Part I. Multiple Choice. Circle the letter of the most appropriate answer. (1 pt ea; 12 points)

1.	Which of the follow a) a balance	ving is the <i>best</i> equi b) a graduated cylin	pment to ander	use for me c) an Er	easuring the <i>volun</i> lenmeyer flask	ne of a liquid? d) a ruler
2.	Which of the follow a) pound	ving is NOT a metri b) cm ³	c unit?	c) gram	d) 1	iter
3.	Which of the follow I.	ving is equal to 100. 10.0 cm	. mm? II. 0.0	100 km	III. 0.100 n	1
	a) II only	b) III only	c) I &	III	d) II & III	e) I, II & III
4.	Which of the follow a) hydrogen	ving is NOT an exa b) sodium c	mple of a j chloride	pure subs	tance?) carbon	d) air
5.	Which of the follow a) water	ving is NOT an exa b) nitrogen	mple of ar	c) gold	? d) r	nercury
6.	 Which of the following statements about compounds is <i>true</i>? a) Compounds are pure substances made up of only one type of element. b) Compounds are made up of two or more elements in all possible ratios. c) Compounds are homogeneous mixtures made up of two or more elements. d) Compounds are pure substances made up of two or more elements in a fixed ratio. 					
7.	Two samples were massed using different balances and the following data were obtained: sample number 1 = 9.287 grams sample number 2 = 1.51 grams The total mass of the samples should be a) 10.7 grams b) 10.8 grams c) 10.79 grams d) 10.80 grams e) 10.797 grams					
8.	 Balance A gives values which are close to the true value and reproducible to the nearest 0.1 gram. Balance B gives values reproducible to the nearest gram, but which are too high by about 2 grams. Compared to Balance B, Balance A is a) more accurate and more precise b) more accurate and less precise c) less accurate and more precise d) less accurate and less precise 					
9.	Which of the followa) the quality of coc) the mass of you	ving is an exact qua offee at Brewberries ar text	ntity?	b) the nud) the vo	umber of millimet blume of a dozen a	ers in a meter apples

- 10. A sample of iron with an actual mass of 10.0 grams was massed on four different lab balances and the values below were obtained. Which value is most *accurate*?
 a) 9.8 g
 b) 11 g
 c) 11.00 g
 c) 10.693 g
- 11. Each letter below represents 3 mass measurements of a 3.25-gram sample taken with a particular balance. Which balance shows a *systematic* error?
 a) 3.25, 3.20, 3.30
 b) 3.2, 3.2, 3.3
 c) 3.23, 3.28, 3.27
 d) 3.35, 3.36, 3.34
- 12. Which of the following are *chemical* properties of aluminum?
 - I. Aluminum is a gray, shiny metal.
 - II. Aluminum reacts readily with oxygen in the air.
 - III. Aluminum has a density of 2.70 g/cm^3 .
 - a) II only b) III only c) I & II d) I & III e) I, II & III

Part II. Answer each question in the space provided. Show all work. (20 points)

1. The element chlorine is too reactive to occur naturally as a free element. It is found in compounds such as NaCl and KCl. It also reacts with magnesium to form MgCl₂. At room temperature, chlorine is a yellow-green gas. It condenses to a liquid at -34°C and solidifies at -101°C. At 0°C and 1 atm pressure, a 3.21 gram sample of chlorine occupies a volume of 1.00 L

List any *4* properties of chlorine and indicate for *each one*, whether it is a chemical property or a physical property. Be sure to include at least one chemical and one physical property in your list. (4 points)

- 2. Express the following numbers in scientific notation with 3 significant figures: (Example: $4.2673 = 4.27 \times 10^{0}$) (2 points each; 8 points)
 - a) 4,321 c) 110,000.
 - b) 0.0064283 d) 10.99

- 3. Perform the following operations and express the answers in significant figures. (2 points each; 8 points)
 - a) 3.12 x 1.8 b) 1.008 + 8.3 + 3.48
 - c) $(5 \times 10^2) \div (6 \times 10^4)$ d) (3.36 3.12)/3.36
- **Part III**. Use conversion factors to solve the problems below. All answers must be in significant figures and include <u>units</u>. Show all work. (18 points)
- 1. What is the volume in ounces of a liquid that has a volume of 68.0 centiliters? (5 points)

2. The density of lead is 11.35 g/cm³. What is the mass in pounds of a 901-microliter sample of lead? (5 points)

3. If a bee flies at an average speed of 3.4 m/s, what is its average speed in mi/hr? (6 points)

4. A prescription says to take exactly 2 teaspoons of a medicine but all you have is a metric eye dropper that measures in mL. How many mL are in exactly 2 teaspoons? (3 teaspoons = 1 Tablespoon, 16 Tablespoons = 1 cup, 4 cups = 1 quart, 4 quarts = 1 gallon) (2 points)

some conversions						
length						
1 km	= 0.6214 miles					
volume						
1 L	= 1.057 quarts					
1 qt	= 32.00 ounces					
mass						
1 kg	= 2.20 pounds					