



**PHILADELPHIA UNIVERSITY
DEPARTMENT OF BASIC SCIENCES**

First Exam A

DISCRETE STRUCTURES

01-04-2008

Part 1 Each problem is worth 2 points. Circle one answer.

- 1) The proposition $(p \wedge q) \rightarrow (p \vee q)$ is a
 - a) tautology
 - b) contingency
 - c) contrapositive
 - d) contradiction
- 2) The proposition $\neg p \rightarrow q$ is equivalent to
 - a) $q \rightarrow p$
 - b) $\neg q \rightarrow \neg p$
 - c) $q \rightarrow \neg p$
 - d) $\neg q \rightarrow p$
- 3) Convert the proposition $(\neg p \wedge q) \vee (\neg p \wedge \neg q)$ to a CNF.
 - a) $(p \vee \neg q) \wedge (p \vee q)$
 - b) $(\neg p \vee \neg q) \wedge (\neg p \vee q)$
 - c) $(\neg p \vee \neg q) \wedge (p \vee q)$
 - d) $(p \vee \neg q) \wedge (\neg p \vee q)$
- 4) Let $P(x,y): y < x^2$. Which proposition is false?
 - a) $\exists x \forall y P$
 - b) $\forall x \exists y P$
 - c) $\exists y \forall x P$
 - d) $\forall y \exists x P$
- 5) Which statement is true?
 - a) 3 is a multiple of 6
 - b) $3 \bmod 6 = 0$
 - c) 6 is a divisor of 3
 - d) all of them false
- 6) Convert the decimal number 1408 to hexadecimal.
 - a) 580
 - b) AF0
 - c) 70C
 - d) 5AC

Part 2 Each problem is worth 4 points. Write complete solution.

- 7) Prove: if $x^2 - 2x + 5$ is odd then x is even.
- 8) Evaluate $\text{GCD}(1010, 395)$ using Euclidean algorithm.

-Amin Witno