PHILADELPHIA UNIVERSITY
DEPARTMENT OF BASIC SCIENCES

Discrete Structures	(210104)	Paper:	Exam 2 Form (A)
Discrete Mathematics	(210242)	Date:	10 May 2005
Discrete Mathematics	(250151)	Time:	15:00 – 15:50

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PART 1 Circle the best answer. (2 points each)

1. The set $(A - B) \oplus B$ is equal to
   (a) $A \oplus B$ (b) A (c) $A - B$ (d) $A \cup B$

2. If $A = \{1, 2, 3\}$ and $B = \{3, 4\}$ then $|P(A \times B)| =$
   (a) 64 (b) 25 (c) 36 (d) 16

3. How many permutations are there from the multiset {A,B,B,A,C,B}?
   (a) 15 (b) 12 (c) 60 (d) 6

4. $A = \{1, 2, 3, 4\}$ and $R = \{(a,b) \mid a \bmod b = 1\}$. This relation is
   (a) symmetric only (c) anti-symmetric only
   (b) symmetric and transitive (d) anti-symmetric and transitive

5. $A = \{1, 2, 3, 4\}$ and $R = \{(1,2), (2,2), (2,3), (3,4)\}$. Find R^3.
   (a) {(1,2), (1,3), (2,2), (2,3), (2,4)}
   (b) {(1,2), (1,3), (1,4), (2,2), (2,3), (2,4)}
   (c) {(1,2), (1,3), (1,4), (2,3), (2,4)}
   (d) {(1,3), (1,4), (2,3), (2,4)}

PART 2 Write complete solutions in the space provided. (5 points each)

1. How many positive integers ≤ 300 are multiples of 4 or 5 or 6?

2. $A = \{2, 4, 6, 24, 36\}$ and $R = \{(a,b) \mid a \text{ divides } b\}$. Find the elements of R and then draw the digraph and the Hasse diagram of R.