Correct answers to questions 1 through 10 are worth 3 points each.

1. The form of nitrogen taken up by plants is
   a) nitrate.
   b) ammonium.
   c) nitrite.
   d) a and b.
   e) none of the above.

2. The process of denitrification does not require
   a) nitrate.
   b) a carbon source.
   c) oxygen.
   d) warm temperatures.

3. A home gardener is given some unidentified organic material in the fall and incorporates it into her garden plot. The next spring she notices that the lower leaves of the sweet corn are turning yellow at the tips and the yellow color is proceeding down the midribs of the leaves. What was the likely carbon:nitrogen (C:N) ratio of the organic material?
   a) 10:1
   b) 30:1
   c) 100:1
   d) There is no way to know given the above information.

4. The form of N that is most susceptible to losses from the soil is
   a) organic N.
   b) NH₄⁺.
   c) NO₃⁻.
   d) N₂O.

5. The nutrient that limits microbial activity in soils is
   a) carbon.
   b) oxygen.
   c) nitrogen.
   d) sulfur.
6. The most commonly used form of nitrogen fertilizer used for corn production in Iowa is  
   a) urea.  
   b) ammonium nitrate.  
   c) anhydrous ammonia.  
   d) ammonium sulfate. 

7. The fertilizer material that is most susceptible to N losses due to volatilization is  
   a) ammonium nitrate.  
   b) urea.  
   c) ammonium sulfate.  
   d) diammonium phosphate. 

8. The process used to industrially fix atmospheric N was created by  
   a) Bausch and Lomb.  
   b) Bray and Kurtz.  
   c) Haber and Bosch.  
   d) Olsen and Watanabe. 

9. If used properly, all N fertilizer sources are equally effective for increasing crop growth and grain production.  
   a) true  
   b) false  

10. The organism that infects the roots of alfalfa plants and fixes atmospheric nitrogen is  
    a) Bradyrhizobium.  
    b) Frankia.  
    c) Azotobacter.  
    d) Rhizobium.
The points for correct answers to questions 6 through 9 are listed at the end of each question.

6. 1500 pounds of sucrose ($\text{C}_{12}\text{H}_{22}\text{O}_{11}$) are added to an acre of soil. Assume that 100% of the sucrose will be decomposed. Maximum incorporation of the carbon into microbial tissue is expected to be very rapid - within a week after application in a warm, moist soil. How much nitrogen must be applied to prevent immobilization of soil inorganic nitrogen? (5 points)

7. Please list three ways that nitrogen can be lost from soils. (6 points)

8. What is the most important consideration in nitrogen fertilizer management? (4 points)

9. Please explain why nitrate is mobile in soils. (5 points)