

**Phones must be off and put away. I see a phone = Cheating = 0 on the exam.**

Directions: Show all your work, each step with units, for calculations. There is only one best choice for multiple choice questions. Good luck! You got this!

1. Which statement is FALSE about the scientific method?

- a. **You only need to do one experiment.**
- b. You need to formulate a hypothesis.
- c. You should draw a conclusion.
- d. You should make observations.
- e. You should perform research.

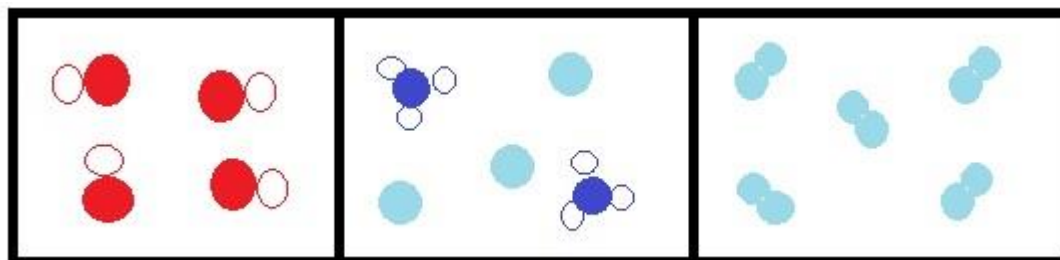
2. Which state of matter has its own shape and volume?  **Solid**

3. Are the following chemical properties (CP) or physical properties (PP)?

- a. Smooth  **PP**
- b. explosive  **CP**
- c. boiling point of 32°C  **PP**

4. When C<sub>6</sub>H<sub>6</sub> liquid boils, what is the resulting formula?  **C<sub>6</sub>H<sub>6</sub>**

5. Label the following as mixture, compound or element:



**compound**

**mixture**

**element**

6. What is the symbol for the following elements:

- a. Sodium  **Na**
- b. silicon  **Si**
- c. silver  **Ag**

7. What is the name for the following elements:

- a. N  **nitrogen**
- b. Au  **gold**
- c. Mg  **magnesium**

8. How many significant figures are in each of the following numbers?

- a. 22,020  **4**
- b. 0.00300  **3**
- c. 14.000  **5**

9. Perform the following calculations. You do not need to show work for these.

- a. 935.256 mg + 82.6 mg =  **1017.9 mg**
- b.  $1.16 \times 10^{74} \text{ m}^2 / 5.24 \times 10^{36} \text{ m} =$    **$2.21 \times 10^{37} \text{ m}$**
- c. 2020 cm x 34.92 cm =  **70,500 cm<sup>2</sup> or  $7.05 \times 10^4 \text{ cm}^2$**

10. Write these numbers in scientific notation please:

a.  $0.000000003050 \text{ mL} = \underline{\quad\quad\quad} \mathbf{3.050 \times 10^{-9} \text{ mL}} \underline{\quad\quad\quad}$

b.  $23,000,000,000 \text{ } \mu\text{m} = \underline{\quad\quad\quad} \mathbf{2.3 \times 10^{10} \text{ } \mu\text{m}} \underline{\quad\quad\quad}$

11. Peyton's super bowl ring is 18 K gold. If the ring masses 86.24 g, and 64.67 g is actually gold, what is the percent of gold in the super bowl ring?

$$\left( \frac{64.67 \text{ g}}{86.24 \text{ g}} \right) \times 100 = 74.99 \% \text{ gold}$$

12. Jermain's lawn is 89.35 yards wide. What is this in meters?

$$\mathbf{89.35 \text{ yds} \left( \frac{3 \text{ ft}}{1 \text{ yd}} \right) \left( \frac{12 \text{ in}}{1 \text{ ft}} \right) \left( \frac{2.54 \text{ cm}}{1 \text{ in}} \right) \left( \frac{1 \text{ m}}{100 \text{ cm}} \right) = 81.70 \text{ m}} \quad \mathbf{(4 \text{ sig fig, exact conversions})}$$

13. During her yoga routine, Mary Ann drank 955 mL of vitamin water. How many dL is this?

$$\mathbf{955 \text{ mL} \left( \frac{1 \text{ L}}{1000 \text{ mL}} \right) \left( \frac{10 \text{ dL}}{1 \text{ L}} \right) = 9.55 \text{ dL}}$$

14. Bobbie Jo went to an Irish pub and drank 4.5 pints of beer. How many gallons is this?

$$\mathbf{4.5 \text{ pts} \left( \frac{1 \text{ qt}}{2 \text{ pts}} \right) \left( \frac{1 \text{ gal}}{4 \text{ qts}} \right) = 0.56 \text{ gal}}$$

15. Kelly worked 42.5 hours this week. How many minutes is this?

$$\mathbf{42.5 \text{ hrs} \left( \frac{60 \text{ min}}{1 \text{ hr}} \right) = 2550 \text{ min}}$$

16. Peyton's super bowl ring masses 86.24 grams and the volume is 5.75 mL. What is the density of the ring?

$$\mathbf{d = \left( \frac{86.24 \text{ g}}{5.75 \text{ mL}} \right) = 15.0 \text{ g/mL}}$$

17. Aluminum melts at 933 Kelvin. What is this in degrees Celsius and Fahrenheit?

**660 °C or  $6.60 \times 10^2$  °C is fine. 1220 °F**

18. Which scientist discovered the electron? Thomson

19. Fill in this table for the various atoms:

Atom	# protons	# neutrons	# electrons	Atomic mass
Carbon-11	<b>6</b>	<b>5</b>	<b>6</b>	<b>11</b>
Sodium-23	<b>11</b>	<b>12</b>	<b>11</b>	<b>23</b>
Iodine-127	<b>53</b>	<b>74</b>	<b>53</b>	<b>127</b>

20. True or False?  $^{40}\text{Ca}$  and  $^{40}\text{K}$  are isotopes of each other. False

79 35 Br
-------------

21. Write the atomic notation for bromine-79 in this box:

22. How many atoms are in this formula:  $\text{Al}(\text{C}_2\text{H}_3\text{O}_2)_3$ ? # atoms = 22

23. What is the physical state of the following elements?

a. Pb solid      b.  $\text{Br}_2$  liquid      c. Ne gas

24. How many  $\mu\text{L}$  are in one L? a million or 1,000,000

25. If Sally picks up an ice cube, heat transfers from her hand to the ice cube.

Bonus: If the density of mercury is 13.56 g/mL, what is the volume for 2453.6 grams?

$$2453.6 \text{ g} \left( \frac{1 \text{ mL}}{13.56 \text{ g}} \right) = 180.9 \text{ mL}$$