

SI Pharmacy Technician - Full Discipline Demo

Measurement Systems

Final Report - Answer Guide

Institution	Science Interactive University
Session	SI Pharmacy Technician - Full Discipline Demo
Course	SI Pharmacy Technician - Full Discipline Demo
Instructor	Sales SI Demo

Test Your Knowledge

Categorize each unit of measurement based on the measurement system in which is it utilized.

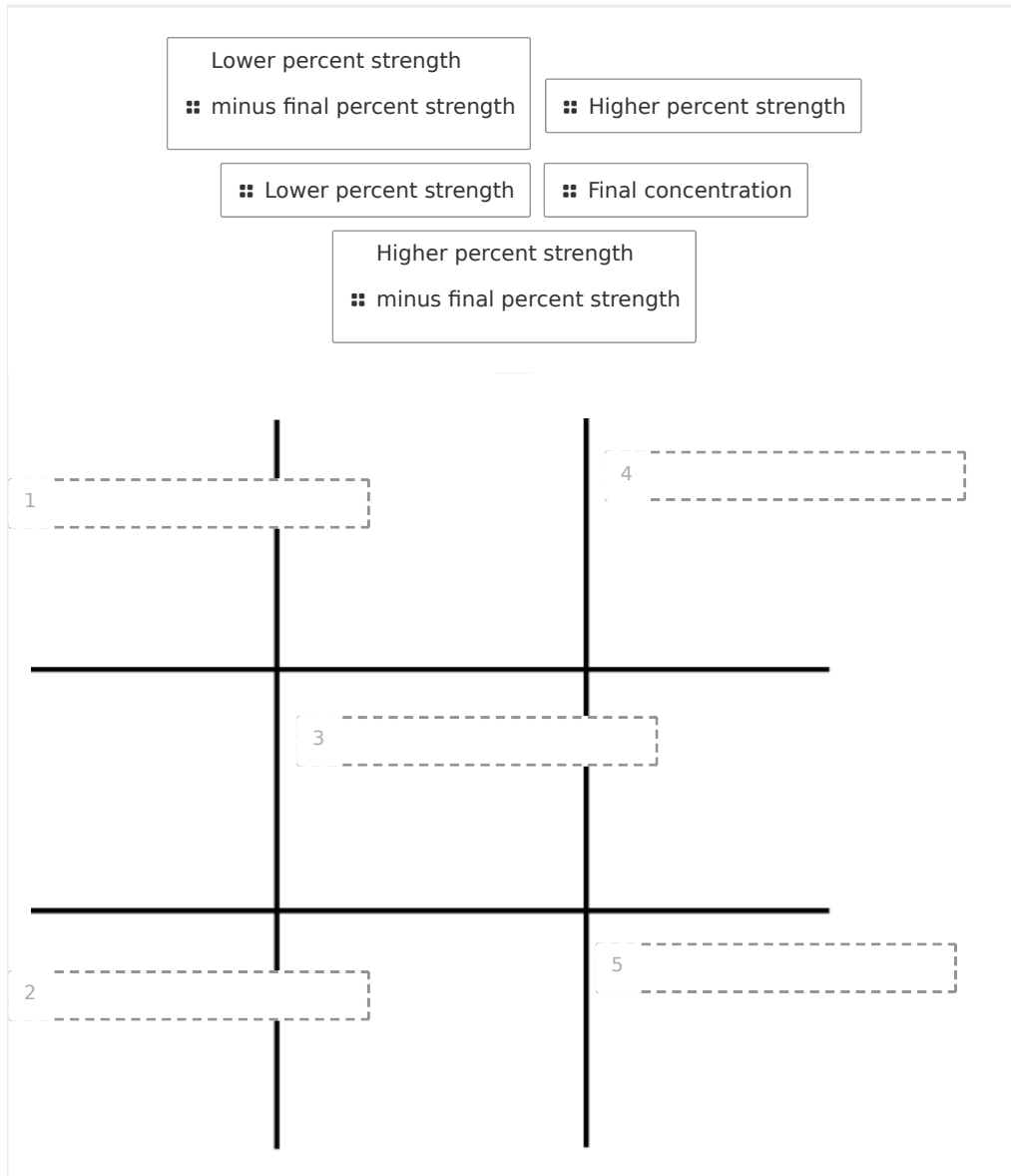
	Metric	Apothecary	Household
⌘ Gram	1	2	3
⌘ Teaspoon			
⌘ Liter			
⌘ Cup			
⌘ Grain			
⌘ Tablespoon			
⌘ Scruple			
⌘ Dram			

Correct answers:

1 Gram Liter 2 Grain Scruple Dram

3 Teaspoon Cup Tablespoon

Label each component of the alligation alternate tic-tac-toe board.



Correct answers:

- 1 Higher percent strength
- 2 Lower percent strength
- 3 Final concentration
- 4 Lower percent strength
minus final percent strength
- 5 Higher percent strength
minus final percent strength

Exploration

How many kilograms are equal to 100 grams?

- ☒ 0.1 kg ✓
- ☐ 1 kg
- ☐ 10 kg
- ☐ 1000 kg

Which system of measurements is most commonly used within a modern pharmacy?

- ☒ Metric ✓
- ☐ Apothecary
- ☐ Household

Using a conversion factor makes it possible to change a value of measurement without changing its unit.

- ☐ True
- ☒ False ✓

The alligation alternate method is used to calculate the initial volume of ingredients to create a known volume of a final solution.

- ☒ True ✓
- ☐ False

Exercise 1

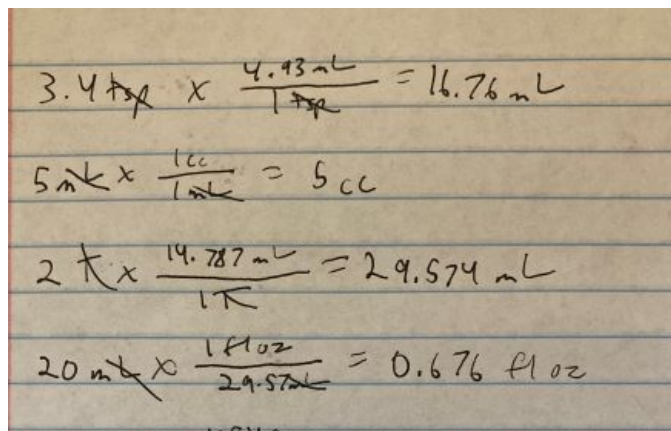
Which measurement system will you most often have to convert to when working in a pharmacy? Which unit(s) used in this exercise are utilized in that measurement system?

Why do you think most pharmacies have agreed to adopted the same measurement system?

Data Table 1: Unit Conversions
(SAMPLE ANSWER BELOW)

Given Value	New Unit	Converted Value
3.4 tsp	Milliliters	16.76 mL
5 mL	Cubic Centimeter	5 cc
2 T	Milliliters	29.574 mL
20 mL	Fluid Ounces	0.676 fl oz
0.8 lbs	Grams	363 g
1.25 C	Fluid Ounces	10.02 fl oz
2 oz	Grams	56.7 g
6 fl dr	Milliliters	22.182 mL
35 dr	Milligrams	62014.8 mg

Photo 1: Unit Conversion Scratch Paper
(SAMPLE ANSWER BELOW)



$$\begin{aligned}
 0.8 \text{ kg} &\times \frac{1000 \text{ g}}{1 \text{ kg}} = 800 \text{ g} \\
 1.25 \text{ L} &\times \frac{237 \text{ mL}}{1 \text{ L}} \times \frac{1 \text{ fl oz}}{29.57 \text{ mL}} = 10.02 \text{ fl oz} \\
 2 \text{ oz} &\times \frac{28.35 \text{ g}}{1 \text{ oz}} = 56.7 \text{ g} \\
 6 \text{ fl oz} &\times \frac{3.697 \text{ mL}}{1 \text{ fl oz}} = 22.182 \text{ mL} \\
 35 \text{ L} &\times \frac{1.772 \text{ g}}{1 \text{ L}} \times \frac{1000 \text{ mg}}{1 \text{ g}} = 62014.8 \text{ mg}
 \end{aligned}$$

Exercise 2

Why is it important to choose the correctly sized graduated cylinder for each liquid measurement?

How would your calculations for prescription 1 change if you were asked to provide 120 mL of the prescription instead of 80 mL?

For each prescription, which ingredient was the diluent, the juice or the syrup?

Data Table 2: Alligation Results
(SAMPLE ANSWER BELOW)

	mL of Juice	mL of Syrup
Prescription 1	48 mL	32 mL
Prescription 2	35 mL	5 mL
Prescription 3	40 mL	20 mL

Photo 2: Prescription 1 Scratch Paper
(SAMPLE ANSWER BELOW)

100%	60
60%	
0%	40

$$\frac{60}{60 + 40} \times 80 \text{ mL} = 48 \text{ mL}$$

$$\frac{40}{60 + 40} \times 80 \text{ mL} = 32 \text{ mL}$$

Photo 3: Prescription 1 Bottle
(SAMPLE ANSWER BELOW)

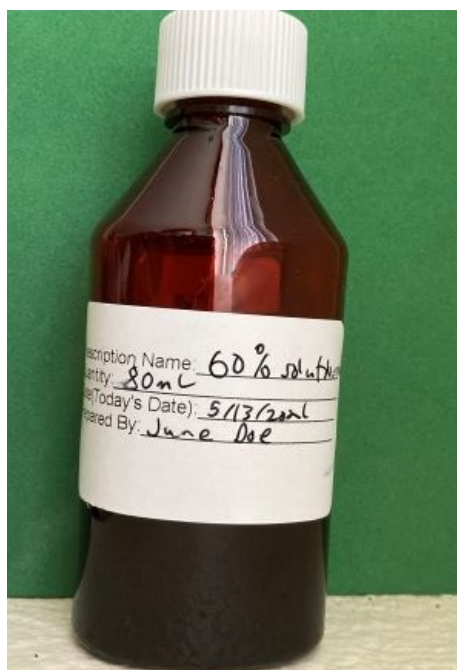


Photo 4: Prescription 2 Scratch Paper
(SAMPLE ANSWER BELOW)

40		10
	20	
10		70

$$\frac{70}{70+10} \times 40\text{mL} = 35\text{mL}$$

$$\frac{10}{70+10} \times 40\text{mL} = 5\text{mL}$$

Photo 5: Prescription 2 Bottle
(SAMPLE ANSWER BELOW)

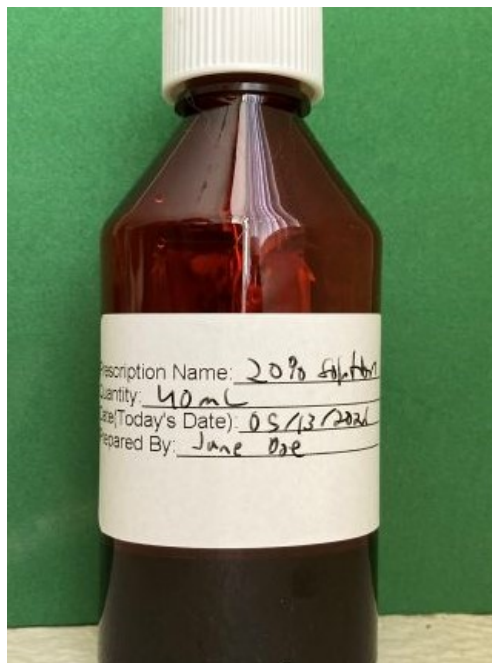


Photo 6: Prescription 3 Scratch Paper
(SAMPLE ANSWER BELOW)

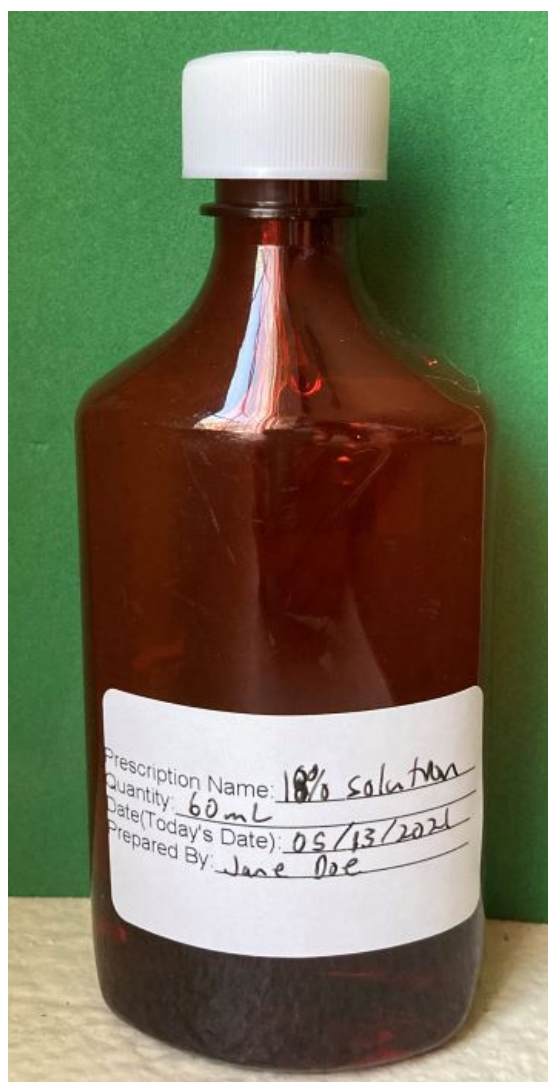
The image shows handwritten work on lined scratch paper. On the left, there is a 3x3 grid with the following numbers:

50		16
	18	
2		32

To the right of the grid are two multiplication problems:

$$\frac{32}{32 + 16} \times 60 \text{ mL} = 40 \text{ mL}$$
$$\frac{16}{32 + 16} \times 60 \text{ mL} = 20 \text{ mL}$$

Photo 7: Prescription 3 Bottle
(SAMPLE ANSWER BELOW)



Competency Review

Which measurement system uses cups as a unit of volume?

- ☐ Metric
- ☐ Apothecary
- ☒ Household ✓

Each prefix unit within the metric system represents a multiple of 10.

- ☒ True ✓
- ☐ False

Pharmacy technicians use allegation alternate more commonly than allegation medial.

- ☒ True ✓
- ☐ False

The _____ is a fluid of low or no strength.

- ☐ concentration
- ☒ diluent ✓
- ☐ stock
- ☐ solution

A conversion factor can only be used to multiply a value to convert it to another unit.

☐ True

☐ False

✓

One cubic centimeter is equivalent to one milliliter.

☐ True

☐ False

✓

Which piece of information was not required when calculating required ingredient volumes using the alligation alternate method?

☐ Final solution volume

☐ Final solution concentration

☐ Starting strength of the ingredients

☐ Available volume of the ingredients

✓

The tic-tac-toe method provides the ratio of the initial ingredients needed for the desired dilution.

☐ True

☐ False

✓

Extension Questions

When creating a dilution of a specific active ingredient by mixing two initial ingredients, what other factors regarding the initial ingredients should be considered in addition to the concentrations of the active ingredient in question? (SAMPLE ANSWER BELOW)

When creating a dilution by mixing two ingredients of different initial concentrations, the other contents of the ingredients should also be investigated. Both the active and inactive ingredients of the two initial solutions must be known to determine if the final product will be exactly what the prescription requires.