Quiz 2A: Logical Equivalence

CS/MATH 113 Discrete Mathematics L1

Habib University — Spring 2023

Total Marks: 5
Duration: 10 minutes

Date: January 19, 2023
Time: 1715–1725h

Student ID: _____

Student Name: _____

1 Problems

1. (5 points) We are given the following definitions.

   Definition 1.1 (Negation, $\neg$).

p	$\neg p$
T	F
F	T

   Definition 1.2 (Conjunction, $\wedge$).

p	q	$p \wedge q$
T	T	T
T	F	F
F	T	F
F	F	F

   Definition 1.3 (Disjunction, $\vee$).

p	q	$p \vee q$
T	T	T
T	F	T
F	T	T
F	F	F

   Use these to prove *De Morgan's laws*, i.e.

   (a) $\neg(p \wedge q) \equiv \neg p \vee \neg q$

   (b) $\neg(p \vee q) \equiv \neg p \wedge \neg q$