

# Floriculture CDE Training Guide

## Where to find contest rules

1. Go to Ag Ed website at gaaged.org
2. Select Awards Bulletin and CDE Materials
3. Select Junior or Senior Floriculture CDE

## General Knowledge

The general knowledge section will consist of twenty-five questions covering all areas of the floriculture industry. Ten points will be awarded for each correct answer and participants have 25 minutes to complete this event phase.

### Preparation:

1. **Questions for the general knowledge exam are developed from the educational objectives from lesson plan curriculum:**

#### Junior Division

- AGGHPS 01.461 (General Horticulture – Plant Science Curriculum)
- AGGHPS 02.012 (Exploring Agricultural Education Middle School Curriculum)
- AGGHPS 02.013 (Exploring Agricultural Education Middle School Curriculum)
- AGGHPS 02.014 (Exploring Agricultural Education Middle School Curriculum)

#### Senior Division

- AG-GH-01.461 (General Horticulture & Plant Science Curriculum)
- AG-FL 01.461 (General Floriculture Curriculum)

2. **Practice taking test:**

- a. Go to Ag Ed Website
- b. Select CDE Exams in MS Word or Online  
Note: MS Word exams are ready to be downloaded and printed  
Online exams are set up as quizzes that are scored
- c. Select:
  - i. Floriculture State – Regional Exams
  - ii. Floriculture National Exams
  - iii. Floriculture Junior CDE Exams

3. **Practice test taking strategies:**

- a. Get a good night's sleep and eat a sensible breakfast (do not load up on sugar).
- b. Be aware of the time limit for the test and bring a watch so you can set your pace.
- c. DO NOT get stuck on *one* answer. If you find a difficult one, mark the question on your test and come back to it when you have finished. Do not dwell on a couple of answers you might not know, that will distract you from showing what you know on other questions.
- d. If you find a question that you need to guess the answer, always try to eliminate two choices before guessing between what's left. That will help you focus and have a higher chance of guessing correctly.
- e. Do not waste time looking for a pattern of answers.
- f. Read each question carefully. Make certain you understand what it is asking. Sometimes, if you read too fast, you miss a key word that can change the meaning. Watch for key

phrases such as “most important.” or “which one is not true”. Do not omit “all of the above” as a choice, sometimes it is the answer.

- g. Watch out for “distracters”. A distracter is a word or a phrase that is very close to the correct answer. Distracters are used to see if you really know the information well. If you read too quickly, distracters can cause you trouble.
- h. Make sure you are marking the correct row of ovals on your answer sheet. Always mark the answer choice on your test or answer booklet so that you can double check your answers.
- i. Relax. You have great skills and knowledge. Take a deep breath and show what you know!

**4. Practice using scan cards:** Here is how to find card:

- a. Go to Ag Ed website at [gaaged.org](http://gaaged.org)
- b. Click on "Career Development Events"
- c. Click on Scan Forms for CDE
- d. Select [CDE\\_228576.pdf](#)

**Identification of Plant Materials, Equipment, Supplies and Disorders**

Twenty-five items from the Georgia Floriculture Plant and Tool List will be displayed for contestants to identify. Ten points will be awarded for each correct answer, and participants have 25 minutes to complete this event phase.

Senior Floriculture: Contestants will be required to identify plant disorders including diseases, insects, weeds, and nutritional disorders and specify, if requested, those pesticides or other treatments necessary to remedy the problem. Items for this phase of the career development event will be selected from the Disorder List. Ten points will be awarded for each correct answer, and participants have 20 minutes to complete this event phase.

**Preparation:**

**1. Live samples will be used on regional and state CDE.**

- A. Begin collecting each plant and keep in the school greenhouse laboratory.
- B. Borrow container plants from local nursery.
- C. Visit local nurseries and practice ID of live containerized plants.

**2. Practice taking photo identification test:**

- A. Go to Ag Ed website at [gaaged.org](http://gaaged.org)
  - i. Select Horticulture PowerPoints
  - ii. Select:
    - 1. Floriculture Plant ID 1, 2, 3, 4, 5, 6.
    - 2. Floriculture Plant ID from State & Regional CDE
    - 3. Quiz Game Floriculture Plants
    - 4. Nursery Landscape Equipment ID
    - 5. Nursery Landscape Tool ID
    - 6. Garden Tool ID
    - 7. Disorder

8. Plant ID Disorders Nursery Landscape
9. Floriculture Insect Disorders
- B. Go to Ag Ed Website
  - i. Select Career Development Events
  - ii. Select CDE Exams on line
    1. Floriculture State ID Exams 1-4
- C. Go to Ag Ed Website
  - i. Select Photos & Clip Art
  - ii. Select
    1. Floriculture Photos
    2. Nursery Landscape Tools & Equipment

### 3. Websites with plant photos and information:

- A. Photos & descriptions of floriculture plants:
  - i. <http://aggie-horticulture.tamu.edu/ornamentals/herbaceous/indexcommon.html>
  - ii. <http://aggie-horticulture.tamu.edu/interiorscape/indexcommon.html>
  - iii. <http://www.hcs.ohio-state.edu/plants.html>
- B. Plants and disorder identification
  - i. <http://www.griffin.uga.edu/grf/station/lpmhome/ornamntl/ornamain.htm>
  - ii. <http://www.gaipm.org/top50/>
  - iii. <http://www.hortnet.co.nz/publications/hortfacts/lcindex.htm>
  - iv. <http://plantfacts.ohio-state.edu/>
- C. Weed Identification
  - i. <http://www.aes.tamu.edu/mary/Wdid.htm>
  - ii. <http://www.bugwood.org/weeds.html>
- D. Insect Identification
  - i. <http://www.ext.vt.edu/departments/entomology/ornamentals/slideshow.html>

### 4. Books, CD, DVD Resources for Plant Identification

#### A. Horticopia A-Z.

Computer Program for Plant ID is available at [www.horticopia.com](http://www.horticopia.com). Includes picture of the National and Georgia FFA plant lists.

## Senior Floriculture Problem Solving

This phase will consist of five questions. Twenty points will be awarded for each correct answer. Participants have 20 minutes to complete this event phase. The problem solving questions will come from these designated areas.

1. Media Volume
2. Area and Volume
3. Chemical and Fertilization
4. Irrigation
5. Pricing

- A. Go to Ag Ed Website
- i. Select Career Development Events
  - ii. Select CDE Exams in MS Word
  - iii. Select Floriculture State and Regional CDE Exams
  - iv. Select Floriculture Problem Solving

## Examples of Problem Solving

### Media Volume

Question One:

*Given the following media fill chart:*

	<b>Container</b>	<b>Pots per Ft<sup>3</sup></b>	<b>3 Ft<sup>3</sup> Bag</b>	<b>3.8 Ft<sup>3</sup> Bag</b>
<b>Round Pots</b>	2 ¼"	276	827	1994
	3"	128	376	912
	3 ¼"	93	279	698
	4"	52	147	369
	5"	25	76	183
	6"	15	45	109
	7"	10	30	75
	10"	3	9	22
	12"	2	6	15
<b>Square Pots</b>	2 ½"	235	704	1684
	3"	136	417	973
	3 ½"	91	294	638
	4"	55	173	391
	4 ½"	46	150	318
	5"	29	87	217
	Jumbo Sq.	17	50	124

Elizabeth's And Jim's after school job at *4-C Greenhouses and Plant Farm* is to fill containers for the next days planting. How many 3 Ft<sup>3</sup> Bags of planting media would they need to fill the following containers?

- 1780-3" round pots
- 950-5" round pots
- 125-10" round pots
- 800-4" square pots
- 450 Jumbo Sq. pots

- A. 1 Bag**                      **B. 100 Bags**                      **C. 45 Bags**                      **D. 197 Bags**

**Question 2:**

A greenhouse mixes potting media for use in growing perennials. The mix is 50% bark and 50% sand. The cost of the bark is \$14.00 per yard and sand is \$10.00 per yard. Each yard of material will fill 220 gallon pots. In addition, the nursery pays an employee \$12.00 per hour to mix the media and he can mix 10 yards of media in one hour. Considering the cost of materials and labor, what is the cost of the media used in a gallon pot?

Note: Round your answer to the nearest penny.

- A. 6 cents
- B. 8 cents
- C. 10 cents
- D. 2 cents

**Question 3:**

Pot Size (in)	Approximate Dimension Top x Depth x Bottom (in)	Number of Pots/ft <sup>3</sup>	Type	Approximate Dimension Top x Depth x Bottom (in)	Units/ft <sup>3</sup>
<b>Standard Round Pots</b>			<b>Flats</b>		
2¼	2¼ x 2 <sup>1</sup> / <sub>16</sub> x 1¾	256	Germination tray	11½ x 21¼ x 1 <sup>1</sup> / <sub>8</sub>	7.0
2½	2 <sup>3</sup> / <sub>8</sub> x 2¼ x 2	208	20-row Seeding tray	11½ x 21¼ x 1 <sup>1</sup> / <sub>8</sub>	11.0
3	3 x 2 <sup>13</sup> / <sub>16</sub> x 2¼	120	<b>Standard Cell-Packs</b>		
3½	3 <sup>3</sup> / <sub>8</sub> x 3 <sup>3</sup> / <sub>10</sub> x 2 <sup>3</sup> / <sub>8</sub>	80	8-4 cell packs per tray		5.4
4	4 x 3 <sup>7</sup> / <sub>8</sub> x 2¾	48	8-6 cell packs per tray		5.9
4½	4 <sup>3</sup> / <sub>8</sub> x 4 <sup>3</sup> / <sub>8</sub> x 3	40	10-4 cell packs per tray		6.2
5	5 x 3½ x 4	28	10-6 cell packs per tray		6.7
5½	5½ x 5 <sup>3</sup> / <sub>8</sub> x 3 <sup>13</sup> / <sub>16</sub>	20	12-4 cell packs per tray		6.0
6	6 x 5¾ x 4 <sup>1</sup> / <sub>16</sub>	16	12-6 cell packs per tray		7.0
7	6¾ x 7¾ x 4 <sup>11</sup> / <sub>16</sub>	10	Standard size 11¼ x 21¼ x 2		

Using the information given above, determine the number of 3 cubic foot bags of potting soil that are needed to fill all the following:

1. 500 flats of 8-4 cell-packs.
2. 400 (4 ½" round pots).
3. 500 (6 ½" round pots).

Answers: (round to the nearest whole bag of soil)

- A. 440
- B. 45
- C. 54
- D. 48

Question Four:

A grower must fill 1000 12-4 cell-packs. The grower mixes his own soil using a formula of 3 parts peat moss, 2 parts sharp sand, and 3 parts ground pine bark. Using the chart above, determine the amount of peat moss needed by the grower to mix the soil needed to fill the cell-packs. (Round the answer up to the next whole cubic foot.)

- A. 3 cu. ft.
  - B. 167 cubic ft.
  - C. 21 cu. ft.
  - D. 63 cu. ft.
- 

Question Five:

A 3:2:1 Peat/Perlite/Sand mixture is used as a formula to make potting soil. Determine the amount of perlite needed to mix 36 cubic yards of media.

- A. 6 cubic yards
  - B. 9 cubic yards
  - C. 12 cubic yards
  - D. 18 cubic yards
- 

## Area and Volume

Question 1:

1020 Poly Flats measure 11"X 21". Which of the following is the maximum number of 1020 Flats that could be placed on a table that is 9' X 36"?

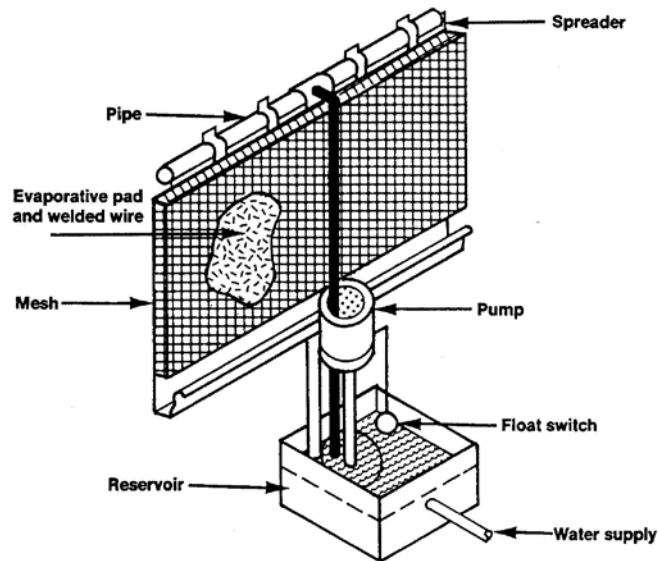
- A. 202**            **B. 15**                            **C. 315**                            **D. 125**
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Question 2:

Fall is fast approaching and it is time to begin your pansy crop. The first step is to order pansy seeds. There are 20,000 seeds in one ounce of pansy seed, and the germination rate is 95%. The seeds are in packs containing 1/8-ounce of seed. Your greenhouse holds 988 flats of pansies and each flat contains 36 plants. How many 1/8-ounce packs of seed will you need to order to completely fill the flats in the greenhouse?

- A. 14 packs
- B. 15 packs
- C. 16 packs
- D. 2 packs

Question 3:



Recommended Water Flow rate and Reservoir Capacity for Cooling Pad		
<b>Pad Type</b>	Minimum Flow rate Per Length of Pad (gpm/ft)	Minimum Reservoir Capacity Per Unit Pad Area (Gal/ft <sup>2</sup> )
Aspen Fiber (2-4 inches)	0.3	0.5
Corrugated Cellulose (4 inches)	0.5	0.8
Corrugated Cellulose (6 inches)	0.8	1.0

What is the minimum water reservoir needed for a 3' x 24', four inch thick corrugated evaporative cooling pad?

Select from the below answers:

- A. 50 gallon reservoir
- B. 60 gallon reservoir
- C. 70 gallon reservoir
- D. 80 gallon reservoir

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Question Four:

You are the manager of a commercial greenhouse operation. You have recently built a new greenhouse that is 30'x 96'. You have installed four longitudinal benches: two sidewall benches that are each 4'x95' and two center benches that are each 8'x 90'. Which of the following answers is the approximate percentage of growing area in the greenhouse?

Area=Length x width

% Area=area of benches÷area of greenhouse

- A. 94%    B.80%    C.76%    D. 69%
- 

Question Five:

Situation: You are building a new greenhouse. The dimensions are 20 feet wide X 96 feet long. The airflow required is 8 cfm per square foot of greenhouse area.

Problem: Using the chart below, select the fan that meets the minimum capacity requirements.

Capacity=8 cfm X area of greenhouse

Fan	Diameter	Rpm	Capacity (cfm)	Motor (hp)
A	30"	650	8,570	1/8
B	36"	476	10,900	1/2
C	42"	462	16,800	1
D	48"	382	21,400	1

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## Chemical and Fertilization

Question One:

Using the following formula, determine how many ounces of water soluble 14-5-17 would be needed to make one gallon of fertilizer concentrate at 275 ppm while using a 1:150 ration fertilizer injector.

$$\frac{\text{Desired ppm X injector ratio}}{\% \text{ N as a decimal X } 9,260}$$

- A. 4.45 oz                      B. 19.64 oz                      C. .32 oz                      D. 31.82 oz



Question Two:

Greenhouse growers often use time-release fertilizers in the production of crops. These fertilizers are incorporated into the potting soil before planting or top-dressed on the surface of plants already established in pots. Below are the suggested rates for three types of time-release fertilizers.

<b>Table 3.</b> Suggested controlled release fertilizer application rates for annuals.			
<b>Incorporated rates</b>	Osmocote 14-14-14	Sierrablen Nursery Mix + Iron 19-6-10	Osmocote 18-18-18
New Plantings 100 ft <sup>2</sup> of bed incorporated 4" deep	4 to 5 lbs.	6 to 7 lbs.	7 to 8 lbs.
Established Plantings 100 ft <sup>2</sup> of bed surface applied	5 to 7 lbs.	6 to 7 lbs.	7 to 8 lbs.
<b>Top-dress rates</b>			
6" standard or azalea pot	1 teaspoon (level)	1 teaspoon (level)	1 teaspoon (level)
1 gallon pot	1 teaspoon (heaping)	1 teaspoon (heaping)	1 teaspoon (heaping)
2 gallon pot	2 tablespoons (level)	1 tablespoon (heaping)	1 tablespoon (heaping)
3 gallon pot	2 tablespoons (heaping)	2 tablespoons (level)	2 tablespoons (level)
<b>NOTES:</b> 1 level teaspoon= 5 grams 1 level tablespoon = 15 grams 28.35 grams = 1 ounce (oz) 454 grams = 1 pound lb. 16 ounces = 1 pound			

It has been decided that Osmocote 14-14-14, the fertilizer source, will be top-dressed on the crops. Using the information from the table above, what is the total amount of fertilizer needed to make one application of fertilizer to the two crops listed below?

200 amaryllis in 2 gallon pots  
500 geraniums in 6" azalea pots  
Select from the answers below:

- A. 382.15 ounces
- B. 211 ounces
- C. 16.5 pounds
- D. 18.7 pounds

Question 3:

*Given information to calculate parts per million*

**1 oz of fertilizer per 100 gallons equals 75 ppm**

Stock Solution Conversion Chart

<i>Fertilizer Injector</i>	<i>For 1 gallon of stock solution multiply oz needed per hundred gallons by</i>
1: 15	.15
1: 50	.50
1: 100	1.0
1: 128	1.28
1: 200	2.00

Question: Using a 20-10-20 fertilizer you want to feed your plants at 200 ppm of nitrogen using a Hozon 1:15 injector. How many ounces of fertilizer concentration are needed per gallon of water?

Select from the below answers:

- A. 2 oz per gallon of concentrate solution
- B. 4 oz per gallon of concentrate solution
- C. 6 oz per gallon of concentrate solution
- D. 8 oz per gallon of concentrate solution

Question 4:

The proper pH of growing media is very important in assuring the availability of essential nutrients. Two pounds of finely ground limestone are needed to bring about a 1 pH unit change in 1 cubic yard of media. The following ingredients were used to mix the media necessary to pot 1000 geraniums:

- 22.5 cubic feet of sphagnum peat
- 10 cubic feet of washed sand
- 8 cubic feet of perlite

The pH of the above mixture was found to be 4.3. The optimum pH for the geranium crop is 5.8.

1 cubic yard = 27 cubic feet.

**Question**

How many pounds of ground limestone should be added to the potting mixture to bring the pH to 5.8?

- A. 2 pounds
- B. 3.5 pounds
- C. 4.5 pounds
- D. 5.8 pounds

**Question #5:**

Florel is a growth regulator used to increase lateral branching in azaleas, geraniums, and garden mums. The suggested rate is 1 quart of Florel mixed with 100 gallons of water. Three applications are made to a crop of garden mums during production. The following amount of solution is necessary to cover the crop:

- Application #1: 75 gallons of mixture
- Application #2: 125 gallons of mixture
- Application #3: 150 gallons of mixture

1 Quart = 32 ounces

Question:

How many ounces of Florel will be used to produce the crop?

- A. 96 ounces
- B. 3.5 ounces
- C. 350 ounces
- D. 112 ounces

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## Irrigation

Question One:

Water restrictions have been placed on *Jones Greenhouses* and they can utilize only 45500 gallons of water per day. The irrigation system at the greenhouses consists of 16 sprinklers that use 6 gallons per minute and 8 misters that use 3.5 gallons per minute. If the irrigation system was in use, how long would it take to utilize the allotted amount of water? (May need to round off to the nearest whole)

- A. 10 hrs**                      **B. 16 hrs.**                      **C. 6 hrs.**                      **D. 2 hrs.**

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Question Two:

**Situation:** You have an irrigation system with 20 rondo mini-sprinklers. The system maintains 25 psi. Using the information below, determine the total amount of water used by the system when operated for 2 hours.

**Rondo Mini-sprinkler**

Pressure	Flow Rate	Diameter
PSI	GPH	FT
20	11.4	21.0
25	12.6	23.4
30	13.7	24.8
35	14.7	25.4

- A. 252
- B. 504
- C. 456
- D. 936

Question Three:

**Situation:** You are designing an irrigation system using rondo mini-sprinklers. Your pump can supply 760 gallons of water per hour at 30 psi. Using the information in the chart above, determine the number of mini-sprinklers that can be operated by your system.

- A. 60
- B. 66
- C. 55
- D. 51

Question Four:

**Table 1. Water use rates/drought resistance rankings and irrigation frequency of annuals used in Georgia.**

Common Name	Water Use/ Drought Resistance	Length of irrigation Using drip	Days between irrigation
Lantana	1	60 mins	14
Verbena	2	60 mins	9
Vinca	3	60 mins	7
Wax Begonia	4	90 mins	6
Petunia	5	90 mins	5

<i>Irrigation</i>	<i>Rate of Flow/Hour/Zone</i>
Drip	2 gallons
Micro Mist Sprayer	7 gallons
Gear Driven Shrub Irrigation	15 gallons
<b>Gear Driven Turf Irrigation</b>	20 gallons

**Question # 4**

Georgia is forecasted for another drought summer.

By planting the most drought tolerant annual, how many gallons of water would the homeowner need in the months May through August to irrigate the annual bed with drip irrigation?

Select from the below answers:

- A. 4 gallons
- B. 8 gallons
- C. 12 gallons
- D. 16 gallons

Question Five:

Flow Zone Chart in gallons per minute



Drip irrigation is used for irrigation in many commercial greenhouses. The flow chart below lists the amount of water used (in gallons per minute) according to the number of plants being irrigated by the system.

Number of Plants	200	400	600	800	1000	1200	1400	1600	1800	2000
GPM used	2	3	5	7	8	10	12	13	15	17

### Question 5

The above system is used to irrigate 800 pots of geraniums. It takes 15 minutes of irrigation to water the plants, and the system runs one time every day. How many gallons of water are used to irrigate the plants for a week?

Select one of the following answers:

- A. 7 gallons
- B. 105 gallons
- C. 735 gallons
- D. 420 gallons

## Pricing

### Question 1:

Valentines Day is always a busy but very profitable time of the year for *Carly's Flowers N Stuff*. If a case contains 144 roses and Carly buys 75 cases of roses for \$135.00 per case. What would a dozen roses cost at *Carly's Flowers N Stuff* if she sells them for 220% over cost? (Round up to the nearest whole dollar)

- A. \$85.00
- B. \$25.00
- C. \$13.00
- D. \$35.00

Question 2:

A grower has detected a fungus attacking the roots of his poinsettia crop. He has decided to apply Subdue, a fungicide, to stop the fungus. The recommended rate for Subdue is 0.5 ounces per 100 gallons of water, but the grower only requires 75 gallons of solution to treat his crop. Subdue costs \$48.25 per quart. What is the total cost of the Subdue used to treat the crop?

- A. \$0.79
- B. \$0.75
- C. \$0.055
- D. \$0.566

**Note: A quart contains 32 ounces.**

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Question 3:

A grower must determine the most cost efficient way to apply 200 ppm of nitrogen to a geranium crop. The crop requires 100 gallons of fertilizer solution to completely irrigate the crop. Peter 20-10-20 cost \$20.70 per 25-pound bag and calcium nitrate (15.5-0-0) cost \$13.95 per 50-pound bag. Choose the correct answer:

- A. 100 gallons of 200 ppm using Peters 20-10-20 costs \$.79. 100 gallons of 200 ppm using calcium nitrate costs \$0.29.
- B. 100 gallons of 200 ppm using Peters 20-10-20 costs \$0.69. 100 gallons of 200 ppm using calcium nitrate costs \$0.29.
- C. 100 gallons of 200 ppm using Peters 20-10-20 costs \$0.69. 100 gallons of 200 ppm using calcium nitrate costs \$0.39.
- D. 100 gallons of 200 ppm using Peters 20-10-20 costs \$0.72. 100 gallons of 200 ppm using calcium nitrate costs \$0.29.

**Note:  $(\text{ppm N} \times 1.33) \div \%N = \text{ounces of fertilizer per 100gallons}$**   
**16 ounces = pound**

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Question Four:

Situation:

Use the retail cost of goods method of pricing to determine how an arrangement of cut flowers in a vase should be sold for if it contains the following materials. Wholesale prices are given in parentheses.

The profit percentage is 20%, and the markup ratios are 2 to 1 for supplies and hard goods, and 3 to 1 for flowers and foliage.

Carnations	(\$4.00)
Mini-carnations	(\$3.00)
Pompoms	(\$3.50)
Solidago	(\$4.50)
Leather Leaf	(\$2.40)
Salal	(\$2.10)
Wheat	(\$1.60)
Cattails	(\$1.25)
Oasis	(\$1.00)
Vase	(\$5.50)

The arrangement should be sold for:

- a. \$94.00
- b. \$97.99
- c. \$96.06
- d. \$95.01

Question Five:

Master Blend Fertilizer is a water-soluble fertilizer that is applied to greenhouse crop to promote healthy plants and optimum growth. To produce a crop of bedding plants, 6.8 ounces of fertilizer are added to each gallon of concentrate used by the fertilizer injector. Two gallons of this concentrate are used each week by the fertilizer injector for irrigation, and it will take 6 weeks of irrigation to finish growing the plants.

Master Blend Fertilizer costs \$22.00 per 25 pound bag.

1 Pound = 16 ounces

### Question

What is the total cost of fertilizer used to grow this crop of bedding plants from beginning to finish?

- A. \$13.60**
- B. \$8.16**
- C. \$1.79**
- D. \$4.49**

## Solutions

### Media Volume

Question #1

**Answer: C**

A  $3\text{ft}^3$  will fill:

- 376 - 3" round pots
- 76 - 5" round pots
- 9 - 10" round pots
- 173 - 4" square pots
- 50 - Jumbo Sq. pots

Since there are 1780-3" round pots, divide 1780 by 376 to determine how many  $3\text{ft}^3$  bags it would take to fill the 1780 pots.  $1780/376 = 4.73$  bags

Since there are 950-5" round pots, divide 950 by 76 to determine how many  $3\text{ft}^3$  bags it would take to fill the 950 pots.  $950/76 = 12.5$  bags

Since there are 125-10" round pots, divide 125 by 9 to determine how many  $3\text{ft}^3$  bags it would take to fill the 125 pots.  $125/9 = 13.88$  bags

Since there are 800-4"square pots, divide 800 by 173 to determine how many 3ft<sup>3</sup> bags it would take to fill the 800 pots.  $800/173 = 4.62$  bags

Since there are 450 Jumbo Sq. pots, divide 450 by 50 to determine how many 3ft<sup>3</sup> bags it would take to fill the 450 pots.  $450/50 = 9$  bags

$4.73 + 12.5 + 13.88 + 4.62 + 9 = 44.73$  bags which would round to **45**.

Question #2

**Answer A**

Cost of labor per yard of soil = \$12 per hour ÷ 10 yards per hour = \$1.20 per yard.

Cost of soil per yard = bark cost + sand cost + labor =  $\frac{1}{2}$  (\$14) +  $\frac{1}{2}$  (\$10) + \$1.20 = \$13.20.

Cost of soil per pot =  $\$13.20 \div 220 = .06$

Question #3:

**Answer is B**

According to the chart, 5.4 flats of 8-4 cell-packs are filled per cubic foot of soil.

The soil required for 500 cell-packs =  $500 \div 5.4 = 92.593$  cubic feet of soil.

According to the chart, one cubic foot of soil will fill 40 round 4 ½" pots.

The soil required for 400 4 ½" pots =  $400 \div 40 = 10$  cubic feet of soil.

According to the chart, one cubic foot of soil will 16 round 6" pots.

The soil required to fill 500 6 ½" pots =  $500 \div 16 = 31.25$  cubic feet.

Total soil =  $92.593 + 10 + 31.25 = 133.84$  cubic feet

Total number of bags of soil =  $133.84 \div 3 = 44.6 = 45$  bags

Question #4:

**Answer D**

6 12-4 cell-packs are filled by one cubic foot of soil.

Soil for 1000 cell-packs =  $1000 \div 6 = 166.67$  cubic ft.

The soil is comprised of 3 parts peat moss, 2 parts sharp sand, and 3 parts ground pine bark.

$$\frac{X}{166.67} = \frac{3}{8}$$

$X = 62.49 = 63$  cubic feet

Question #5:

**Answer C.**

36 cubic yards of soil are needed. The soil is comprised of 3 parts peat, 2 parts perlite, and 1 part sand.

$$\frac{X}{36} = \frac{2}{6}$$

$X = 12$  cubic yards of perlite



## Area and Volume

Question #1

**Answer: A**

The table measures 9' X 36' or 108" X 432".  $9 \times 12 = 108$ ,  $36 \times 12 = 432$

$108" \times 432" = 46,656 \text{ In.}^2$ . (Table)

$11" \times 21" = 231 \text{ In.}^2$ . (Flats)

$46,656 \text{ In.}^2 / 231 \text{ In.}^2 = 201.97$  or **202**

Question #2

The correct answer is B.

Total number of plants needed = number of flats X number of plants per flat =

$988 \times 36 = 35,568$

Number of seeds needed = number of plants needed  $\div$  germination rate =

$35,568 \div .95 = 37,440$  seeds

Number of seeds per 1/8 oz. pack = number of seeds per ounce  $\div$  8 =  $20,000 \div 8 = 2500$

Number of packs needed = number of seeds needed  $\div$  seeds per pack =

$37,440 \div 2500 = 14.976$

In order to obtain all the seeds needed, you must round up 14.976 to 15.

Question 3:

**Answer: B. 60 gallon reservoir**

$3 \times 24 = 72$  sq ft of pad area

$72 \times .8 = 57.6$  minimum reservoir needed for pad

round up to 60 gallon reservoir

Question 4: **Answer C, 76%**

Area of greenhouse =  $30' \times 96' = 2880$  sq. ft

Area of benches = 2200 sq. ft.

2 sidewall benches =  $2 (4 \times 95) = 760$  sq. ft

2 center benches =  $2 (8 \times 90) = 1440$

% of space used =  $2200 \div 2880 = .764$

Question 5: Answer C

Solution: Capacity = 8 cfm X area of greenhouse

Capacity =  $8 \text{ cfm} \times (20' \times 96')$

Capacity =  $8 \text{ cfm} \times 1920$  square ft.

Capacity = 15,360 cfm

## Chemical and Fertilization

Question #1

Answer: **D**

**Desired ppm X injector ratio**

**% N as a decimal X 9,260**

$$\frac{275 \times 150}{.14 \times 9,260}$$
$$\frac{41,250}{1296.4}$$

$$31.8188 = \mathbf{31.82 \text{ oz}}$$

Question #2

Answer : **D**

Fertilizer for 200 2 gallon amaryllis = 200 X 2 tablespoons = 400 tablespoons  
400 tablespoons = 400 X 15 grams = 6000 grams

Fertilizer for 500 6" geraniums = 500 X 1 teaspoon = 500 teaspoons  
500 teaspoons = 500 X 5 grams = 2500 grams

Total fertilizer = 6000 grams + 2500 grams = 8500 grams  
8500 grams ÷ 28.35 grams/oz = 299.824 oz.  
299.824 oz ÷ 16 oz. = 18.73 pounds

Question 3:

Answer: **A. 2 oz**

1. For a 20-10-20 formulation that you want to feed at 200 ppm

Use: 1 oz per 100 gallons = 75 ppms

$$\mathbf{75 \times .20 = 15 \text{ ppm}, 200/15 = 13.33 \text{ oz}}$$

\* Place a decimal in front of the nitrogen level of your fertilizer and multiply this times 75 ppm (fertilizer formulas are percentage values, so you have to place a decimal in front of it before you multiply) Then divide your desired ppm by this number. This will give you the ounces of fertilizer needed to give you your desired ppm for one hundred gallons of water.

13.33 oz equals 200 ppm of 20-10-20 fertilizer in 100 gallons of water

**2. You can multiply the ounces needed for 100 gallons by the following numbers to give you the proper ounces per gallon of stock or concentrate solution**

**For 20-10-20 formulation that we wish to feed at 200 ppm using a Hozon 1:15 injector :**

13.33 oz x .15 = 2 oz needed per gallon of concentrate solution

Question #4:

**C is the correct answer.**

Total amount of media: 22.5 cubic feet of sphagnum peat  
10 cubic feet of washed sand  
8 cubic feet of perlite  
40.5 cubic feet of media = 1.5 cubic yards

Optimum pH 5.8

Tested pH 4.3

Units of change 1.5

Pounds limestone needed =  
1.5 cubic yards X 1.5(2 Pounds) = 4.5 pounds

Question #5;

**Answer is D.**

Total gallons of mixture = 75 + 125 + 150 = 350

$\frac{32 \text{ ounces}}{100 \text{ gallons}} = \frac{X \text{ ounces}}{350 \text{ gallons}}$

X = 112 ounces

## Irrigation

Question #1

**Answer: C**

6 gal./minute = 360 gal./hour      6 X 60 = 360  
3.5 gal./minute = 210 gal./hour      3.5 X 60 = 210

16 sprinklers that emit 360 gal./hour = 5760 gal./hour  
8 misters that emit 210 gal./hour = 1680 gal./hour

5760 + 1680 = 7440 gal./hour

45,500gal./7440 gal./hour = **6.11 hours**

Question #2

**Answer A**

One rondo mini-sprinkler uses 12.6 gallons of water at 25 psi.  
20 sprinklers = 20 X 12.6 gallons = 252 gallons

Question #3

**Answer C**

1 rondo mini-sprinkler uses 13.7 gallons at 30 psi.

Total number of sprinklers = 760 gallons ÷ 13.7 gallons = 55.47 sprinklers

Question #4

**Answer: D. 16 gallons**

Solution:

1. 2 gallons x 1 zone = 2 gallons per hour during each application
2. Lantana is the most drought tolerant  
Run irrigation 2x a month (every 14 days for 60 mins)
3. 2 gallons x two times a month = 4 gallons of water per month
4. 4 gallons x 4 months = **16 gallons** of water need for 4 months of irrigation

Question #5

**Answer: B**

According to the chart, 800 pots require 7 gallons of water per minute and the irrigation system will run 15 minutes.

7 gallons X 15 = 105 gallons.

### Pricing

Question#1

**Answer: B**

144 roses cost \$135.00  
 1 rose costs \$.94  
 12 roses cost \$11.28  
 220% of \$11.28 = \$24.82

$135 / 144 = .9375$  or \$.94  
 $.94 \times 12 = \$11.28$   
 $11.28 \times 2.20 = \$24.816$  or **\$24.82= \$25.**

Question #2

**Answer: D**

Amount of Subdue needed:

$$\frac{.5 \text{ oz.}}{100 \text{ gal.}} = \frac{X}{75 \text{ gal.}}$$

$$100X = 37.5$$

$$X = .375 \text{ oz.}$$

Cost of Subdue:

32 oz = \$48.25  
 1 oz = \$48.25 ÷ 32 = \$1.508  
 .375 oz X \$1.508 = .566

**Question #3:**

The correct answer is B.

Determine the cost per ounce of each fertilizer:

Peters 20-10-20 costs \$20.70 per 25 pound bag.

$\$20.70 \div 25 \text{ pounds} = \$.828 \text{ per pound}$

$\$.828 \div 16 \text{ ounces} = \$0.052 \text{ per ounce}$

Calcium nitrate (15.5-0-0) costs \$13.95 per 50 pound bag.

$\$13.95 \div 50 \text{ pounds} = \$0.279 \text{ per pound}$

$\$0.279 \div 16 \text{ ounces} = \$0.017 \text{ per ounce}$

Determine amount of fertilizer needed to make 100 gallons of a 200 ppm solution:

$(200\text{ppm N} \times 1.33) \div 20 = 13.3 \text{ ounces of Peters 20-10-20}$

$(200 \text{ ppm N} \times 1.33) \div 15.5 = 17.16 \text{ ounces of Calcium nitrate}$

Determine the cost of each fertilizer in 100 gallon of a 200 ppm nitrogen solution:

Peters 20-10-20 =  $13.3 \times \$.052 = \$0.69$

Calcium nitrate =  $17.16 \text{ ounces} \times \$.017 = \$.29$

Question 4:

**Answer: C**

<b>Materials</b>	<b>Wholesale Cost</b>	<b>Markup ratio</b>	<b>Retail Cost</b>
<b>Carnations</b>	<b>\$4.00</b>	<b>X3</b>	<b>\$12.00</b>
<b>Mini-carnations</b>	<b>\$3.00</b>	<b>X3</b>	<b>\$9.00</b>
<b>Pompoms</b>	<b>\$3.50</b>	<b>X3</b>	<b>\$10.50</b>
<b>Solidago</b>	<b>\$4.50</b>	<b>X3</b>	<b>\$13.50</b>
<b>Leather Leaf</b>	<b>\$2.40</b>	<b>X3</b>	<b>\$7.20</b>
<b>Salal</b>	<b>\$2.10</b>	<b>X3</b>	<b>\$6.30</b>
<b>Wheat</b>	<b>\$1.60</b>	<b>X3</b>	<b>\$4.80</b>
<b>Cattails</b>	<b>\$1.25</b>	<b>X3</b>	<b>\$3.75</b>
<b>Oasis</b>	<b>\$1.00</b>	<b>X2</b>	<b>\$2.00</b>
<b>Vase</b>	<b>\$5.50</b>	<b>X2</b>	<b>\$11.00</b>

**Total Retail Cost of Materials = \$80.05**

$$\text{Profit} = \$80.05 \times .20 \text{ (20\% profit)} = \$16.01$$

$$\text{Total Retail Cost of Materials} + \text{Profit} = \$80.05 + \$16.01 = \$96.06$$

Question 5:

**Answer D is correct.**

6.8 ounces of fertilizer X 2(gallons per week) =13.6 ounces per week

13.6 (ounces per week) X 6 weeks=81.6 ounces used

$$\frac{\text{Ounces used}}{400 \text{ ounces (25 lbs)}} = \frac{\text{Cost of Fertilizer used}}{\$22.00}$$

$$\frac{81.6 \text{ ounces}}{400} = \frac{X}{\$22.00}$$

$$X = \$4.488 = \$4.49$$