Quiz 22

1. Let A and B be languages such that $A \leq_m B$. When does $\overline{A} \leq_m \overline{B}$ hold?

   (A) Only when A and B are decidable

   (B) Only when A and B are recursively enumerable

   (C) Only when exactly one out of A and B is decidable

   (D) Always

   Correct answer is (D).

2. Suppose A and B are languages such that A reduces to B. If A is undecidable then which of the following is necessarily true about B?

   (A) B is decidable

   (B) B is undecidable

   (C) B is not recursively enumerable

   (D) None of the above

   Correct answer is (B).

3. Suppose A and B are languages such that A reduces to B. If B is undecidable then which of the following is necessarily true about A?

   (A) A is decidable

   (B) A is undecidable

   (C) A is not recursively enumerable

   (D) None of the above

   Correct answer is (D).

4. Recall that $A_{\text{TM}} = \{\langle M, w\rangle \mid M \text{ accepts } w\}$ is recursively enumerable but not decidable. Suppose L is a language such that $A_{\text{TM}} \leq_m L$. Which of the following is necessarily true?

   (A) L is recursively enumerable

   (B) L is not recursively enumerable

   (C) $\overline{L}$ is recursively enumerable

   (D) $\overline{L}$ is not recursively enumerable

   Correct answer is (D).