**NP-Completeness Problem**

Here are some multiple-choice questions related to the np-completeness problem:

**Easy:**

1. What does NP stand for in NP-completeness?  
   a) Non-Polynomial  
   b) Nondeterministic Polynomial  
   c) Not Possible  
   d) Numerical Prime
2. An NP-complete problem is one that:  
   a) Has a polynomial-time algorithm for solving.  
   b) Is solvable using a non-deterministic Turing machine.  
   c) Can be reduced to a known NP-hard problem.  
   d) Has an exponential time complexity.
3. Which of the following is not an example of an NP-complete problem?  
   a) Traveling Salesman Problem (TSP)  
   b) Boolean Satisfiability Problem (SAT)  
   c) Knapsack Problem  
   d) Prime Number Checking

**Medium:**

1. What is the significance of Cook's theorem in NP-completeness?  
   a) It proved that all NP-complete problems are solvable in polynomial time.  
   b) It introduced the concept of non-deterministic polynomial time.  
   c) It proved that Boolean Satisfiability Problem (SAT) is NP-complete.  
   d) It proved that NP-completeness is only applicable to graph problems.
2. Which of the following is an accurate statement about the P vs. NP problem?  
   a) It has been definitively resolved, and P = NP.  
   b) It seeks to determine whether P is a subset of NP.  
   c) It deals with the complexity of solving NP-hard problems.  
   d) It remains an open question whether every problem in NP can be solved in polynomial time.
3. The concept of "reduction" in NP-completeness refers to:  
   a) Simplifying a complex problem into a simpler one.  
   b) Transforming one problem into another in polynomial time.  
   c) Reducing the time complexity of a problem.  
   d) Converting an NP-complete problem into a polynomial-time solvable problem.

**Hard:**

1. Which of the following is true regarding the relationship between NP-completeness and NP-hardness?  
   a) Every NP-complete problem is NP-hard.  
   b) Every NP-hard problem is NP-complete.  
   c) NP-completeness and NP-hardness are equivalent concepts.  
   d) NP-completeness is a subset of NP-hardness.
2. The Traveling Salesman Problem (TSP) is NP-complete because:  
   a) It is solvable in polynomial time for all instances.  
   b) It can be reduced to a known NP-complete problem.  
   c) It involves non-deterministic algorithms for solving.  
   d) Its time complexity is exponential for all instances.
3. Which of the following is a potential implication if P = NP is proven true?  
   a) Computers would become slower and less efficient.  
   b) Cryptography based on the difficulty of NP-complete problems would be compromised.  
   c) All optimization problems would become NP-complete.  
   d) NP-complete problems would become solvable in exponential time.