

Department of Basic Sciences — Philadelphia University

Exam 1

Discrete Structures

05–04–2017

Part I. (1 point each) Circle one answer.

1. The proposition $\neg(p \vee \neg q) \equiv$

- (A) $\neg p \wedge q$ (B) $p \wedge \neg q$ (C) $\neg p \vee q$ (D) $p \vee \neg q$

2. The set $(\{1, 2, 3, 4\} \oplus \{1, 3, 5, 6\}) - \{2, 6\} =$

- (A) $\{1, 5\}$ (B) $\{3, 6\}$ (C) $\{4, 5\}$ (D) $\{4, 6\}$

3. Let $A = \{1, 2, 3, 4\}$ and $B = \{1, 3, 5, 6\}$. Then $|P(A \cap B)| =$

- (A) 4 (B) 8 (C) 32 (D) 64

4. The set $A - (A \oplus B) =$

- (A) $A \cup B$ (B) $A \cap B$ (C) $B - A$ (D) $A - B$

5. The congruence $13 \equiv x \pmod{5}$ is true for $x =$

- (A) 20 (B) 21 (C) 25 (D) 28

6. The value $\text{LCM}(12, 16) =$

- (A) 36 (B) 48 (C) 72 (D) 84

7. The inverse $7^{-1} \pmod{10} =$

- (A) 2 (B) 3 (C) 4 (D) 5

8. From 1 to 100, the number of multiples of 10 or 12 is

- (A) 13 (B) 15 (C) 16 (D) 17

Part II. (4 points each) Write complete solution.

9. Convert the proposition $(P \rightarrow Q) \leftrightarrow R$ to CNF.

10. Find integers a and b such that $\text{gcd}(444, 45) = 444a + 45b$.

11. Evaluate $3^{197} \pmod{11}$ using SSA.

–Amin Witno