**SOIL 4234 Laboratory #11**

**Fertilizer Calculations Data Sheet (20 points)**

 Student

 Lab

 TA

**Useful formulas**

Weight of fertilizer x nutrient analysis / 100 = weight of nutrient

Gallons per acre (GPA) = 5940 x gallons per minute (GPM)

 miles per hour (MPH) x nozzle spacing (inches)

Density of urea-ammonium nitrate 28% (UAN 28%) = 10.67 lbs per gallon

**Data Sheet (4 pts.)**

Barber metered fertilizer spreader (3.5 pts)

Circumference of the wheel (in) \_\_\_\_87”\_\_\_\_\_

Width of applicator (in) \_\_\_\_96”\_\_\_\_\_

Weight of urea fertilizer after **10 rotations** (kg) \_\_\_\_1.02 kg\_\_

Distance traveled for **10 rotations** (ft) \_\_\_\_\_\_\_\_\_\_\_\_

Area covered in the **10 rotations** (ft2) \_\_\_\_\_\_\_\_\_\_\_\_

Application rate urea fertilizer (lbs urea / acre) \_\_\_\_\_\_\_\_\_\_\_\_

Application rate of nitrogen (lbs N / acre) \_\_\_\_\_\_\_\_\_\_\_\_

\*\*\*Show your calculations to receive full credit\*\*\*

ATV broadcast liquid applicator (3 pts)

Nozzle spacing on the boom (in) \_\_\_\_20”\_\_\_\_\_

Volume of all six nozzles for **30 seconds** (mL) \_\_\_\_2724 ml\_\_

Average volume for one nozzle for **30 seconds** (mL) \_\_\_\_\_\_\_\_\_\_\_\_

Gallons per minute (GPM) for one nozzle (GPM) \_\_\_\_\_\_\_\_\_\_\_\_

Gallons of UAN per acre at **3 MPH** (GPA) \_\_\_\_\_\_\_\_\_\_\_\_

Application rate of nitrogen (lbs N / acre) \_\_\_\_\_\_\_\_\_\_\_\_

\*\*\*Show your calculations to receive full credit\*\*\*

Broadcast Spreader (2 pts)

\*Use Alabama Fact Sheet ANR-0724\*

Width of applicator (ft) \_\_\_40\_\_\_\_\_\_\_

Weight of product in catch pans (grams/sq ft) \_\_\_\_5\_\_\_\_\_\_\_

Application rate (lbs product / acre) \_\_\_\_\_\_\_\_\_\_\_\_

Application rate of nitrogen (lbs N / acre) \_\_\_\_\_\_\_\_\_\_\_\_

 \*\*\*Assume Urea was used (46-0-0)

\*\*\*Show your calculations to receive full credit\*\*\*

Sprayer Calculations for Herbicide (3 pts)

Scenario: You will be spraying 160 acres with a 45 foot boom sprayer with 20” nozzle spacing. Product to be sprayed is round-up at 1.5 quarts per acre, at a spray rate of 10 gallons per acre. You will be spraying at 7 mph with a pump capable of producing 50 psi max.

\*\* Assume no over spray or overlap\*\*

How many gallons of round-up are needed \_\_\_\_\_\_\_\_\_\_\_\_

How many gallons of water will be needed \_\_\_\_\_\_\_\_\_\_\_\_

What **flat fan** tip should be used for a 10 g/a spray rate \_\_\_\_\_\_\_\_\_\_\_\_

 \*\*\*\*According to Teejet Selection Guide

 \*\*\*\*Droplet size does not matter

What psi is required for your tip selection \_\_\_\_\_\_\_\_\_\_\_\_

 \*\*\*\*According to Teejet Selection Guide

\*\*\*Show your calculations to receive full credit\*\*\*

**Questions**

1. (2.5 pts.) Assume the following costs of fertilizer:
**urea = $440 / ton** and 28% **UAN = $420 / ton**.
	1. Using the application rate of nitrogen (lbs N / ac) you just calculated for the barber fertilizer spreader and the ATV broadcast liquid applicator, which fertilizer application method and source is most economical for topdressing your wheat crop this upcoming year? **Show calculations to receive full credit!!!**
2. (3 pts.) Bulk blending of dry fertilizer is common in today’s agriculture. Use **46-0-0**, **18-46-0**, and **0-0-60** to bulk blend one ton of **20-15-10**. How much (lbs) of each product would you use to make that blend? **Show calculations to receive full credit!!!**
3. (3 pts.) What would be the analysis (N – P2O5 – K2O) of a turf fertilizer that was formulated using:

Urea (46-0-0) 600 lbs

Sulfur-coated urea (37-0-0) 600 lbs

DAP (18-46-0) 400 lbs

Potassium Chloride (0-0-62) 400 lbs

2000 lbs

**\*\*\*Bonus\*\*\*** (10 pts.) Assuming the soil testing lab that you used for your lawn (0.5 acres) recommends that you apply a fertilizer with a 4-1-3 ratio, how many 20 pound bags of 16-4-12 should you buy at the local lawn care store so that you have enough for the 2014 year if you plan for **4 different fertilizer applications**  where you apply 0.75 lbs N per 1000 ft2, 1.0 lbs N per 1000 ft2, 0.75 lbs N per 1000 ft2, and 1.0 lbs N per 1000 ft2 per application timing. Also calculate how much P2O5 and K2O you are applying each time you fertilize. What would be the total cost of fertilizer for the 2014 season if each 20 lb bag of 16-4-12 costs $12.00 per bag? Remember you must buy the fertilizer in 20 lb bags, not partial bags!

**SHOW ALL WORK TO RECEIVE CREDIT!!!!**