

# June Review Term 1

## Topic 1- Atomic model and periodic table

1. Make a Bohr-Rutherford model for the following:

Lithium	Aluminum	Argon

2. Define or explain the following words:

Family or group \_\_\_\_\_

Periods or energy levels \_\_\_\_\_

Metals \_\_\_\_\_

Non-metals \_\_\_\_\_

Metalloids \_\_\_\_\_

Valence electrons \_\_\_\_\_

3. Give three characteristics of each family.

Alkali metal	Alkaline earth metal	Halogen	Noble or inert gas

4. What are the Lewis diagrams for the following elements

Sodium- Na	Phosphorus- P	Calcium- Ca	Aluminum- Al	Sulfur- S

5. Which element is being described?  
I am in period 2 and have 2 valence electrons.  
I have 2 energy shells and each is full  
A halogen whose electrons are distributed among 3 energy levels  
An alkali metal that has 2 energy levels  
I form a  $^{+1}$  ion and have 3 orbitals  
I form a  $^{-3}$  ion and have 2 periods  
I am the most reactive alkali metal

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## Topic 2- Solutions and electrolytes

1. Explain what a solution is.
2. What is the formula used for calculation the concentration of a solution?
3. What does a solution in ppm mean?
4. The water in a lake is contaminated. To determine the concentration of the contaminant, a technician takes a 100 mL sample of water. After several tests, he concludes the sample contains 4.25 mg of contaminant. Calculate the concentration of the contaminant in ppm.
5. If you convert a 15 g/L to a % concentration and a ppm, explain which one will be more concentrated. Determine which one will have the most solute?
6. Convert the following units to ppm:  
A) 10 %                      B) 15 g/L                      C) 2 g/300 mL                      D) 0.5 mg/L
7. Convert the following units to g/L:  
A) 5 %                      B) 3 g/200 mL                      C) 100 g/ 2 L                      D) .03 mg/L

8. Convert the following units to %:  
A) 30 g/L                      B) 5 g/20 mL                      C) 50 ppm                      D) 2.5 mg/L
9. In a pond, the lethal concentration of nitrate ( $\text{NO}_3^-$ ) is **0.08 g/L** and phosphate's ( $\text{PO}_4^{3-}$ ) lethal concentration is **0.6 mg/L**. This means if the concentrations of nitrate or phosphate is over the values given, certain types of aquatic organisms will die. You test the water and get the following values:  
**Nitrate has a concentration of 45 ppm   Phosphate has a concentration of 0.15 ppm.** Determine if the pond contains any lethal doses.
10. You need to make 250 ml of a 15 g/L solution. Describe the steps you would take and show the calculations to support your method.
11. Explain what an electrolyte and a non-electrolyte is.
12. Why are acids bases and salt electrolytes?
13. What test determines if a substance is an electrolyte or a non electrolyte?
14. How can you identify an acid, base and salt by looking at its molecular formula?

15. How can you identify a non-electrolyte from its molecular formula?

16. Which of the following, when dissolved in water, must be an electrolyte?

- A)  $\text{CO}_2$                       B)  $\text{HNO}_3$                       C)  $\text{H}_2\text{O}$                       D)  $\text{C}_6\text{H}_{12}\text{O}_6$

17. Which of the following, when dissolved in water, will be a non-electrolyte?

- A)  $\text{KCl}$                       B)  $\text{HCl}$                       C)  $\text{KOH}$                       D)  $\text{C}_2\text{H}_5\text{OH}$

18. 11. Which of the following substances would you use to clean greasy dishes?

- A)  $\text{KCl}$                       B)  $\text{HCl}$                       C)  $\text{KOH}$                       D)  $\text{C}_2\text{H}_5\text{OH}$

19. 12. Which of the following is a salt?

- A)  $\text{KBr}$                       B)  $\text{LiOH}$                       C)  $\text{HNO}_3$                       D)  $\text{SO}_2$

20. 13. You want to neutralize something with a pH of 4, what would you use?

- A) water                      B) An acid                      C) something with a pH of 7                      D)  $\text{Mg}(\text{OH})_2$

21. Write the equation for the electrolytic dissociation of the following compounds:

$\text{CaCl}_2$  \_\_\_\_\_

$\text{HCl}$  \_\_\_\_\_

22. Fill in the table. Give the pH range or number. /12

	$\text{Ca}(\text{OH})_2$	$\text{CaCl}_2$	$\text{CH}_3\text{COOH}$	$\text{CH}_3\text{OH}$	$\text{H}_2\text{SO}_4$	$\text{HCl}$	$\text{NCl}_3$	$\text{NaCl}$
Acid, base, salt or neither								
pH range or #								
Electrolyte or Non-elect.								

23. What is the pH range of acids, bases and salts?

24. Explain how indicators and buffer solutions are used to identify an unknown solution.

25. Using the table below, answer the questions below.

pH	1	2	3	4	5	6	7	8	9	10	11	12	13
A	red			Orange				Yellow					
B	Blue		green		Yellow								
C	red				purple				blue				

- Which indicator would you use for a strong acid? \_\_\_\_\_
- What colour will indicator A turn with a pH of 5? \_\_\_\_\_
- If indicator A turns orange and indicator B turns green, what is the pH of the substance?
- What is the pH range of indicator C turns purple? \_\_\_\_\_
- If a substance has a pH of 3 with indicator 2, which colour will develop? \_\_\_\_\_

26. How many times more acidic is a solution of pH 2 than a solution of pH 6?

27. How many times more basic is a solution of pH 11 than a solution of pH 8?

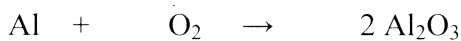
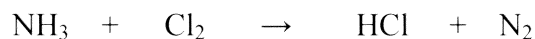
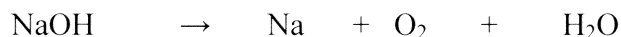
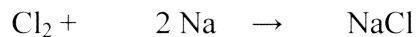
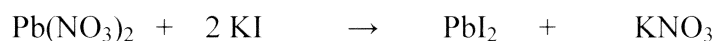
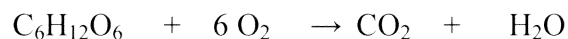
### Topic 3- Balancing equations, neutralization and combustion

1. Give the signs that show a chemical change occurred.

2. Represent each equation using the particle model.



3. Balance the equations



4. When 191 g of copper, Cu, is combined with 756 g of nitric acid, HNO<sub>3</sub>, the chemical reaction produces 563 g of copper nitrate, Cu(NO<sub>3</sub>)<sub>2</sub>, 108 g of water, H<sub>2</sub>O, and a certain amount of nitrogen dioxide, NO<sub>2</sub>. This reaction is represented by the following balanced chemical equation: What mass of nitrogen dioxide does this reaction produce?



5. The neutralization of 24.5 g of sulphuric acid (H<sub>2</sub>SO<sub>4</sub>) requires 42 g of sodium bicarbonate (NaHCO<sub>3</sub>). This neutralization reaction produces 35.5 g of sodium sulphate (Na<sub>2</sub>SO<sub>4</sub>), 22 g of carbon dioxide (CO<sub>2</sub>) and a certain amount of water (H<sub>2</sub>O). The balanced equation for this reaction is:  
What is the mass of the water produced during this neutralization reaction?



6. Explain how an indicator is used to determine when an acid or a base is neutralized?
7. What 2 products are produced when acids and bases neutralize themselves?

8. Write a chemical equation to show a neutralization reaction.

9. You have been given a sample of water taken from a swimming pool. You are to determine whether this water is acidic, basic or neutral. The materials available are

- a graduated cylinder containing 15 mL of vinegar (pH = 2.8)
- a graduated cylinder containing 15 mL of ammonia (pH = 11)
- a graduated cylinder containing 15 mL of pure water (pH = 7)
- a small bottle of bromothymol blue without a colour chart

Write the experimental procedure you would follow to determine whether the water is acidic, basic or neutral, using the materials available.

10. Explain what oxidation and combustion are.

11. Define what the fuel, oxidizing agent and ignition is during the process of combustion.

12. What are the three types of combustion and explain them.

13. Give the differences between respiration and photosynthesis?