

**Exam I – Chapters 1-5**

$$\begin{array}{ll} 1 \text{ lb} = 454 \text{ g} & 1 \text{ mile} = 1.61 \text{ km} \\ 1 \text{ inch} = 2.54 \text{ cm} & 1 \text{ qt} = 946 \text{ mL} \\ T_{\text{°F}} - 32 = 1.80 \times T_{\text{°C}} & T_{\text{K}} = T_{\text{°C}} + 273 \end{array}$$

Please circle the correct answer for questions 1-20 on your exam. There is only one correct answer and each question is worth 2 points.

- Select the correct number of significant figures in the following number: 390 m  
a. 1                      **b. 2**                      c. 3                      d. 4
- When converting from seconds into centiseconds you need to multiply by  
a. 10                      **b. 100**                      c. 1000                      d. 10000
- The alkaline earth metal in the fifth period is  
a. Rb                      b. I                      **c. Sr**                      d. Xe
- The halogen in the second period is  
a. Ne                      b. Li                      c. He                      **d. F**
- Round the following number to three significant figures: 198733 dg  
a. **1.99 x 10<sup>5</sup> dg**                      b. 1.98 x 10<sup>5</sup> dg                      c. 2.00 x 10<sup>5</sup> dg                      d. 1.987 x 10<sup>5</sup> dg
- Which of the following requires a **physical** method to be separated into two or more pure substances?  
a. compound                      b. element                      **c. mixture**                      d. molecule
- Please perform the following calculation:  $(310 \text{ g} + 24 \text{ g}) / (401 \text{ mL} - 25.6 \text{ mL}) =$   
a. **0.89 g/mL**                      b. 0.78 g/mL                      c. 0.783 g/mL                      d. 0.890 g/mL
- Which of the following elements is a semimetal?  
a. Al                      **b. Ge**                      c. I                      d. Bi
- The process for a gas changing into a liquid is called \_\_\_\_\_.  
a. sublimation                      b. melting                      c. vaporization                      **d. condensation**
- Which of the following is **not** a physical property:  
a. density                      b. melting point                      **c. flammable**                      d. boiling point
- Once a scientific theory is developed, it can never be disproved.  
a. True                      **b. False**
- Circle the property that is a chemical property of magnesium.  
a. shiny metallic luster  
b. malleable and ductile  
**c. reacts with acid**  
d. conducts heat and electricity
- How many hydrogen atoms are there in citric acid, C<sub>3</sub>H<sub>4</sub>OH(COOH)<sub>3</sub>?  
a. 5                      b. 6                      c. 7                      **d. 8**
- Convert 328 K into °C.  
**a. 55°C**                      b. 601°C                      c. 164°C                      d. 622°C

15. What happens to the flow of energy when your bare hand touches a mug of water when the water temperature is 125 °C.
- The heat transfers from the mug to your hand, so you gain heat.
  - The cold transfers from the mug to your hand, so you lose heat.
  - The cold transfers from your hand to the mug, so you gain heat.
  - The heat transfers from your hand to the mug, so you lose heat.
16. Which of Dalton's proposals is *not* valid?
- Atoms of different elements can combine to form compounds.
  - Atoms can combine in small whole number ratios.
  - Atoms can combine in more than one whole number ratio.
  - Atoms are indivisible and indestructible.
17. What do the chocolate chips (or raisins) represent in JJ Thomson's model of the atom?
- electrons
  - protons
  - neutrons
  - atoms
18. Which of the following is *not* considered a natural law?
- Matter is neither created nor destroyed, it is conserved.
  - Energy is neither created nor destroyed, it is conserved.
  - Heat flows from a substance at a higher temperature to a substance at a lower temperature.
  - All matter is composed of small, indivisible particles called atoms.
19. Which of the following conversions is exact?
- 1 lb = 454 g
  - 1 mile = 1.61 km
  - 10 dL = 1 L
20. How many pounds are there in 3003 cg?
- 0.006614 lbs
  - 0.06614 lbs
  - 0.6614 lbs
  - 6.614 lbs
21. How many inches are there in 720 dm?
- 18 in
  - 18.3 in
  - $2.8 \times 10^3$  in
  - $2.83 \times 10^3$  in
- I will accept either answer!
22. Convert 28.5°C into °F.
- 245°F
  - 1.9°F
  - 19°F
  - 83°F
23. The Scientific Method includes all of the following *EXCEPT*:
- hypothesis
  - data
  - law
  - experiments
24. Dalton's Atomic Theory was later disproved when what was discovered?
- atomic line spectrum
  - photon
  - electron
  - hydrogen gas
25. An isotope has a different number of
- protons
  - neutrons
  - electrons
  - atoms

**Questions 26-30 are short answer type questions. Please show all work for full credit.**

26. (8 pts) Write the correct name or give the correct symbol for the following elements: (spelling counts!)
- |       |           |              |    |
|-------|-----------|--------------|----|
| a. B  | boron     | e. neon      | Ne |
| b. Na | sodium    | f. potassium | K  |
| c. S  | sulfur    | g. calcium   | Ca |
| d. Mg | magnesium | h. helium    | He |

27. (6 pts) Write the **full** electron configuration for the following elements:



28. (20 pts) Please complete the following table. Each box is worth 2 points.

Isotope	Mass Number	Number of Protons	Number of Electrons	Number of Neutrons
oxygen - 18	18	8	8	10
$^{40}\text{Ar}$	40	18	18	22
$^{210}\text{Po}$	210	84	84	126

29. (6 pts) Light travels at a velocity (speed) of  $3.00 \times 10^8$  m/s. What is the velocity in miles per hour?

$$3.00 \times 10^8 \frac{\text{meters}}{\text{second}} \left( \frac{1 \text{ km}}{1000 \text{ m}} \right) \left( \frac{1 \text{ mile}}{1.61 \text{ km}} \right) \left( \frac{60 \text{ seconds}}{1 \text{ minute}} \right) \left( \frac{60 \text{ minutes}}{1 \text{ hour}} \right) = 6.71 \times 10^8 \text{ miles per hour}$$

30. (5 pts) Welch's Grape Soda contains 50.0 g of sugar. A typical can of soda weighs about 227 g. What is the percent of sugar in the soda?

$$\% = \frac{50.0 \text{ g}}{227 \text{ g}} \times 100\% = 22.0\% \text{ sugar}$$

31. (5 pts) A student weighs out an irregularly shaped platinum rock and finds its mass to be 44.5090 g. Then the student places the platinum rock into a graduated cylinder containing 2.50 mL of water. The cylinder's volume increases to 4.58 mL after the rock is placed inside. What is the density of platinum?

$$\text{Volume} = 4.58 \text{ mL} - 2.50 \text{ mL} = 2.08 \text{ mL}$$

$$\text{Density} = \frac{\text{mass}}{\text{volume}} = \frac{44.5090 \text{ g}}{2.08 \text{ mL}} = 21.4 \text{ g/mL}$$

**Extra Credit: (7 pt) For the full seven points, write the formula and physical state of the seven diatomic elements.**

- |                  |                             |       |        |     |
|------------------|-----------------------------|-------|--------|-----|
| 1. Formula _____ | Physical State (circle one) | solid | liquid | gas |
| 2. Formula _____ | Physical State (circle one) | solid | liquid | gas |
| 3. Formula _____ | Physical State (circle one) | solid | liquid | gas |
| 4. Formula _____ | Physical State (circle one) | solid | liquid | gas |
| 5. Formula _____ | Physical State (circle one) | solid | liquid | gas |
| 6. Formula _____ | Physical State (circle one) | solid | liquid | gas |
| 7. Formula _____ | Physical State (circle one) | solid | liquid | gas |