Name___________________________________ (-5 points if not legible)

Choose the best answer for each question. Questions are worth 2 points each.

1. You have a fertilizer recommendation to apply 92 pounds of $P_2O_5$ per acre. How much 18-46-0 material will you need to apply?
   a) 46 lb/a
   b) 92 lb/a
   c) 138 lb/a
   d) 200 lb/a

2. The form of phosphorus taken up by plants is
   a) $H_2PO_4^-$
   b) $P_2O_5$
   c) Polyphosphate.
   d) all of the above.
   e) none of the above.

3. A source of potassium (K) in soils is weathering of
   a) strengite.
   b) apatite.
   c) mica.
   d) taranakite.

4. The most important soil characteristic that affects P is
   a) temperature.
   b) moisture content.
   c) pH.
   d) type of clay.

5. All phosphorus fertilizers are refined from
   a) $P_2O_5$
   b) Apatite.
   c) Strengite.
   d) Kaolinite.

6. At low soil pH phosphorus forms precipitates with
   a) Aluminum, and Boron.
   b) Calcium, and Chloride.
   c) Aluminum, and Calcium.
   d) Aluminum, and Iron.

7. The form of potassium taken up by plants is
   a) $K_2O$
   b) $K^+$
   c) $K^-$
   d) $K_2O_5$. 
8. How many gallons of liquid N fertilizer (28-0-0) should be applied to supply 150 lb N/acre? A gallon of 28-0-0 weighs 10.8 lb/gal.
   a) 5 gallons/acre.
   b) 10 gallons/acre.
   c) 25 gallons/acre.
   d) 50 gallons/acre.

9. The P soil test that was specifically developed to work on calcareous soils is the
   a) Olsen test.
   b) Mehlich III.
   c) Bray P-2.
   d) Bray P-1.

10. In fertilizer nomenclature the term available phosphorus refers to
   a) the total amount of P in the fertilizer.
   b) the water soluble P in the fertilizer.
   c) the citrate soluble P in the fertilizer.
   d) the water soluble P plus the citrate soluble P in the fertilizer.

For the next 5 questions decide if the answer that is in bold font is correct. If it is, leave the question. If the answer in bold font is not correct, circle the correct answer. (4 points each)

11. Band application of phosphorus fertilizer is especially important in what situation?
   a) Soils that test high in P.
   b) **Soils with high organic matter content.**
   c) Soils that are cold and wet.
   d) Soils that are intensively tilled.

12. An important function of potassium in plants is
   a) maintenance of plant turgor pressure.
   b) promotion of cell elongation.
   c) formation of chlorophyll.
   d) **promotion of infection by mychorrizae.**

13. The essential nutrient that neutralizes organic acids in plants is
   a) Nitrogen.
   b) Phosphorus.
   c) **Potassium.**
   d) Calcium.

14. Luxury consumption, taking up more of a nutrient than is required to reach maximum dry matter production, is especially a problem with
   a) potassium.
   b) nitrogen.
   c) phosphorus.
   d) **All of the above.**
15. The nutrient whose uptake is reduced the most in compacted soils is
   a) nitrogen.
   b) phosphorus.
   c) calcium.
   d) potassium.

Part 2.

14. Describe a situation where you would expect potassium to leach and why you would expect leaching to occur. (6 points)

15. Please briefly explain why \( \text{H}_2\text{PO}_4^- \) doesn’t leach. (4 points)