Name: _____

AGRO / MSYM / AGEN 431
Site-Specific Crop Management
Fall 2008

Exam 2 (100 pts)

1. (5) List three possible reasons for variable rate irrigation:

   1. _____

   2. _____

   3. _____

2. (15) Implementation of variable rate technology allows one to increase the average yield by 4 bu/acre while reducing average fertilizer usage by 6 lbs/acre. Soil mapping and VRT cost is about $11/acre, and 1 lb of fertilizer costs $0.5/lb. What is the minimum price per bu of crop that would justify VRT?

3. (20) Your yield monitor system shows that a 7.53 lbs/sec soybean grain flow was measured during two (2) seconds while traveling 130 inches with a 180 inch swath width. Corresponding moisture content was 14.6 %. What is the actual (14.6% moisture) and reference (13% moisture) yield at that point in bu/acre? Note: 1 bu = 60 lbs, 1 ft = 12 in, 1 acre = 43560 ft^2.

$$Yield_{act} = Flow/(Width*Speed)$$
$$Yield_{ref} = Yield_{act}*(100-Moisture_{act})/(100-Moisture_{ref})$$

4. (5) Your variable rate sprayer includes two sets of spray nozzles of different sizes. If only the smaller nozzles are turned on, the system delivers 25 gal of solution per acre. The other set consists of nozzles providing twice as large flow as the first set. How many (including zero flow) and what application rates can be achieved with such a system?

5. (5) Circle in which part of spectrum vegetation has the highest light reflection:
   - Blue
   - Green
   - Red
   - NIR

6. (5) Identify three applications of telemetry in site-specific crop management.

   1. _____

   2. _____

   3. _____

7. (5) Circle the methods used to sense weeds and crop plants:

   a. Human visual sensing
   b. Machine vision (photoelectric area sensing)
   c. Chemical analysis
   d. Light reflection measurement
   e. Conductivity measurement

8. (10) Name the five primary soil forming factors.

   1. _____

   2. _____

   3. _____

   4. _____

   5. _____

9. (5) Which two factors, over time, most influence organic matter levels in soil?

a. pH	d. rainfall
b. salts	e. phosphorus
c. temperature	f. zinc

10. (15) Define and differentiate predictive and reactive approaches to nitrogen fertilizer management.

11. (10) Identify three site-specific seed management factors that producers can consider to increase profit, protect environmental quality, or both.

    1. _____

    2. _____

    3. _____

12. (10 - bonus) Based on an image with 4x4 m pixel size, your field is represented by 24,000 pixels (120 x 200). What is the area of the field in acres?

    1 acre = 43,560 ft^2, 1 ft = 0.3048 m