PHILADELPHIA UNIVERSITY
DEPARTMENT OF BASIC SCIENCES

First Exam A **DISCRETE STRUCTURES** **08–11–2012**

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

1) Which proposition is a tautology?

a) $p \wedge \neg p$ c) $p \vee (p \rightarrow q)$
b) $\neg(p \vee \neg p)$ d) $p \wedge (p \rightarrow q)$

2) Evaluate GCD (6543, 3456).

a) 1 b) 3 c) 9 d) 27

3) Let A = {1, 2, 3, 4, 5} and B = {3, 5, 7}. Then $|P((A \oplus B) - B)| =$

a) 8 b) 16 c) 32 d) 64

4) Let A = {1, 2, 3, 4, 5} and B = {1, 3, 5, 7}. Then {2, 4, 7} =

a) $A - B$ b) $A \oplus B$ c) $B - A$ d) $A \cap B$

5) How many permutations with elements A, A, B, B, B, B, C ?

a) 24 b) 105 c) 120 d) 140

6) From 1 to 1000, how many are multiples of 12 or 16 ?

a) 111 b) 125 c) 138 d) 145

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

7) Convert $(P \leftrightarrow Q) \oplus R$ to CNF and DNF.

8) How many non-negative integer solutions of $A + B + C = 10$ such that $A \geq 2$ or $B \geq 3$ or $C \geq 5$?

-Amin Witno