

Key with Solutions

2023 State Floriculture CDE Problem Solving Practicum (200 points)

Directions: Use the information given with each problem, along with a calculator and scratch paper/work space on packet, to solve each problem (20 points each). Mark your answers on the scantron.

1. Nitrogen recommendations for Wave Petunias calls for 200 ppm. Using the information in the table below, how many ounces of water-soluble fertilizer (20-10-20) would be needed per gallon of concentrate while using an injector ratio of 1:100?

Injector Ratio	100 ppm Nitrogen	150 ppm Nitrogen	200 ppm Nitrogen	400 ppm Nitrogen	Nitrogen Strength
Ounces of fertilizer per gallon of concentrate					
1:16	2.1	3.2	4.3	8.5	10 %
1:50	6.67	10.0	13.33	26.66	10 %
1:100	13.3	20.0	26.7	53.3	10 %
1:200	26.7	40.0	53.3		10 %
1:16	1.4	2.1	2.8	5.7	15 %
1:50	4.5	6.75	9.0	18.0	15 %
1:100	9.0	13.5	18.0	36.0	15 %
1:200	18	27.0	36.0		15 %
1:16	1.1	1.6	2.1	4.3	20 %
1:50	3.4	5.1	6.8	13.5	20 %
1:100	6.8	10.2	13.5	27.0	20 %
1:200	13.5	20.3	27.0	54.0	20 %

N 20 P 10 K 20

- A. 6.67 oz/gal
- B. 53.3 oz/gal
- C. 18.0 oz/gal
- D. 13.5 oz/gal

2. A greenhouse employee is asked by a supervisor to use a 5-gallon backpack sprayer to apply a pesticide. This employee is restricted to carrying no more than 50 pounds on their back due to doctor's orders. If the sprayer weighs 13.7 pounds empty, how many gallons of water/pesticide mixture can the worker put in the sprayer to equal 50 pounds? Round to the nearest hundredth. (One pound of water/pesticide mixture weighs 8.3 pounds)

- A. 5.0 gallons
- B. 4.37 gallons
- C. 3.78 gallons
- D. 3.15 gallons

$$50 \text{ pounds} - 13.7 \text{ pounds (sprayer)} = 36.3 \text{ pounds of liquid}$$

$$36.3 \text{ lbs liquid} / 8.3 \text{ lbs/gallon} = 4.37349 \text{ gallons of liquid}$$

3. A greenhouse operator is trying to calculate water usage. The average water pressure in the greenhouse is 50 lbs. The greenhouse has a 75-foot water hose that is $\frac{1}{2}$ " in diameter. How many gallons of water would flow through the hose in 10 minutes?

Table 32. Volume of water delivered - by size of hose

Water Pressure (lbs)	(Gallons per Minute in Bold Face) Hose Diameter						
	3/8"	13/32"	7/16"	1/2"	9/16"	3/4"	5/8"
30	2.6	3.2	3.8	5.3	7.2	9.3	14.5
40	3.5	4.2	5.0	7.0	9.4	12.2	19.0
50	4.3	5.2	6.3	8.8	11.8	15.3	24.0
60	5.2	6.2	7.5	10.5	14.1	18.3	28.5
70	6.0	7.3	8.7	12.2	16.2	21.0	32.7
80	6.8	8.3	9.9	13.9	18.5	24.0	37.3

NOTE: Table based on 50-foot hose length; for 25 feet, multiply by 1.40; for 75 feet, multiply by 0.80.

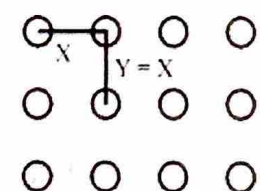
- A. 8.8 gallons
- B. 88 gallons
- C. 70.4 gallons
- D. 7.04 gallons

8.8 gal/minute for $\frac{1}{2}$ " 50 foot hose

$8.8 \text{ gal/minute} \times 0.80 = 7.04 \text{ gal/minute}$

$7.04 \text{ gal/minute} \times 10 \text{ minutes} = 70.4 \text{ gallons}$

4. A designer is calculating the number of pansies to be placed in a 10' x 20' raised bed. Using the chart below, how many pansies would be needed if the entire raised bed was planted on a 10" x 10" spacing?

Planting Pattern	Inches between rows of plants (Y)	Inches between plants (X) within rows	Estimated number of plants per 100 ft ²
<p>Square</p> <p>For square spacing, the distance between plants within rows (x) equals the distance between rows (Y)</p> 	4	4	900
	6	6	400
	8	8	225
	10	10	144
	12	12	100
	14	14	74

- A. 288
- B. 144
- C. 200
- D. None of the above

144 plants per 100 ft²

10' x 20' bed = 200 ft²

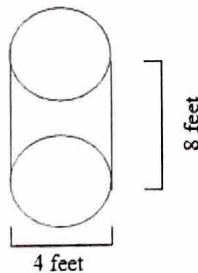
$144 \times 2 = 288 \text{ plants}$

5. A greenhouse contractor is assessing options for covering a new greenhouse. The U-value indicates the insulating properties of the material; a high U-value indicates a poor insulator. Of the answer choices given, what material offers good insulation and the lowest cost per square foot?

Material	U-Value	Light Transmittance	Cost per square foot
Glass	1.13	75%	\$2.31
Glass, Double Layer	0.65	70%	\$4.62
Fiberglass	1.00	75%	\$1.47
Corrugated Polycarbonate	1.20	75%	\$1.68
Polyethylene	1.15	65%	\$0.34
Polyethylene, Double Layer	0.70	60%	\$0.68
Polycarbonate Bi-Wall	0.65	60%	\$2.09
Acrylic Bi-Wall	0.65	60%	\$2.44
IR Film	1.00	65%	\$2.06

- A. Glass, Double Layer
- B. Acrylic Bi-Wall
- C. Corrugated Polycarbonate
- D. Polyethylene, Double Layer

6. A nursery has acquired three large cylindrical containers measuring 4 feet wide at the base and 8 feet tall. Using the information provided below, how many total gallons of liquid could be stored in these three containers (rounded to nearest gallon)?



Given:
 Volume in $\text{ft}^3 = \pi r^2 h$
 $\pi = 3.14$
 $r = \text{radius}$
 $h = \text{height}$
 $7.48 \times \text{ft}^3 = \text{gallons}$

- A. 301 gallons
- B. 2,255 gallons
- C. 752 gallons
- D. 711 gallons

$$V = \pi r^2 h$$

$$V = 3.14 (2^2) 8$$

$$V = 3.14 (4) 8$$

$$V = 3.14 (32) = 100.48 \text{ ft}^3 / \text{cylinder}$$

$$100.48 \times 3 = 301.44 \text{ ft}^3$$

$$301.44 \text{ ft}^3 \times 7.48 = 2,254.77 \text{ gallons}$$

7. A greenhouse worker is planning to mix Osmocote in a batch of potting media but cannot find the graduated measuring cup or weight scale. A fellow worker suggests using a 3 1/2" plastic pot to measure out the needed quantity and provides the chart below for reference. With a suggested rate of 6 pounds of Osmocote per batch, how many 3 1/2" pots filled with Osmocote would equal the needed amount for the batch of potting media?

Fertilizer	Pot Size					
	2 1/4"	3"	3 1/2"	4"	5"	6"
Ammonium nitrate	2 oz	5 1/2 oz	9 oz	15 oz	1 lb 12 oz	2 lb 15 oz
Urea, 45-0-0	2 1/2 oz	6 oz	9 oz	1 lb	1 lb 13 oz	3 lb
Superphosphate	2 1/2 oz	6 oz	9 1/2 oz	1 lb	1 lb 14 oz	3 lb 2 oz
Dusting sulfur	2 1/2 oz	6 oz	10 oz	1 lb	1 lb 14 oz	3 lb 3 oz
Peters, 20-5-30	2 1/2 oz	6 oz	10 oz	1 lb 1 oz	1 lb 15 oz	3 lb 3 oz
Ammonium sulfate	3 oz	7 oz	11 oz	1 lb 3 oz	2 lb 3 oz	3 lb 11 oz
Osmocote, 14-14-14	3 oz	7 1/2 oz	12 oz	1 lb 4 oz	2 lb 5 oz	3 lb 13 oz
MagAmp, 12-62-0	3 oz	7 1/2 oz	12 oz	1 lb 4 oz	2 lb 5 oz	3 lb 14 oz
Gypsum, CaSO ₄	3 oz	8 oz	12 1/2 oz	1 lb 5 oz	2 lb 7 oz	4 lb 1 oz
Calcium nitrate	3 oz	8 oz	12 1/2 oz	1 lb 6 oz	2 lb 8 oz	4 lb 2 oz
Peters, 15-0-15	3 1/2 oz	8 oz	13 oz	1 lb 6 oz	2 lb 9 oz	4 lb 5 oz
Potassium chloride	3 1/2 oz	9 oz	14 oz	1 lb 8 oz	2 lb 12 oz	4 lb 9 oz
Sodium nitrate	4 oz	9 oz	15 oz	1 lb 9 oz	2 lb 14 oz	4 lb 13 oz
Dolomitic limestone	5 1/2 oz	13 oz	1 lb 5 oz	2 lb 4 oz	4 lb 2 oz	6 lb 14 oz

- A. 4
- B. 6
- C. 8
- D. 10

6 pounds Osmocote per batch

6 pounds \times 16 oz/lb = 96 oz/batch

96 oz/batch \div 12 oz/scoop = 8 scoops

8. A florist is preparing a bouquet of flowers for Valentine's Day. The customer has ordered the "Sweetheart Special" – a dozen red roses with baby's breath and leatherleaf fern cuttings. This shop calculates the total retail cost of arrangements by adding up the wholesale cost of materials and multiplying by 3 to cover retail markup and labor. What would be the total cost to the customer (rounded to nearest whole dollar)?

Quantity	Material	Wholesale Price per Unit
12	Red Rose	\$1.09
6	Baby's Breath Stems	\$0.59
4	Leatherleaf Fern Stems	\$0.79
1	#9 Satin Ribbon	\$0.79
1	Floral Tape	\$0.25
1	Vase	\$4.99
1	Enclosure Card	\$0.20

- A. \$26
- B. \$78
- C. \$52
- D. \$68

\$26.01 \times 3 = \$78.03

\$26.01 in materials

9. A greenhouse worker is mixing four backpack sprayers that are 5 gallons each to treat a whitefly infestation. Given the information from the label provided below, how many total ounces of Decathlon will be used for the 20 gallons she is mixing (rounded to nearest one hundredth)?

GROUP 3 INSECTICIDE

DECATHLON® 20 WP

FOR COMMERCIAL USE ONLY. FOR BROAD-SPECTRUM CONTROL OF LISTED CRAWLING AND FLYING INSECT PESTS ON ORNAMENTALS AND NURSERY STOCK.

ACTIVE INGREDIENT: Cyfluthrin 20.0%
 OTHER INGREDIENTS: 80.0%
 TOTAL: 100.0%

EPA Reg. No. 59807-17 EPA Est. Indicated by second and third digits of the batch number on this package. (03)=3125-MO-1 (98)=33967-NJ-1

**STOP - READ THE LABEL BEFORE USE
 KEEP OUT OF REACH OF CHILDREN
 CAUTION**

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

Produced for: GHP, Inc., PO Box 746, Bluffton, SC 29910-0746, (800) 356-4647
 981780
 Net Contents: 8 ounces (227 grams) ESL072417N REV102417

			APPLICATIONS
CROP	PEST		DECATHLON 20 WP per 100 gallons
Ornamentals and Nursery Stock (Including Trees, Shrubs, Evergreens, Flowers, Foliage Plants)	Aphids	Mealybugs	54 grams (1.9 oz)
	Boxelder bugs	Orchid weevil	
	Budworms	Pear psylla	
	Casebearers	Peppertree psyllid	
	Clover mites	Plant bugs	
	Cockroaches**	Scale insects (crawler stages)	
	Elm leaf beetles	Spittlebugs	
	Flea beetles	Striped beetles	
	Grasshoppers	Thrips	
	Japanese beetles (adult)	Ticks	
	June beetles (adult)	Tussock moth larvae	
	Leafhoppers	Whiteflies	
	Leafrollers		
	Leaf Skeletonizers		

- A. 1.9 oz
- B. 0.095 oz
- C. 0.475 oz
- D. 0.38 oz**

*4 sprayers x 5 gallons = 20 gallons
 20 gallons = 20% of 100 gallon rate, or 0.2
 1.9 fl oz Decathlon/100 gal x 0.2 = 0.38 oz*

10. A producer is planning to order 3,000 plugs of Coleus. What is the total price for this number of plugs and what is the earliest week the order can be arranged for delivery?



		Current Availability			
Sold in Liners of 100	(Week 07)	0	(Week 12)	3,900	
Price Per Plug:	65.8¢	(Week 08)	0	(Week 13)	3,800
Total Per Tray:	565.80	(Week 09)	0	(Week 14)	5,800
Partial Tray	(Week 10)	0	(Week 15)	5,700	
Price Per Plug:	83.3¢	(Week 11)	2,100	(Week 16)	5,700

- A. \$1,974 - arranged for week 12**
- B. \$1,974 - arranged for week 11
- C. \$1,365 - arranged for week 7
- D. \$2,499 - arranged for week 12

more than 3000 available (with arrow pointing to 3,900)

only 2100 of 3000 available (with arrow pointing to 2,100)

3,000 plugs / 100 plugs per tray = 30 trays

1 tray = \$65.80

\$65.80 x 30 trays = \$1,974