Unit 1 Review **Name: _____** **Block: _____**
Chemistry

****SHOW WORK for all Calculations! Express your final answer with the proper number of significant figures and units!****

Safety and Equipment

1. Know safety rules
2. Know laboratory glassware and instruments

3. What is the difference between an observation and an inference?

Measurement and Significant Figures.

4. Underline the number of significant figures in the following measurements and indicate what the measurement is (time, distance, length, etc...)
   a. 0.0040500 m
   b. 2071000 kg
   c. 100 mL
   d. 0.001030 L
   e. 100.0 ms
   f. 30500 kPa

5. Put the following numbers in scientific notation.
   a. 560000000 g
   b. 0.000000000003700 cm
   c. 9847380000000000g
   d. 0.0048 mL
   e. 40600 kPa
   f. 0.000000049300 mm

6. Round the following measurements to the requested number of significant figures and put the numbers in scientific notation,
   a. 34890 km → 2 s.f.
   b. 0.0087998 mm → 3 s.f.
   c. 456666 ns → 4 s.f.
   d. 399 g → 2 s.f.
   e. 0.00762055 mL → 3 s.f.
   f. 3290 cm → 2 s.f.

7. Calculate the following using the correct number of significant figures:

a. 3.560 km + 2.04 km

d. 2.109 cm – 0.2 cm

b. 0.00349 s x 100. s

e. 4500 g ÷ 0.00324 K

c. $\frac{(30.0 \text{ cm} + 0.3 \text{ cm})}{4.345 \text{ s}}$

f. (2.50 m/s x 3.4 s) + 2.788 m

SI Units, Measurement, and Dimensional Analysis

8. Name the SI unit for temperature and convert 36ºC to that temperature

9. The density of copper is 8.96 g/cm^3. A student measured the mass and volume which are on the data table below.

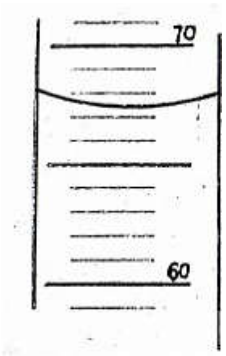
Measurement	Mass (g)	Volume (cm^3)	Density (g/cm^3)
1	25.45	2.85	
2	27.89	3.12	
3	26.44	2.97	
4	21.55	2.41	
average	--------	--------	

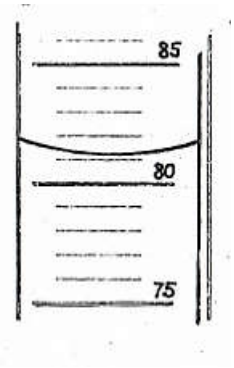
a. Calculate the density for each measurement and indicate your answers in the table
b. Calculate the average density and indicate the answer in your table
c. Calculate the % error.

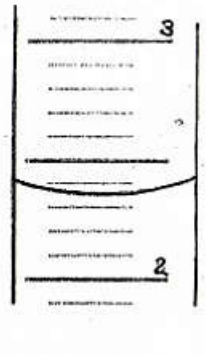
d. Is the data precise and/or accurate for just the density?

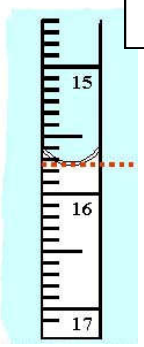
10. Determine the measurements for the following graduated cylinders (in mL). Make sure to estimate to the **proper number of decimal places**!

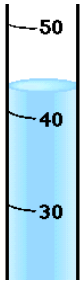
CIRCLE THE MOST PRECISE GRADUATED CYLINDER(S)











11. Perform the following conversions. SHOW ALL WORK!

1) 0.00662 kJ → J

3) 350 cg → kg

2) 4.5 m → cm

4) 14 km → m

12. Perform the following conversions. SHOW WORK!

(*1 kg =2.2 lbs* *1 ton = 2000 lbs* *1 mile = 1.6 km* *1 calorie = 4.18 J)*

a. 0.0056 g → lbs

b. 1230 m → mile

c. 3.56 kJ → calorie

d. 273.55 kg → tons

13. Perform the following conversions. (Show work!)

a. 5.398 g KCl = _____ moles KCl (for KCl: 74.55 g = 1 mole)

b. If an automobile is able to travel 254 mi on 11.2 gal of gasoline, what is the gas mileage in km/L? (1.0 in = 2.54 cm) (1 mi = 5280 ft.) (1 ft = 12 in.) (1 US gallons = 3.7854118 liters)

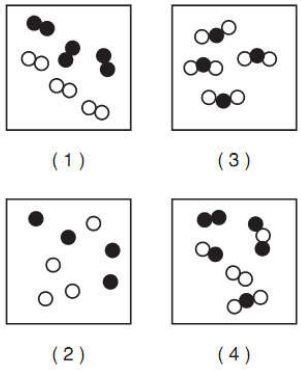
c. 8.719 g H_2O_2 = _____ moles H_2O_2 = _____ molecules H_2O_2
(1 mole = 6.022×10^{23} molecules) (for H_2O_2: 34.01 g = 1 mole)

Elements, Compounds, and Mixtures

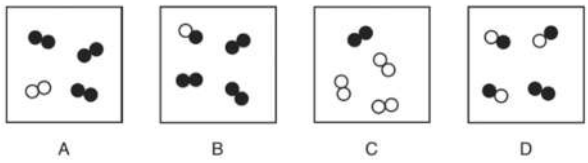
1. Which substance represents a compound?
   A. C (s)
   B. Co (s)
   C. CO (g)
   D. O_2 (g)

2. When potassium chloride, KCl (*s*) is dissolved in water, the resulting solution is classified as a
   A. heterogeneous compound
   B. homogeneous compound
   C. heterogeneous mixture
   D. homogeneous mixture

3. Which particle model diagram represents only one compound composed of elements X and Z?

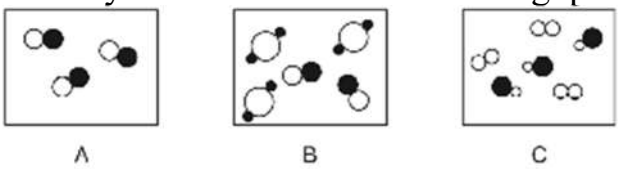


4. Circle the two particle diagrams that represent mixtures of diatomic elements



5. Two substances, A and Z, are to be identified. Substance A cannot be broken down by a chemical change. Substance Z can be broken down by a chemical change. What can be concluded about these substances?
   A. Both substances are elements.
   B. Both substances are compounds.
   C. Substance A is an element and substance Z is a compound.
   D. Substance A is a compound and substance Z is an element.

6. Base your answers to the following questions on the particle diagrams below:



7. Explain, in terms of composition, why sample A represents a pure substance

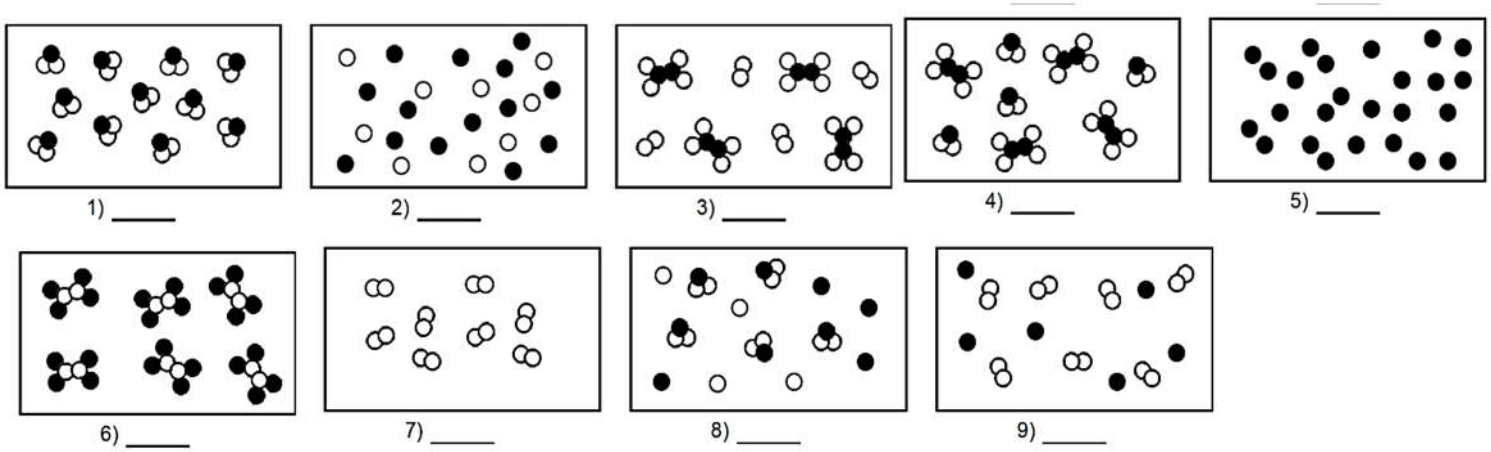
8. Explain why sample C would represent a mixture of fluorine (F_2) and hydrogen chloride (HCl)

9. Contrast sample A and sample B, in terms of compounds and mixtures. Include both sample A and sample B in your answer

Directions: Classify each of the pictures below by placing the correct label in the blanks below:

A= Element
B= Compound
C= Mixture of elements
D= Mixture of compounds
E= Mixture of elements and compounds

Each circle represents an atom and each different color represents a different kind of atom. If two atoms are touching then they are bonded together.



10. Determine the physical properties that each separation technique takes advantage of in order to separate the different components of a mixture

Separation Technique	**Physical Properties**	**Type of Mixture (heterogeneous and/or homogeneous)**
Distillation		
Decanting		
Filtration		
Evaporation		
Centrifuge		
Paper Chromatography		
Column Chromatography		

11. Classify each property as being a physical (P) or chemical (C) property. Also indicate whether it is an intensive (I) or extensive (E) property in each box.

1) Mass	2) Density	3) Length
4) Color	5) Reactivity	6) Volume
7) Malleability	8) Luster	9) Copper conducts electricity.
10) The pH of an acid is below 7.0.	11) Iron can be oxidized.	12) The density of water is 1.0g/mL.
13) Oxygen is a gas.	14) A flag pole is 25 ft. tall.	15) A ruby is red.