PROBLEM #1

A grower plans to use Laddock S-12 POST applied on his 700 acres of field corn for broadleaf weed control. His sprayer has a 650 gallon spray tank, and a 60' spray boom equipped with nozzles on 20" centers. After calibration he knows each nozzle's average output volume is 25.6 oz/30 seconds and all nozzles are within +/-5% of the average output volume. At this output volume the grower wants to have a spray rate of 17 gpa and mix for 38 acres when he mixes each tank full of spray solution. Laddock S-12 is a prepackaged mix equivalent to 2.5 pounds per gallon each of bentazon and atrazine. The grower wants to apply the Laddock S-12 so that he is applying 0.73 lbs. of atrazine per acre. The grower has a velvetleaf problem and notices on the label that he should add UAN to Laddock S-12, at a rate of 5% V/V, for improved control of velvetleaf.

*****Round only your final answer to one decimal point (nearest tenth)*****
--unless instructed otherwise--

Rounding Rule: Round the tenths up when the hundredths is 5 or greater.

QUESTIONS:

1. What will be the minimum quantity of each of the following products that the grower will need to purchase for the above situation?
   A. Laddock S-12: 204.4
   B. UAN: 595

   700 × .73 lbs At ÷ 2.5

2. How much of the following is required per tank for one complete fill up?
   A. Laddock S-12: 11.1 g
   B. UAN: 32.3 g
   C. Water: 606.6 g

   700 × 5 × 17 / 100

   650 × .73 / 17 / 2.5

3. At what speed should the grower be applying his herbicide spray?
   7 mph

4. Laddock S-12 is a restricted use pesticide. What information must this grower provide the dealer to be able to purchase this chemical? _____

   650 × 5 / 100

   650 − (11.1 + 32.3)

PROBLEM #2

You are to conduct a residue study to determine the amount of compound RAT 123 found in soil samples between corn rows. Corn will be treated at six individual use rates of 0.014, 0.040, 0.114, 0.324, 0.924, and 2.675 gm ai/hectare of RAT 123. This chemistry is a 25% DF. Plot size is to be 10' X 50". Each treatment is to have 6 replications. Spray volume is to be 20 GPA, 15% average and mix size 6 liters. Because of the small quantity of test substance to be added to each spray mix it will be necessary that you make a stock solution of RAT 123 to be used when preparing the spray solution for each treatment. The sponsor asks that the spray solution for all treatments be mixed using test substance from a common stock solution that contains a RAT 123 concentration of 0.18 mg/ml.

*****Round only your final answer to one decimal point (nearest tenth)*****
---unless instructed otherwise---

Rounding Rule: Round the tenths up when the hundredths is 5 or greater.

QUESTIONS:

1. What quantity of RAT 123 will be needed per mix for each of the six treatments? Express your answer to the nearest hundredth milligram.

A Rate	Rate Units	Chemical Per Mix (mg) B
0.014	g ai/ha	1.8
0.04	g ai/ha	5.13
0.114	g ai/ha	14.63
0.324	g ai/ha	41.58
0.924	g ai/ha	118.59
2.675	g ai/ha	343.18

$\rightarrow \frac{0.014 \times 4 \times 1000 \times 6}{49.4 \times 3.785}$ (25%) mg (Litres mix size)

→ GPA

So, $B = \frac{A \times 4 \times 1000 \times 6\,Lit}{49.4 \times 3.785}$

2. What volume of stock solution and water will you use to make the spray solution for each treatment?

Rate	Rate Unit	C Vol. Stock Solution (mls)	D Vol Water (mls)
0.014	g ai/ha	10 ml	5990
0.04	g ai/ha	28.5	5971.5
0.114	g ai/ha	81.3	5918.7
0.324	g ai/ha	230.9	5769.1
0.924	g ai/ha	658.6	5341.4
2.675	g ai/ha	1906.6	4093.4

$C = \frac{B}{0.18\ mg/ml} = \frac{1.8\ mg}{0.18\ mg/ml} = 10\ ml$

$D = 6000 - 10 = 5990$

PROBLEM #3

You have been asked to spray a 600 x 950 ft alfalfa field with Sencor 75DF at the rate of 12 oz/a. The sprayer is calibrated at 35 GPA. You need to leave 1.75 gal in the sprayer to maintain full pressure and keep hoses filled.

Questions:

1. How much Sencor is needed to complete the job? 9.8 lb

2. How many acres will be sprayed? 13.1 acres → $\frac{600 \times 950}{43560}$

3. How much water is needed to complete the job? 458.5 gal 13.1×35

4. Your sprayer broke down with 105 gal left. Fortunately, you have another sprayer you can use to finish the job, but it is calibrated at 50 GPA. Assuming you can completely empty the tank, how much additional water do you need to add to maintain the same rate of herbicide? 45 gal

5. The dealer just used up the last jug of Sencor 75DF on your neighbor's field, but he has some Sencor 4F. How much Sencor 4F would be required to treat this same field? 1.83 gal

$$\frac{600 \times 950}{43560} \times 12.02 \times \frac{1}{16 \text{ oz}} = 9.81 \qquad \frac{\text{oz}}{\text{pound}}$$

$$\frac{9.8 \times .75}{4 \text{ } 16/\text{gal}} = 1.83$$

PROBLEM #4

Given: A grower wants to apply FUSION + REFLEX + BASAGRAN at 8 oz + 1 pt + 1 pt producter per acre to an 80 acre field. The dealer told him to add crop oil concentrate and 28% UAN at 1.0 and 2.5 gallons per 100 gallons of spray volume, respectively. The sprayer is calibrated at 10 GPA and has a 500 gallon tank.

Questions:

1. How much total spray volume is required to spray this field? 800 gal

8 ox 10 gpa

2. How much FUSION, REFLEX, and BASAGRAN are needed to spray this 80 acre field? 5 gal FUSION, 10 gal REFLEX, 10 gal BASAGRAN.

8 pt / 8 pt/gal

3. How much crop oil concentrate and 28% UAN are needed to spray this 80 acres? 8 gal COC, 20 gal 28% UAN

4. Assuming 500 gallons are used on the first run, what is the total spray volume needed for the second tank? 300 gal

5. How much FUSION, REFLEX, and BASAGRAN are needed in the second tank? 15 pt FUSION, 30 REFLEX, 30 pt BASAGRAN

8 x 80 / 128

WRITTEN CALIBRATION PROBLEM

PROBLEM # 5

Given:

Sprayer:	4-row, 40-inch row width planter sprays a 13-inch band two, 150-gallon saddle tanks 20 GPA 5 MPH
Herbicide:	Alachlor 2 lbs/ac linuron 1.5 lbs/ac
Field size:	200 acres

Questions:

1. What is the flow rate in gallons/minute from each nozzle?

   0.219 GPM

2. How many total gallons of spray solution is needed to treat the entire field?

   1300 gal — cuz, he is treating ½ area = 13" band over 40"/row

3. How many quarts of Lasso 4E and pounds of Lorox 50W will be added to each tank at each fill?

   15 quarts of Lasso 4E → $\frac{150 \times 2 \times 4 \text{ qts/gal}}{20 \times 4}$

   22.5 lbs. of Lorox → $\frac{150 \times 1.5 \times 100}{20 \times 50\%}$

4. How many gallons of Lasso 4E and pounds of Lorox 50W will be needed to treat the entire field?

   32.5 gallons of Lasso → $\frac{1300 \times 2 \text{ lb/acre}}{80 \times 4 \text{ lb/gal}}$

   195 lbs. of Lorox → $\frac{1300 \times 1.5 \text{ lb/acre} \times 100}{20 \times 50\%}$

5. If Lasso costs $16.70 per gallon and Lorox costs $4.60/lb., what is the total cost of herbicide on this field?

   $1490 dollars