Quiz 4
CS 373: Theory of Computation

Date: October 28, 2010.   Lecture Section AL1.   Time limit: 15 minutes.

Name	
netid	
Discussion	Tu 2-2:50 Tu 3-3:50 Tu 4-4:50 W 4-4:50 W 5-5:50

Pick the correct alternative from among the choices (A), (B), and (C) provided for each question below. Each question is worth **1 point**.

1. Let A and B be disjoint, recursively enumerable languages. Further let $\overline{A \cup B}$ also be recursively enumerable. What can you say about A and B?

   (A) It is possible that neither A nor B is decidable.

   (B) At least one among A and B is decidable.

   (C) Both A and B are decidable.

2. Let L be decidable. Which of the following is true about L?

   (A) If $L' \subseteq L$ then L' is decidable.

   (B) If $L \subseteq L'$ then L' is decidable.

   (C) $L \leq_m \{0^n 1^n \mid n \geq 0\}$

3. Let A and B be any languages such that $A \leq_m B$. Under what conditions is it the case that $\overline{A} \leq_m \overline{B}$?

   (A) Only when both A and B are decidable.

   (B) Only when both A and B are recursively enumerable.

   (C) Always.

4. Recall that $L_d = \{M \mid M \notin L(M)\}$ is the diagonal language. Suppose $L_d \leq_m L$. What can you say about L?

   (A) L is decidable.

   (B) L is not decidable but is recursively enumerable.

   (C) L is not recursively enumerable.

5. Which of the following **is not** a property of recursively enumerable languages?

  (A) $\{M \mid M \text{ accepts } 0011\}$.

  (B) $\{M \mid L(M) \text{ is accepted by a TM with even number of states}\}$.

  (C) $\{M \mid M \text{ uses no more than 32 tape cells}\}$.

6. Let $L = \{M \mid M \text{ is a TM that accepts at least 312929 strings}\}$. What can you say about L?

  (A) L is decidable.

  (B) L is not decidable but is recursively enumerable.

  (C) L is not recursively enumerable.