2017 NCWSS weed contest   **Time: _____**

Written sprayer calibration test

Name:_____

School:_____

Team:_____

Instructions:
- Only host-provided calculators can be used.
- Time limit: 60 minutes
- Give answer to the number of decimal places indicated.
- Circle your answer (except #1 and #2F-J)
- Conversion sheet on last page

1.   Convert the following (1 point each):

   A.   48 weed scientists/acre = ____307,200___ weed scientists/10 square
           miles (0 decimal place)

   B.   10 km/hr = ___9.1_____feet/sec (1 decimal place)

   C.   124 ml/20 sec = _____5.9_____ gal/hr (1 decimal place)

   D.   15 gal/acre = _____140_____ L/ha (0 decimal place)

2.   You are a blueberry grower and want to spray Devrinol 50 DF herbicide. Your
        blueberry rows are 10 feet apart, with a 4-foot grass strip between the rows
        that you do not treat and just keep mowed. See Devrinol 50 DF product label
        provided for this problem.

   A.   For this 5 acre field, how many acres of the field is mowed grass? (1
           decimal place) (2 points)

                        2.0 acres

B.   For this silty clay loam soil, what is the rate in lb ai/acre you should apply? (2 points)

4.0 lb ai

C.   How pounds of Devrinol product will be sprayed on this field at this rate? (1 decimal place) (2 points)

24.0 lb

D.   How many pounds of active ingredient will be sprayed on this field? (1 decimal place) (1 point)

12 lb ai

E.   How long must you wait before re-entering the field without having to use PPE? (1 point)

24 hours

F.   List the PPE required for applicators and handlers. (3 points)

Long-sleeve shirt and long pants
Chemical-resistant gloves
Shoes plus socks

G.   Will Devrinol control weeds that are emerged at the time of application? (1 point)

No

H.   Can Devrinol be applied as a tank mix with Gramoxone Max? (1 point)

Yes

I. What is the minimum gallons per acre required for applying Devrinol? (1 point)

    10 gpa

J. If you decide to tear out your blueberries and plant corn, how long after Devrinol application do you need to wait before planting corn in this field? (1 point)

    12 months

3. The 14th fairway on a golf course has had a crabgrass problem. As head greenskeeper for this course, you want to prevent the problem by applying Pendulum AquaCap at 1.1 fl oz/1000 ft^2 in the spring. The fairway is 115,000 ft^2.

    A. How many acres are contained within this fairway? (2 decimal places) (2 points)

        2.64 acres

    B. How many pints of Pendulum AquaCap will you apply to this fairway? (1 decimal place) (2 points)

        7.9 pts

    C. The label states that control is improved if a half inch of rainfall or sprinkler irrigation occurs soon after application. How many gallons of water need to be applied to this fairway to achieve this? (0 decimal place) (2 points)

        35,843 gal

    D. In a calibration run with your ATV-mounted sprayer, you collected an average of 4.2 fl oz per nozzle in 15 seconds. Your nozzle spacing is 12 inches and your speed is 3.6 mph. How many gallons of spray solution do you need to apply to the fairway at this GPA? (1 decimal place) (2 points)

4.   47.6 gal

5.   You want to apply Impact herbicide (2.8 lb ai/gal) to a corn field to control annual broadleaf weeds. The field is 130 acres. Your sprayer covers eighteen 20-inch rows and has 15 nozzles. You put 100 gallons of water in your 500-gallon tank and do a calibration run on for 500 feet. At the end of the run there are 94 gallons left in the tank.

   A.   What is the spray volume in gallons/acre? (1 decimal place) (2 points)

   17.4 gal/a

   B.   If the calibration run took 58 seconds, what was the sprayer speed in mph? (1 decimal place) (2 points)

   5.9 miles/hour

   C.   What was the average output (ml/nozzle) during the calibration run? (0 decimal place) (2 points)

   1514 ml

   D.   You will spray Impact at 0.75 fl oz/acre. How many pints of product do you need per full spray tank? (2 decimal places) (2 points)

   1.35 pints

   E.   How many tanks will you need to cover the field? (1 decimal place) (2 points)

   4.5 tanks

6. As a rice farmer, you want to apply Ordram 15-GM herbicide to control barnyardgrass. This is a granular formulation with 15% molinate active ingredient and the use rate is 25 lb/acre. Your field is 0.25 square miles and the Ordram will be applied by air.

    A. How many pounds of Ordram are needed to treat this field? (0 decimal place) (1 points)

<div align="center">4000 lbs</div>

    B. How many pounds of inert ingredient are applied to this field? (0 decimal place) (1 point)

<div align="center">3400 lbs</div>

    C. The plane flies at 120 mph and treats a swath 50 feet wide. How many pounds of Ordram should be applied on a 1000-foot calibration run to ensure proper application rate? (0 decimal place) (2 points)

<div align="center">29 lbs</div>

    D. If Ordram has a bulk density of 60 lb/ft^3, how many bushels of Ordram are needed to treat the field? (1 decimal place) (2 points)

<div align="center">53.8 bu</div>

7.   Storm 4L is a premix of bentazon and acifluorfen at a 2:1 ratio, respectively.

    A.   How many pounds of bentazon are in each gallon of Storm 4L? (2 decimal places) (1 point)

        2.67 lbs

    B.   How many pounds of acifluorfen are in each gallon of Storm 4L? (2 decimal places) (1 point)

        1.33   lbs

    C.   You want to apply bentazon at 0.75 lb ai/acre and acifluorfen at 0.25 lb ai/acre. To do this, you will need to add additional bentazone (as Basagran, 4 lb bentazon/gal) to achieve the desired bentazon rate. How many pints of Basagran (4 lb bentazon/gal) would you need to add per acre? (1 decimal place) (3 points)

        0.5 pt

    D.   How many gallons of Storm would you need to add to a 400-gallon spray tank to achieve the desired up rate if your spray volume is 20 gpa? (1 decimal place) (2 points)

        3.8 gal

Conversion sheet

1 ml = 0.034 fl oz
1 gallon = 3.785 L
1 gallon = 8 pints
1 hectare (ha) = 2.471 acres
1 mol = 6.023 x 10^{23} molecules
1 fl oz = 29.6 ml
1 oz = 28.4 g
1 ton = 2000 lbs
640 a = 1 sq. mile
1 bushel = 9.31 gallons = 1.24 ft^3
1 lb = 454 g
1 hour = 60 minutes
1 minute = 60 seconds
1 mile = 5280 feet
1 pt = 16 fl oz
1 foot = 30.5 cm
1 inch = 2.54 cm
1 acre-inch = 27, 154 gallons (1 inch of water covering 1 acre)
1 acre = 43,560 ft^2
1 kg = 2.203 lbs
Area = πr^2
Circumference = $2\pi r$
π=3.14