Dawson College: Principles of Mathematics and Logic: 360-124-DW-S02: Winter 2013

Name: Y. Lamontagne
Student ID: _____

Quiz: Tautologies, Contradictions and Contingent Statements

No books, calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remain marks are given for the work. If you need more space for your answer use the back of the page.

Question 1. *(6 marks)* WITHOUT USING A TRUTH TABLE: Show that the following statement is not a tautology

$(\neg A \vee B) \rightarrow \neg(A \wedge B)$

Lets find a valuation that makes the statement false.

If $(\neg A \vee B)$ is true and $\neg(A \wedge B)$ is false then the statement is false. For $\neg(A \wedge B)$ to be false $A \wedge B$ need to be true, so A and B need to be true. It follows that if A and B are true $(\neg A \vee B)$ is true since $\neg T \vee T = F \vee T = T$

Question 2. *(3 marks)* WITHOUT USING A TRUTH TABLE: Show that the following statement is not a contradiction.

$(\neg A \wedge B) \rightarrow \neg(A \vee B)$

Lets find a valuation that makes the statement true.

If $(\neg A \wedge B)$ is false then the statement is true. For it be false one of the conjuncts need to be false so let B be false $\circ\circ$ if B is false then we have a valuation that makes the statement true.