Write a statement in symbolic form using the indicated letters to represent “You may go to the movies (m) if and only if you clean your room (r) ”. (Chapter 2)

ｍ⇔r

* 1. Descriptive Statistics (Chapter 1)

The branch of Statistics, meaning quantitative fact or statement. Statistics is used to estimate the unknown, a characteristic of the individual we would like to know about in a given population. It is similar to the scientific method.

1. Construct the truth table for [(p∧q)∨q]→p. (10%)

p q p∧q (p∧q)∨q **[(p∧q)∨q]→p**

T T T T T

T F F F T

F T F T F

F F F F T

1. Simplify ~(p∧q)∧(~p∧q). (10%)

~ (p∧q)

1. Verify equivalent or not between A and B. A: ~(p∨q) ∨ (p∧~q); B: ~q (10%)

A: ~(p∨q) ∨ (p∧~q)

B: ~q

Truth table

p q ~q p∨q ~(p∨q) (p∧~q) ~(p∨q) ∨ (p∧~q)

T T F T F F F

T F T T F T T

F T F T F F F

F F T F T F T

* 1. ~(p∨q) ∨ (p∧~q) B. ~q A=B

F F yes

T T yes

F F yes

T T yes

**Answer**：A and B are logically equivalent.

1. Translate “∀x∃y(y=2x)” into complete English statements assuming the universal discourse is the set of all real numbers. (10%)

**Answer**: For every x, there exists a y such that y is equal to 2x.

1. Let U be the universal set and A, B, and C be subsets of U. Prove or disprove

“” (15%)

Universal set U = {1,2,3}

A = {1}

B = {2}

C = {3}

= ({1}U{1,3})U{3}= {1,3}

= {1}U{1}= {1}

**Answer**: 　is general.

1. Outline a function to show that the set {1, 0.1, 0.01, 0.001, 0.0001,…} is countable. (15%)

S={1, 0.1, 0.01, 0.001, 0.0001,…}

S= {}

Function : →　S by f(n) =

**Answer**: The set is countable because it is in one-to-one correspondence with .

1. Without writing the list of all permutations of the set A5f1, 2, 3, 4g chosen 4 at a time, compute the number of such permutations. (15%)

A = {1,2,3,4} chosen 4 at a time

P(4,4) = = 24

**Answer:** 24