

Curtin University
Department of Computing
Quiz 1 – Semester 2, 2015

Subject: Foundations of Computer Science 2001
Index No.: COMP2001

Name:.....

Student ID:.....

Practical Time:.....

Time Allowed: 45 MINUTES

1. Represent the following statements in a propositional logic. You are required to define all necessary propositions and predicates used in your answers.
 - (i) The difference of one positive integer and one negative real number is positive.
 - (ii) Not all birds can fly.
 - (iii) You will pass this test only if you have done all the questions in the tutorial.
 - (iv) No two students in this class have the same height.
 - (v) Every child has a unique biological father and mother.

(5 marks)

2. Write out the truth table for the proposition of “implication”: $p \rightarrow q$. **(5 marks)**

3..

- (a) Using the absorption rule ($p \vee (p \wedge q) \equiv p; p \wedge (p \vee q) \equiv p$) to prove the following assertion

$$(p \wedge (p \vee q \vee r)) \vee (p \wedge q \wedge r) \vee ((p \wedge q) \vee (p \wedge r)) \equiv p$$

(5 marks)

(b) Prove or disprove the following statements.

- (i) Some positive integers can be written as the sum of the squares of two integers.
- (ii) If Dr. Wanquan Liu continues to teach this unit in this semester, I will get high distinction.
- (iii) If $3n+2$ is even, then $n+5$ is odd..

(5 marks)

4. Find the negations for the following propositions and simplify them if possible.

a) $\neg(\forall x \in D, \{(P(x) \wedge Q(x)) \vee R(x)\}) = ?$

b) $\neg(\neg q \wedge (p \vee \neg q)) = ?$

c) $\neg(\exists x(P(x) \wedge \forall y(P(y) \rightarrow x = y))) = ?$

(5 marks)