PHILADELPHIA UNIVERSITY
DEPARTMENT OF BASIC SCIENCES

First Exam A **DISCRETE STRUCTURES** **03–04–2011**

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

1) Convert the proposition $p \leftrightarrow q$ to CNF.

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

2) Which proposition is a contingency?

a) $\neg p \leftrightarrow \neg p$ b) $p \rightarrow p$ c) $\neg p \rightarrow p$ d) $\neg p \oplus \neg p$

3) Convert the decimal number 2011 to hexadecimal.

a) 7E5 b) 7DB c) 7D5 d) 7EB

4) Let $A = \{1,3,5,7\}$ and $B = \{3,5,6,8,9\}$. Then $|P(A \oplus B)| =$

a) 4 b) 8 c) 16 d) 32

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

5) Evaluate GCD (1081, 437) and LCM (1081, 437) by the Euclidean algorithm.

6) Find the function f(n) given by the recurrence relation

$f(0) = 3$, $f(1) = 2$, $f(n) = f(n-1) + 12\, f(n-2)$

7) Is this argument valid? Prove it.

Premise 1: x is odd if and only if 3x is odd.
Premise 2: 3x is even.
Conclusion: x is even.

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