Name: _____

Honors Chemistry Unit 1 Practice Sheet

Chapter 1:

1. What is matter?
2. What is chemistry?
3. Determine the branch of chemistry for each example below:
    a. Determining the energy transfer when water boils
    b. Finding out how much nitrogen is in a sample of air
    c. Studying the process of photosynthesis in plants
    d. Manufacturing nylon, which contains carbon
    e. Determining the composition of a moon rock
    f. Research on making a new medicine to treat high blood pressure
    g. Regulate the rate of gasoline burning in a car engine
    h. Develop a plastic that can be decomposed by bacteria
    i. Improve the method for extracting iron from iron ore
4. What were the alchemists TRYING to achieve?
5. Why are the alchemists important to us today?
6. List the 5 steps of the scientific method in order.

**Use the following scenario to answer the next 3 questions.

A student is testing the effect of sugar on a mouse's weight. The student feeds 5 mice a low-sugar diet for 60 days and 5 mice a high-sugar diet for 60 days. The student compares the starting and ending weights of the mice.

7. What is the manipulated/independent variable?
8. What is the responding/dependent variable?
9. What is one control during the experiment?
10. What is the difference in a law and a theory?

Chapter 2:

11. Classify each of the following as an extensive or intensive property.

    a. Color b. Volume c. Mass d. Boiling Point

12. Which of the following is NOT a physical property? (select only one)

    a. Solid a room temperature
    b. Decomposes when heated
    c. Dissolves in water
    d. Tastes sweet

13. Complete the following table.

Physical State	Definite Shape?	Definite Volume?	Easily Compressed?
gas			
	no		no
	yes		

14. What is a vapor?
15. Classify each of the following as a solid, liquid, gas, or vapor.
    a. Steam
    b. Apple juice
    c. Gasoline
    d. Hockey puck
    e. Air
16. What is another name for a homogeneous mixture?
17. Classify each of the following as a mixture or a substance.
    a. Table sugar
    b. Tea
    c. Table salt
    d. Windex
    e. Neon
18. What is the difference in an element and a compound?
19. Classify each of the following as an element, compound, or mixture.
    a. Table salt
    b. Water
    c. Iron
    d. Stainless steel
20. List the 5 signs that a chemical reaction has occurred.

**Use the following reaction to answer the next 3 questions.

Carbon dioxide plus water yields carbonic acid.

21. Name the product(s) of this reaction.
22. Name the reactant(s) of this reaction.
23. If 44 g of carbon dioxide react completely with 18 g of water, what is the mass of carbonic acid formed?
24. When 16 g of methane gas combines with 64 g of oxygen, 44 g of carbon dioxide form, plus water. What mass of water is produced?

Chapter 3:

25. Write the following numbers in scientific notation.
    a. 34900000000 m
    b. 0.000912 s
    c. 0.03°C

26. Write the following numbers in standard notation.

    a. 6.6×10^3 mi
    b. 2.63×10^6 mol
    c. 9.77×10^{-4} J

27. A student conducts an experiment and collects 30.7 g of product. He should have collected 53.9 g of product. What was his error? What was his percent error?

28. Underline the significant figures in the following numbers.

    a. 40700.2 m
    b. 20.700 s
    c. 0.00409800 L
    d. 3.98×10^4 kg
    e. 40 buttons
    f. 2700 cm

**Answer the following calculations with the correct number of significant figures.

29. 40.08 g + 2.7 g =
30. (0.099 m + 18.72 m) x 1.290 m =
31. $\frac{(30.9 \text{ m} - 12 \text{ m})}{13.30 \text{ s}}$ =

32. What is the difference in mass and weight?
33. If you went to Jupiter with a much larger gravity than Earth, what would happen to your mass and weight?

34. Fill in the following chart.

Measurement	SI Unit	Abbreviation
Temperature		
		m
	candela	
		A
	mole	
Time		
		kg

35. Why can Kelvin never be negative? (BE SPECIFIC – Don't just tell me that it has absolute zero)

36. Convert the following temperatures.

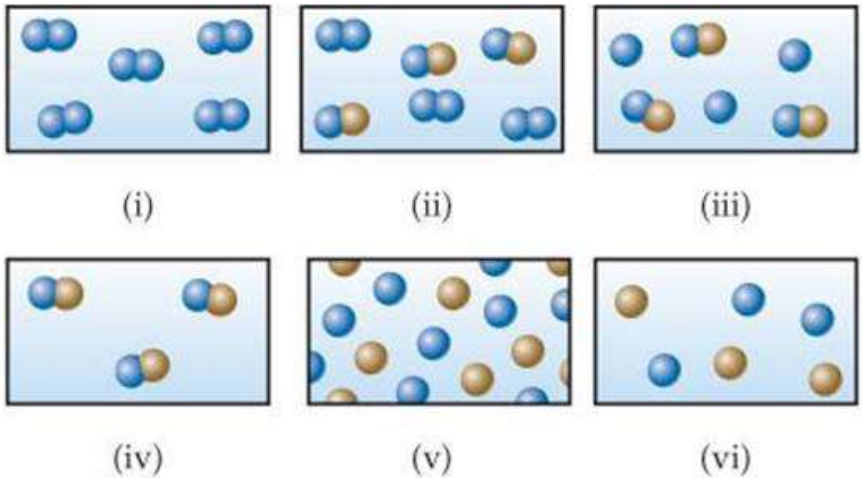
    a. 792 K = _____°C
    b. 43.8°C = _____K
    c. 123°F = _____°C
    d. 200°F = _____K

**Make the following conversions.

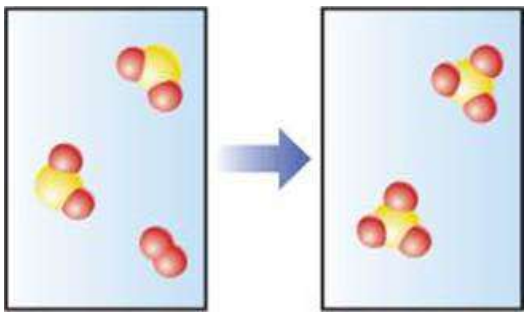
37. Convert 37 days into seconds.
38. Convert 6.5 Mm into meters.
39. Convert 9.8×10^4 ns into kiloseconds.
40. Convert 9.85 g/mL into kg/dL.
41. Convert 83.7 cm^3 into m^3.
42. Convert 197 kg/nm^3 to g/cm^3.
43. Convert 14.9 ft into centimeters.
44. How does density normally change when temperature increases?
45. If an object has a density of 1.78 g/cm^3 and a volume of 12.3 cm^3, then what is the mass of the object?
46. An object has a mass of 165 g and a density of 0.38 g/mL, what is the volume of the object?

Additional Exercises:

47. Which of the following figures represents the following. (More than one picture might fit each description.)
    a. A pure element
    b. A mixture of two elements
    c. A pure compound
    d. A mixture of an element and a compound



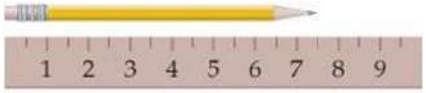
48. Does the following diagram represent a chemical or physical change? How do you know?



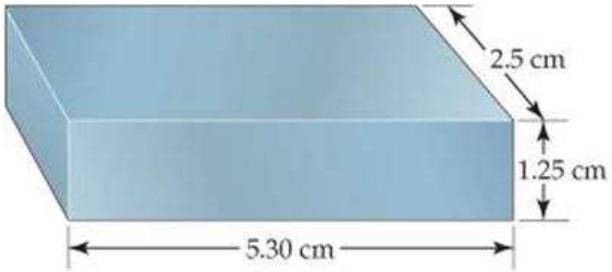
49. Classify each of the following as a pure substance or a mixture. If a mixture, indicate whether it is homogeneous or heterogeneous.
    a. rice pudding
    b. seawater
    c. magnesium
    d. gasoline
    e. air
    f. tomato juice
    g. iodine crystals
    h. sand
50. Label each of the following as either a physical process or a chemical process:
    a. Corrosion of aluminum metal
    b. Melting of ice
    c. Pulverizing of aspirin
    d. Digesting a candy bar
    e. Explosion of nitroglycerin
51. A match is lit and held under a cold piece of metal. The following observations are made. Which of these occurrences are due to physical changes, and which are due to chemical changes.
    a. The match burns.
    b. The metal gets warmer.
    c. Water condenses on the metal.
    d. Soot (carbon) is deposited on the metal.
52. Suggest a method of separating each of the following mixtures into two components:
    a. Sugar and sand
    b. Iron and sulfur
53. Identify each of the following as measurements of length, area, volume, mass, density, time, or temperature:
    a. 5 ns
    b. 5.5 kg/m^3
    c. 0.88 pm
    d. 540 km^2
    e. 173 K
    f. 2 mm^3
    g. 23^oC
54. Three spheres of equal size are composed of aluminum (density = 2.70 g/cm^3), silver (density = 10.49 g/cm^3), and nickel (density = 8.90 g/cm^3). List the spheres from lightest to heaviest.
55. Round each of the following numbers to four significant figures, and express the result in scientific notation:
    a. 102.53070
    b. 656,980
    c. 0.008543210
    d. 0.000257870
    e. -0.0357202

56. The following dart boards illustrate the types of errors often seen when one measurement is repeated several times. The bull's eye represents the "true value," and the darts represent the experimental measurements. Which board best represents each of the following scenarios:
    a. measurements both accurate and precise
    b. measurements precise but inaccurate
    c. measurements imprecise but yield an accurate average

57. a. What is the length of the pencil in the following figure if the scale reads in centimeters? How many significant figures are there in this measurement?
    b. An oven thermometer with a circular scale reading degrees Fahrenheit is shown. What temperature does the scale indicate? How many significant figures are in the measurement?



58. a. How many significant figures should be reported for the volume of the metal bar shown below?
    b. If the mass of the bar is 104.7 g, how many significant figures should be reported when its density is calculated using the calculated volume?



59. When you convert units, how do you decide which part of the conversion factor is in the numerator and which is in the denominator?

60. A copper refinery produces a copper ingot weighing 150 lb. If the copper is drawn into wire whose diameter is 8.25 mm, how many feet of copper can be obtained from the ingot? The density of copper is 8.94 g/cm^3 (Assume the wire is a cylinder whose volume is $V = \pi r^2 h$, where r is its radius and h is its height or length.)