OLERICULTURE
Horticulture 320 – (UI PlSc 451/551)
EXTRA CREDIT – Fertilizer Calculations

Date Due: December 3, 2014

INSTRUCTIONS: Solve the following fertilizer calculation problems. Your answers are due at the beginning of class on December 3rd. Read each problem carefully and note the units given and the answers requested. Each question is worth 1 extra-credit point, which is equivalent to a class point. Points for each question will be awarded on an ALL-OR-NOTHING basis. Meaning, you must clearly present the correct answer. As such, you WILL NOT turn in your calculation steps. However, I suggest that you save your calculation steps, as they will be handy in studying for the final. Finally, I encourage you to work with your classmates to complete this worksheet, but be sure to do your own work. There will be a **difficult** calculation problem on the final, and it will be weighted heavier than on previous exams. NOTE: Questions on this worksheet get progressively harder. If you can solve all of the problems on this worksheet, you will be able to correctly answer any fertilizer calculation problems on the final exam.

1. A 50 # bag of fertilizer is labeled with a guaranteed analysis of 24-6-8, how many pounds of each labeled constituent are contained in the bag?
   N_____ **P_2O_5**_____ **K_2O** _____

2. Considering the same 50 # bag of fertilizer (24-6-8) in question 1, how many pounds of elemental nitrogen, phosphorus, and potassium are contained in the bag?
   N_____ **P**_____ **K** _____

3. A farmer received a fertilizer recommendation suggesting an addition of 50 #N/ac. The farmer will apply this recommendation to 5 acres using sulfur-coated urea (SCU), which is 32% N. How many pounds of SCU, will the farmer apply?_____

4. If a 50 # bag of urea (45-0-0) costs $8.00, what is the cost per pound of N?_____

5. A gardener wants to add 4 #N/1,000 ft^2 and 2 #P_2O_5/1,000 ft^2 to a 2,500 ft^2 garden. The gardener has a fertilizer (#1) with a guaranteed analysis of 10-0-1 and another fertilizer (#2) with a guaranteed analysis of 0-3-2. How many pounds of each fertilizer will the gardener apply? **Fertilizer #1** _____ **Fertilizer #2**_____

6. A grower will add 75 #N/ac to 16 acres using SCU (32-0-0). What is the grower's fertilizer cost if SCU is priced at $300 per ton? _____

7. A farmer will add 120 #N/ac and 30 #P_2O_5/ac to a 75 acre field. The farmer will use methylene urea (MU), which contains 39% N, and di-ammonium phosphate (DAP) with a guaranteed analysis of 18-46-0. How much of each fertilizer will the farmer apply?
   MU_____ **DAP**_____

8. An organic farmer wants to add exactly 150 #N/ac, 40 #P_2O_5/ac, and 20 #K_2O to a 10-acre field. How much bat guano (10-1-1), bone meal (1-15-0), and langbeinite (0-0-22) must the farmer purchase?
   Guano _____ **Bone Meal** _____ **Langbeinite** _____

9. Given your answers in Question 8, how many bags of each of the following the farmer must purchase to minimize the overall cost of fertilizing this field?

Bat Guano	**Bone Meal**	**Langbeinite**
1-ton tote ($900) _____	1-ton tote ($580) _____	1-ton tote ($283) _____
250 # tote ($350)_____	250 # tote ($165) _____	250 # tote ($152) _____
100 # bag ($180)_____	100 # bag ($85) _____	100 # bag ($85) _____
50 # bag ($105)_____	50 # bag ($50) _____	50 # bag ($56) _____
10 # bag ($26.90) _____	10 # bag ($12) _____	10 # bag ($15) _____
5 # bag ($14.95) _____	5 # bag ($7.20)_____	5 # bag ($9.25)_____
1 # bag ($4.40) _____	1 # bag ($1.50)_____	1 # bag ($1.90)_____

10. A farmer will fertigate his 2.5-acre field to add 80 #N/ac and 30 #elemental P/ac. How many gallons of Fertilizer #1 (16-8-4) and Fertilizer #2 (4-12-8) will the farmer add to the irrigation water if the specific gravity of both fertilizers is 1.21 (HINT: assume the density of water is 8.3 #/gal; and, the guaranteed analysis of both fertilizers is given as N - P_2O_5 - K_2O)?
    Fertilizer #1 _____ **Fertilizer #2**_____