1. Let $A$ and $B$ be disjoint, recursively enumerable languages. Further let $A \cup B$ 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) $L \leq_m \{0^n1^n \mid n \geq 0\}$

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

   (A) Only when both $A$ and $B$ are decidable.
   (B) Only when both $A$ and $B$ are recursively enumerable.
   (C) Always.

4. Recall that $L_d = \{ M \mid M \not\in L(M) \}$ 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\text{ tape cells}\}.

6. Let \(L = \{M \mid M\text{ is a TM that accepts at least }312929\text{ strings}\}\). 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.