

Department of Basic Sciences — Philadelphia University

Exam 1

Discrete Structures

22–11–2017

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

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

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

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

- (A) $\{1, 5\}$ (B) $\{1, 3, 5\}$ (C) $\{3\}$ (D) $\{2, 6\}$

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

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

4. Convert the binary number 101010 to decimal.

- (A) 21 (B) 42 (C) 36 (D) 19

5. Evaluate $(-25) \bmod 7$.

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

6. Evaluate $\text{LCM}(12, 18)$.

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

7. Compute $5^{-1} \bmod 12$.

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

8. From 1 to 100, how many are multiples of 10 or 15?

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

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

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

10. Find integers a and b such that $\text{gcd}(432, 45) = 432a + 45b$.

11. Evaluate $4^{177} \bmod 11$ using SSA.

–Amin Witno