PROBLEM #4

Questions:

1. You are going to spray a 6EC herbicide in a 6 acre turf plot. If the rate of application for the chemical is 1.5 quarts (formulation) in 20 gallons of water per acre, how much herbicide formulation should be added to the tank?
   _____qts

2. How many ounces of a NIS adjuvant should be added for a 0.5% v/v final concentration? _____gal

3. What is the use rate in pounds ai/A? _____lbs

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: _____
   B. UAN: _____

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

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

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.

Rate	Rate Units	Chemical Per Mix (mg)
0.014	g ai/ha	_____
0.04	g ai/ha	_____
0.114	g ai/ha	_____
0.324	g ai/ha	_____
0.924	g ai/ha	_____
2.675	g ai/ha	_____

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

Rate	Rate Unit	Vol. Stock Solution (mls)	Vol Water (mls)
0.014	g ai/ha	_____	_____
0.04	g ai/ha	_____	_____
0.114	g ai/ha	_____	_____
0.324	g ai/ha	_____	_____
0.924	g ai/ha	_____	_____
2.675	g ai/ha	_____	_____

PROBLEM #2 (cont.)

3. Calculate the stock solution to the nearest liter greater than what is needed.

What quantity of RAT 123 should be used? _____g
What volume of water is to be used? _____mls

PROBLEM #3

This problem is designed to test your ability to sort through a chemical label and extract the appropriate information. A full label for FRONTIER is included for your use with this problem.

*****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. Frontier may be used for weed control in what crops?
_____, _____, _____, _____

2. What is the common came for Frontier? _____

3. What is the maximum use rate per acre of Frontier that can be used on any soil type in a single year? _____

4. What is the REI for Frontier if it is applied preemergence? _____

5. A grower applied Frontier at a use rate of 20 oz/ac. This use rate is equal to _____ lbs/ac ai.

6. If the CEC of the soil in a filed is <5 and the soil texture is a sand what is the highest permitted use rate for Frontier? _____ (1 pt)

7. List the required PPE for an early entry into a Frontier treated area. (5 pts)
_____
_____
_____
_____
_____
(Note: you may not need all the blanks.)

8. A grower has an 80 acre field to which he applied Frontier. 40 acres was planted to field corn and 40 acres was planted to soybeans. Harvest is complete and he wants to turn his stock cows into the 80 to graze. Is there a problem if he does this? Explain the problem if there is one and give a recommendation for eliminating the problem.

PROBLEM #4

1. What will be your target speed for the application to this plot?
_____ft/sec

Now that you have answered question #1, assume this to be your application speed as you answer the remaining questions:

2. How many mls of test substance will you measure out for this plot?
_____mls (Test substance is to be measured with a 10 ml pipet.)

3. What will be the total volume of spray solution required to spray this treatment?
_____mls

4. What will be the volume of additives used to spray this treatment?
_____mls

5. What will be the volume of carrier you will measure out for this treatment?
_____mls

6. During the application you collected the time to make the application pass across the plot. That time was 36.5 sec.

   A. What was the actual output (GPA) that was delivered to the plot?
   _____GPA

   B. What was the actual ai delivered to the plot? _____lbs ai/A

   C. What percent of target was:
   Actual GPA= _____%
   Actual lbs ai/A=_____

1998 Contest Problems

PROBLEM #1

You are asked to compare the herbicide XY-745 to XY-431. Each herbicide will be compared at 5, 10, 20, and 40 g ai/A. In addition, there will be an untreated control. The protocol requests 4 reps, 20 gpa, and 40 psi. From past experience, you decide to use an 8002 even spray tip with a 20 inch band and a 50 ml spray mixture. XY-431 is a 10% by weight suspension concentrate. Due to the small quantities, the herbicide concentrate must be measured by weight to ensure proper accuracy.

QUESTIONS:

1. What height should the nozzle be set over the target? (tan 40° = 0.839)
   _____(in.)

2. Assuming the spray tip produces the rated output, what is the target speed?
   _____(mph)

1. How much XY-745 is needed? _____(g)

4. How much acetonitrile is needed? (density = 0.78 g/ml)
   _____(ml)

5. How much XY-431 is needed for the 10 g ai/A treatment?
   _____(g)

PROBLEM #3

You have been asked to do a processing study to support the registration of XY-431 in soybeans. The study requires treatments of 0, 20, 40, and 100 GPA. Two 50 lb. samples will be required from each treatment. In addition, the 5 ft. on each end of the plots and boom-end rows may not be sampled, and not more than half of the remaining plot area may be sampled. You will be using 30 in. rows and a 10 ft. boom with 6 nozzles. The field that you are assigned will only allow a plot length of 100 ft., but you may make the plots as wide as you like. Assume that the untreated plot is the same size as the others and your expected yield is 50 bu/A (test weight = 60 lb/bu).

QUESTIONS:

1. What will your minimum plot width be? Make sure your answer a whole number of passes. _____(ft.)

2. Assuming 50 ft. buffers between treatments, how much total area will you need? _____ (Acre)

3. How much chemical will you need (XY-431 is 0.83 lb/gal)? Assume 50% overage and 20 gpa. _____(gal.)

PROBLEM #1 (cont)

4. You are not able to apply the herbicide on the application date. The applicator (your intern) timed his/her pass on one plot at 11.5 sec.

   a) What was the actual output (GPA) that was delivered to the plot?
   _____GPA

   b) What was the actual ai delivered to the plot which received 12 oz/a?
   _____ai/A

   c) What was the percent of target delivered for this plot?
   _____%GPA _____% lb ai/A

PROBLEM #2

You have been asked to spray a 3.3 EC insecticide on a 600 ft x 720 ft pasture. The rate of application is 3 pt/A of formulated product in 40 gal of water per acre. Your sprayer will hold 500 gallons.

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

Questions:

1. How much insecticide formulation should be added to your tank to spray the pasture? _____qts

2. What is the rate in pounds ai/A? _____lbs ai/A

3. How many gallons of product will be needed to spray the pasture? _____gal

4. How many gallons of water will be needed to spray the pasture? _____gal **(±10 gallons)**

PROBLEM #3

This problem is to test your ability to sort through a product label and extract important information. A full Hornet label guide is included with your exam for this problem.

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

Questions:

1. What is the active ingredient(s) in Hornet (common name(s))?
   _____

2. What is the maximum number lb(s) of ai/A allowed per season for ingredient(s)?
   _____lb(s) ai/A

3. What crop(s) is Hornet labeled for? _____

4. A grower applied Hornet at the rate of 2.4 oz/A Post. How many lbs of ai was applied per acre (round to thousandths)? _____lbs ai/A

5. What are the PPE for Hornet?
   _____
   _____
   _____

6. A grower wants to apply Stinger to control Canada thistle in field corn. Hornet was soil applied at a 3.2 oz/A rate. Can the grower use Stinger and if so up to what rate? _____

2000 Contest Problems

PROBLEM #1

Examine this Epic label and answer the questions about the product.

Questions:

1. What is (are) the active ingredient (s) in Epic?

   _____

2. What are the PPE requirements?

   _____

3. Farmer Brown is planning to apply Epic to a sandy loam soil with a pH of 7.6 and 3% organic matter. What rate should he use? _____

4. Farmer Green wants to use Epic on his sweet corn. He has a silty clay loam with a pH of 6.5 and 3.5% organic matter. What rate of Epic should he use?

   _____

5. Farmer Red sprayed 64 acres of Epic at the maximum labeled rate on his silty clay loam soil with a pH of 7.2 and 3% organic matter ten days before planting his corn. How many pounds of active ingredient did he use?

   _____

PROBLEM #2

You have been asked by your parent company in Germany to make an application of an experimental herbicide at 0, 10, 22.5, 37.5, and 50 g ai/ha. The experimental herbicide is formulated as a 120 SC. You need a plot size of 100 x 15 ft to plant all the 40 different weeds and crops and will need 3 replications for each treatment.

Questions: (Use 10% overage in your calculations for these questions.)

1. How many ml do you need for each rate?
   10.0 g rate _____ml 37.5 g rate _____ml

   22.5 g rate _____ml 50.0 g rate _____ml

2. This experimental compound is 14.5% ai by weight. How many grams are required for each rate?
   10.0 g rate _____g 37.5 g rate _____g

   22.5 g rate _____g 50.0 g rate _____g

3. How much compound do you need to order from Germany (Assume your overage has already been figured in from a previous question and you can extract all of the material from the bottle)? _____ml

4. If you spray at 20 GPA, how many liters of water do you need for each treatment? _____L

5. Assume you have just received an EUP for this compound and you will be able to apply the highest rate to a 1 acre block. How much additional material will you need to order? _____ml

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? _____lb

2. How many acres will be sprayed? _____acres

3. How much water is needed to complete the job? _____gal

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? _____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? _____gal

PROBLEM #4

You are calibrating a sprayer. Your output/nozzle is 950 ml/min. Your nozzle spacing is 20 inches and you have a 9 nozzle boom with 11003 tips. Your pressure is set at 30 psi.

Questions:

1. What is the width of the boom? _____ft

2. What is the GPA if you are spraying at 5 mph? _____GPA

3. How fast would you need to go if you wanted to spray at 20 GPA? _____mph

4. What should the height of the boom be over the target? _____in

5. Theoretically, how many acres could be sprayed in 1 hour if the sprayer speed was 8 mph? _____acres

2001 Contest Problems

MULTIPLE CHOICE:

1. Which of the following items does the Precautionary Statement not include information about:
   a. inhalation hazards
   b. applicator and mixer loader safety
   c. first aid information
   d. skin irritation

2. Which of the following would you find on an MSDS?
   a. directions for application
   b. pests controlled by the pesticide
   c. information on the chemical's potential toxicity
   d. foods to eat when applying this chemical

3. Which of the following is an example of cultural pest management?
   a. introducing beneficial insects
   b. post-directed herbicides
   c. a fungicide treatment
   d. use of resistant varieties

4. How does allelopathy contribute to weed survival?
   a. inhibits the germination and growth of other competitive plants
   b. ensures a high rate of crop seed production
   c. allows weeds to absorb more water later in the season
   d. makes the weed difficult to control by cultural, biological, or chemical means.

5. Which of the following statements defines herbicide persistence?
   a. how long a herbicide stays mixed in the spray tank
   b. how long a herbicide will last when stored in a sealed container.
   c. how long a herbicide stays active in the environment after application
   d. how long a herbicide will keep a large market share

6. Which of the following is something an adjuvant can do?
   a. reduce the rate of pesticide needed
   b. help reduce drift by creating larger particles
   c. kill fungal pathogens
   d. both a and b

MULTIPLE CHOICE (cont)

7. What herbicide mode of action would cause the following symptoms: plant stunting and interveinal chlorosis, red/purple leaf veins, roots with pruned lateral roots, slow plant death?
   a. growth regulators
   b. cell membrane disruptors
   c. amino acid biosynthesis inhibitors
   d. photosynthetic inhibitors

8. What type of nozzle does the following describe: a wide angle pattern often used to apply herbicide and herbicide/fertilizer mixtures; produces a large droplet and needs a nozzle arrangement with 100% overlap?
   a. standard flat fan
   b. AI tip
   c. flood tip
   d. full cone

9. Which of the following is a symptom of chronic poisoning?
   a. cramps
   b. vomiting
   c. memory loss
   d. loss of bowel control

10. To reduce off-target pesticide movement spray in conditions with minimal wind and small spray droplets. _____True/False

PROBLEM #1

You are an Illinois farmer applying an EPP treatment to your corn ground in March. Your spray boom has 11 nozzles with 19.5 inch spacing. The flow rate for each nozzle is 12.873 oz/ 15 seconds. You are applying a tank mix of Harness 7EC at 1.5 pts/A and Atrazine 4L at 2 qts/A. Your tractor has two, 225 gallon saddle tanks. Your application rate allows you to apply to 20 acres per total fill up.

*****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. How much chemical per tank for one complete fill:
   A. Harness 7EC _____qts.

   B. Atrazine 4L _____qts.

2. How many hectares can you treat with 2 complete fills: _____ha

3. At what speed should this application be made: _____mph

2001 Contest Problems

PROBLEM #2

This problem is designed to test your ability to sort through a chemical label and extract the required information. A Roundup ULTRAMAX label has been provided for your enjoyment.

*****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. When using Roundup ULTRAMAX in soybeans with the Roundup Ready gene what is the maximum allowable rate in one year in central IL? _____qts. (nearest 0.1 qts)

2. For preharvest weed control in RR corn Roundup ULTRAMAX must be applied at what grain percent moisture? _____%

3. To control 3-6" blacknightshade in central Illinois how many fluid ounces are recommended in Roundup Ready Soybeans? _____oz

4. What is the REI for a post emergence application of Roundup ULTRAMAX? _____hrs.

5. Farmer Brown had a heavy stand of 8-9" Pennsylvania smartweed and applied the maximum allowable rate of Roundup ULTRAMAX to his 82 acre field. How many quarts of product did he use? _____qts.

2001 Contest Problems

PROBLEM #4

You are calibrating a sprayer and find your output/nozzle averages 920 ml/min. Your nozzle spacing is 20 inches and you have a 10 nozzle boom with TT11003 tips. Your pressure is set at 29 psi.

*****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 is the width of your boom? _____ft
2. What is the GPA if you are spraying at 5 mph? _____GPA
3. How fast would you need to go if you wanted to spray at 20 GPA? _____mph
4. What should the height of the boom be over the target? _____in
5. Theoretically, how many acres could be sprayed in 1 hour if the sprayer speed was 8 mph? _____acres