WRITTEN CALIBRATION PROBLEM

PROBLEM #19

Given:	Sprayer:	300 gallon tank 30 nozzles 20 inch nozzle spacing output 10 gallons/acre at approximately 40 PSI
	Herbicide:	Pursuit (22.87% imazethapyr --2.0 lb/gal), applied at the rate of 4.0 fl. oz. of product/acre
	Calibration test:	Traveled at 6 MPH for 30 sec.

Questions:

1. What is the spray swath width? What distance is traveled during the calibration test?
   _____ft swath width
   _____ft distance

2. In setting up the sprayer, what size flat fan nozzles must be on the sprayer to attain 10 gallon/acre at 6 MPH? _____GPM nozzles

3. When the sprayer is correctly calibrated, how much Pursuit should be added to make 300 gallons of spray solution? _____fl ounces

4. How much surfactant would be required in the tank at 0.25% v/v? How much 28% liquid N would be required in the tank at a rate of 2 qts/acre?
   _____pts surfactants
   _____qts 28% N

5. How much water should be collected during the calibration trail, when the sprayer is calibrated perfectly? All nozzles? _____gal

WRITTEN CALIBRATION PROBLEM

PROBLEM #20

Given:

Equipment:	Granular Applicator
Herbicide:	Devrinol:10G Granular Herbicide
Application Rate:	40 lbs/acre
Row Spacing:	24 inches
Band Width:	12 inches
Field Size:	20 Acres

Questions:

1. What is broadcast rate in pounds active ingredients of product?
_____lbs ai/acre

2. How many pounds of product are needed per field acre if treated in 12 inch bands? _____lbs/acre

3. Banded, how many acres actually treated in a 20 acre field?
_____acres

4. How many pounds of product are needed to treat whole field in 12 inch bands?
_____lbs

5. Calculate the amount needed to collect from one outlet per row when the product is banded for 100 ft. _____oz/100 ft

WRITTEN CALIBRATION PROBLEM

PROBLEM #21

Given:	Sprayer:	4 nozzles, spaced on 50 cm centers, spray pressure 40 PSI, spray volume 200/L ha (liter/hectare, 1 hectare = 10,000 sq. m)
	Herbicide:	A water dispersible experimental compound containing 5% ai
	Plot design:	Research plots one spray swath by 10 meters, replicated 4 times

Questions:

1. What is the total treated area per treatment? If you add 10% to cover overage (filling the sprayer tank and plumbing), what would be the total sq. ft. you theoretically could spray?
   _____sq. m. total treated area
   _____sq. m. total treated area plus overage

2. What is the total volume of spray solution needed per treatment (including overage)?
   _____ml

3. How much experimental material is required for one treatment (including overage) at a rate of 5 g ai/ha?
   _____grams

4. What does the output of each nozzle need to be to apply 200 L/ha of total spray at 5 KPH (kilometers per hour)?
   _____ml/min./nozzle

5. How much crop oil concentrate should be added per treatment if used at a rate of 2 L/ha?
   _____ml

WRITTEN CALIBRATION PROBLEM

PROBLEM #22

Given: Two 150-gallon saddle tanks
40-foot spray boom, 40-inch nozzle spacing
15 GPA at 5 mph
Traveled 220 feet for calibration run
Pendimethalin 1.0 lbs./A + imazaquin 0.125 lbs./A

Questions:

1. What is the flow rate from the spray boom?_____GPM

2. What is the flow rate from each nozzle?_____GPM

3. How much Scepter 1.5EC is required to treat 60 acres?_____gal.

4. How much Prowl 4EC is required per tank at each fill?_____gal.

5. If Prowl 4EC costs $25 per gallon and Scepter 1.5EC costs $175 per gallon, what is the cost per acre of this application? _____$/A

WRITTEN CALIBRATION PROBLEM

PROBLEM #23

Given: 12 row, 30 inch spacing planter with 14-inch band granular herbicide applicators.

Lasso II 15G granular herbicide applied at 3 lbs ai/acre 50-acre field.

Questions:

1. What is the broadcast rate in lbs. of product?_____lbs/A

2. How many lbs. of product are needed per field acre when banded?_____lbs/A

3. How many acres are actually treated in this field?_____acres

4. How many lbs. of Lasso II are required to treat this field? _____lbs

5. Calculate the amount of product to collect from each applicator unit over a distance of 500 feet to ensure proper calibration: _____oz

WRITTEN CALIBRATION PROBLEM

PROBLEM #24

Given:

Plot length:	20 feet
Replications:	3
Sprayer:	4 nozzles, 20" spacing
Spray volume:	25 GPA
Spray pressure:	30 PSI
Formulation:	1.5 a.i./gal.

Questions:

1. What is the total area treated per treatment over three replications?
_____acres (nearest 1000th)

2. Assuming a 30% overage to charge your equipment, how much solution is required per treatment mix to treat the desired area?_____gal. (nearest tenth)

3. How many milliliters of formulated compound are required for one treatment mix, in order to apply a rate of 0.0625 lbs. a.i./A? _____ml.

4. How many milliliters of surfactant would be required for one treatment mix, to apply a rate of 0.5% v/v? _____ml.

5. What should the output of each nozzle be to apply 25 GPA at 4 MPH?
_____GPM

WRITTEN CALIBRATION PROBLEM

PROBLEM #25

Given:

Equipment:	Gandy Air-Spred Test Plot Applicator
Product:	Amiben 10G Granular Herbicide
Application Rate:	2.5 lbs. a.i./Acre (Broadcast)
Row Spacing:	30 Inches
Band Width:	10 Inches
Field Size:	40 Acres

Questions:

1. What is broadcast rate in pounds of product?

2. How many pounds of product needed per field acre if treated in 10-inch bands?

3. How many acres actually treated in a 40-acre field?

4. How many pounds of product needed to treat whole field in 10-inch bands?

5. How many pounds of product needed if material is broadcast?

6. Calculate the amount needed to collect from one outlet when the product is broadcast for 100 feet.

7. Calibrate the Air-Spred to apply the correct amount at 5 mph.

   Grams/100' _____ Amiben 10G

   Time _____ sec/100'

WRITTEN CALIBRATION PROBLEM

PROBLEM #26

Given: 250 gallon tank
30 nozzles, 20-inch spacing
10 GPA at 8 mph
Assure 0.8 EC (0.8 lb ai/gal quizalofop)
Rate = 10 oz Assure/A plus X-77 surfactant at 0.25% v/v
Traveled 33 seconds for calibration run

Questions:

1. How much quizalofop is applied per acre?
_____oz.

2. How much X-77 is applied per acre? _____oz.

3. At 8 MPH, what distance is traveled during the calibration run?
_____ft.

4. A calibration run indicated an output of 9.5 GPA at 8 MPH. Adjusting travel speed to attain the desired output of 10 GPA would result in a new travel speed of _____MPH.

5. After setting the proper calibration, how much Assure and X-77 should be added each time the spray tank is filled?
Assure _____oz. X-77_____oz.

WRITTEN CALIBRATION PROBLEM

PROBLEM #27

Given: Basagran 4 S (4.0 lb ai/gal bentazon)
Rate = 0.50 lb a.i. per acre applied in a 15 inch band
28% Nitrogen solution (UAN) at 1 GPA
12 row sprayer, 30 inch rows
20 GPA at 5 MPH
350 acre field
200 gal spray tank

Questions:

1. What is the broadcast rate of Basagran in ounces of product per acre?
_____oz

2. How many ounces of product are needed per field acre when banded?
_____oz

3. How much 28% Nitrogen, in gallons, should be added to each spray tank?
_____gal

4. How many total gallons of spray solution are needed to treat the field?
_____gal

5. What flow rate (GPM) is required per nozzle to apply 20 GPA in the band?
_____GPM

WRITTEN CALIBRATION PROBLEM

PROBLEM #28

Given: 80 acre field
Marksman 3.2 L (1.1 lb ai dicamba + 2.1 ai atrazine per gallon)
Aatrex 4L (4.0 lb ai atrazine per gallon)
Rate = 0.5 lb ai dicamba per acre + 2.0 lb ai atrazine per acre
20 GPA at 4 MPH
250 gallon tank
20 inch nozzle spacing

Questions:

1. How many gallons of Marksman are required to treat the field with 0.5 lb ai/A dicamba? _____gal

2. How much atrazine (lb ai) is applied to the field from the Marksman application in question 1? _____lb ai

3. Assume the proper Marksman (0.5 lb ai dicamba/A) application is made to the field. How many additional gallons of Aatrex 4L are required to treat the field to maintain the final 2.0lb ai/A rate of atrazine? _____gal

4. What should the output of each nozzle be to apply 20 GPA at 4 MPH? _____GPM

5. If Marksman costs $19.44 per gallon and Aatrex 4L costs $10.19 per gallon, what is the cost per acre of this application? _____$/A

WRITTEN CALIBRATION PROBLEM

PROBLEM #29

Given: Harmony 75 DF (75% ai dry flowable)
Rate = 0.375 oz. ai per acre
Nonionic surfactant (X-77) at 0.25% v/v
200 acre field
10 GPA at 5 MPH
300 gallon tank
30 nozzles spaced 20 inches apart
Calibration test for 15 seconds at 5 MPH

Questions:

1. What is the boom width? _____feet

2. What volume (ml) should be collected from a single nozzle during the calibration test? _____ml

3. How many ounces of Harmony 75DF must be added to each full tank?
_____oz

4. How many spray tanks will be required to treat the field?
_____tanks

5. How much Harmony 75 DF (oz) is needed to treat the field?
_____oz.

6. Assuming you use an 8002 Flat Fan nozzle, what should the pressure be to achieve an output of .156 gallons per minute from the nozzle? _____PSI

7a. If you are applying 23 GPA @ 38 PSI while travelling 6 mph, what should your speed be in order to get an output of 20 GPA? _____MPH

7b. What should you adjust the pressure to if the speed remains contsant?
_____PSI

WRITTEN CALIBRATION PROBLEM

PROBLEM #30

Given: Marksman 0.38L (0.13 kg ai dicamba + 0.25 kg ai atrazine per liter)
Aatrex 0.5L (0.5 kg ai atrazine per liter)
Rate: 0.6 kg ai dicamba/ha + 2.25 kg ai atrazine/ha
187 LPH at 6.5 KPH
950 liter tank
50 cm nozzle spacing
32 ha field

Questions:

1. How many liters of Marksman are required to treat the field with 0.6 kg ai/ha dicamba? _____liters

2. How much atrazine (kg ai) is applied to the field from the Marksman application in question 1? _____kg ai

3. Assume the proper Marksman (0.6 kg ai dicamba/A) application is made to the field. How many additional liters of Aatrex 0.5L are required to treat the field to maintain the final 2.25 kg ai per ha rate of atrazine? _____liters

4. What should the output of each nozzle be to apply 187 LPH at 6.5 KPH?
_____ml/15 sec/nozzle

5. If Marksman costs $5.14 per liter and Aatrex 0.5L costs $2.69 per liter, what is the cost per ha of this application? _____$/ha

WRITTEN CALIBRATION PROBLEM

PROBLEM #31

Given: Galaxy 0.44L, 4.5:1 package mix ratio of bentazon and acifluorfen, respectively.

1. How many kg of bentazon are in each liter of Galaxy? _____kg

2. How many kg of acifluorfen are in each liter of Galaxy? _____kg

3. What would the rate of acifluorfen be if the rate of bentazon is 0.84 kg/ha?
_____kg

4. If a grower wanted to apply bentazon at 0.84 kg/ha and acifluorfen at 0.28 kg/ha, how much Blazer 0.24S would have to be added to Galaxy for each ha treated?
_____ml

5. How many liters of Galaxy would need to be added to a 1500 liter spray tank when the spray volume is 187 LPH and the rate is 0.84 kg/ha bentazon + 0.19 kg/ha acifluorfen?
_____liters

WRITTEN CALIBRATION PROBLEM

PROBLEM #32

Given: Herbicide: Pursuit Plus 2.9EC, 13.5:1, package mix ratio of pendimethalin to imazethapyr, respectively.

Questions:

1. How many pounds of pendimethalin are in 2.5 pints of Pursuit Plus herbicide? _____lbs (nearest 1/1000th)

2. How many pounds of imazethapyr are in 2.5 pints of Pursuit Plus herbicide? _____lbs (nearest 1/100th)

3. If a grower wanted to apply pendimethalin at 1.485 lbs/a, how much additional Prowl 3.3EC would have to be added to Pursuit Plus 2.9 EC herbicide for each acre treated if the Pursuit Plus rate is based upon 0.063 lbs/a of imazethapyr? _____pts (nearest 1/10 pts.)

4. How many gallons of Pursuit Plus herbicide will need to be added to a 300 gallon spray tank when the spray volume is 25 gallons/acre and the rate is based upon 0.063 lbs/a of imazethapyr? _____gals (nearest 1/1000th)

5. How many gallons of Prowl 3.3EC herbicide will need to be put into the spray tank with the Pursuit Plus to provide the grower with 1.485 lbs/a Of pendamethalin? _____gals (nearest 1/10)

WRITTEN CALIBRATION PROBLEM

PROBLEM #33

Given:	Sprayer:	4 nozzles spaced on 48.26 cm centers, spray pressure 40 PSI, spray volume 200 L/ha (liters/hectare, 1 hectare = 10,000 sq. m)
	Herbicide:	An EC experimental compound containing 10% ai.
	Plot Design:	Research plots one spray swath by 10 meters, replicated 4 times.

Questions:

1. What is the total treated area per treatment? If you add 10% to cover overage (fill the plumbing and maintain enough spray solution in spray tank that you don't blow air), what would be the total sq. meters you theoretically could spray?

   _____sq. m. treated area
   _____sq. m. treated area plus overage

2. What is the total volume of spray solution needed per treatment (including overage)? _____ml (nearest ml)

3. How much experimental material is required for one treatment (including overage) at a rate of 70 g ai/ha? _____ml (nearest 1/10 ml).

4. What does the output of each nozzle need to be to apply 200 L/ha of total spray at 4 KPH (kilometers per hour)? _____ml/min/nozzle (nearest ml).

5. How much non-ionic surfactant should be added per treatment if used at a rate of 0.25% v/v? How much carrier (water) should be added to the spray tank per treatment (including overage)?
   _____ml of NIS (nearest ml).
   _____ml of carrier (nearest ml).

WRITTEN CALIBRATION PROBLEM

PROBLEM #34

Given:

Equipment:	Granular applicator
Herbicide:	Eradicane 25G
Application Rate:	20 lbs/acre (broadcast)
Row Spacing:	30 inches
Band Width:	12 inches
Field Size:	20 acres

Questions:

1. What is the broadcast rate in pounds of active ingredient per acre?
_____lbs ai/a

2. How many pounds of product are needed per field acre when treated in 12 inch bands? _____lbs/a

3. When banded, how many acres are actually treated in this 20 acre field?
_____acres

4. How many pounds of product are needed to treat the whole field in 12 inch bands? _____lbs

5. Calculate the amount to be collected from one band when the product is banded for 100 ft of row? _____oz/100 ft (nearest 1/100).

WRITTEN CALIBRATION PROBLEM

PROBLEM #35

Given:

Sprayer: Nozzles spaced on 20 inch centers
Spray pressure--30 PSI
Discharge from nozzles -- ml/ 1 sec
Nozzle #1 -- 7.24
Nozzle #2 -- 7.74
Nozzle #3 -- 7.09
Nozzle #4 -- 7.26
Nozzle #5 -- 7.17
Nozzle #6 -- 7.13

Speed Check -- Rate of Travel
1st check -- 300 ft 1.3588 min
2nd check -- 300 ft 1.3668 min
3rd check -- 300 ft 1.3646 min

Herbicide: Roundup (glyphosate) -- 4 lb ai/gallon
Specific gravity = 1.1690 gr/ml

Area of Treatment: 12,100 ft^2

Questions:

1. Your SOP states that you must replace any nozzle tip that falls outside + 5% of the mean flow rate for all nozzles. Do all nozzles fall within +5% of the mean nozzle flow rate? ____Yes _____No

   If your answer is no, which nozzle(s) must be replaced?
   _____Nozzle number(s).

2. After carefully checking the nozzle flow rates you have replaced nozzle number _____ (from question #1). The replacement nozzle has a discharge rate of 7.04 ml/1 sec. What is the total discharge: _____ml/1 sec. (nearest 1/100)

3. What would be the gallonage of spray solution applied per acre?
   _____gal/ac (nearest 1/100)

PROBLEM #35 (cont)

4. In this residue study glyphosate is to be applied PRE at 7.6 lbs ai/ac. The researcher wants to measure out the product by weight instead of by volume.

   How many milliliters of Roundup will he need? _____mls (nearest 1/100)

   How much will this volumn of Roundup weigh? _____grams (nearest 1/100)

5. The Roundup will be applied in water. What volume of water (carrier) will the researcher need for this residue study? _____mls (nearest 1/10)

WRITTEN CALIBRATION PROBLEM

PROBLEM #36

You are a farmer applying a PPI treatment with a 15 ft. Lely Rotara. Your spray boom has 9 nozzles with 19.25 inch spacing. The flow rate for each nozzle is 12.192 oz/15 seconds. You are applying a tank mix of Scepter 1.5AS at 0.125 lbs ai / A and Prowl 3.3EC at 0.75 lbs ai / A. Your tractor has two, 225 gallon saddle tanks and a 30 gallon induction cone tank for mixing. Your application rate allows you to apply to 18 acres per total fill up.

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

Rounding Rule: When the digit to be rounded off is followed by a 5 standing alone or followed by zeroes, it is unchanged if it is even but increased by one if it is odd.

QUESTIONS:

1. How much chemical per tank for one complete fill:

   A) Prowl 3.3 EC _____

   B) Scepter 1.5 AS _____

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

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

WRITTEN CALIBRATION PROBLEM

PROBLEM #40

GIVEN:
Herbicide: Tornado 1.75E, 0.75:1, package mix ratio of fluazifop-P-butyl to fomesafen, respectively.

QUESTIONS:

1. How many pounds of fomesafen are in 2.0 pints of Tornado herbicide? _____lbs (nearest 1/100 lbs.)

2. How many pounds of fluazifop are in 2.0 pints of Tornado herbicide? _____lbs. (nearest 1/1000 lbs.)

3. If a grower wanted to apply fomesafen at 0.375 lb/A, how much additional Reflex 2 LC would have to be added to Tornado 1.75E herbicide for each acre treated if the Toronado rate is based upon 0.125 lb/A of fluazifop? _____pts. (nearest 1/10 pts.)

4. How many gallons of Tornado herbicide will need to be added to a 250 gallon spray tank when the spray volume is 20 gallon/A and the rate is based upon 0.125 lb/A of fluazifop? _____gals. (nearest 1/10)

5. How many gallons of Reflex 2 LC herbicide will need to be put into the spray tank with the Tornado to provide the grower with 0.375 lb/A of fomesafen? _____gals. (nearest 1.10)

WRITTEN CALIBRATION PROBLEM

PROBLEM #42

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? _____gal

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

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

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

5. How much FUSION, REFLEX, and BASAGRAN are needed in the second tank? _____pt FUSION, _____REFLEX, _____pt BASAGRAN

WRITTEN CALIBRATION PROBLEM

PROBLEM #43

Given: Herbicide: GEMINI (**see attached label**)

Questions:

1. How many pounds of linuron are in 20 oz products of GEMINI herbicide? _____lbs (nearest 1/100)

2. GEMINI is a restricted use herbicide. True_____ False_____

3. If a grower had a 2% OM silt loam soil, what rate range of GEMINI herbicide is recommended? _____oz prod/A

4. How many pounds of chlorimuron E are in 20 oz product of GEMINI herbicide? _____lbs (nearest 1/1000)