Chemistry 30

REVIEW OF BASIC CHEMISTRY

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1. Name the following elements. Spelling counts:

   H _____

   S _____

   Cl _____

   C _____

   N _____

   Na _____

   Pb _____

   Ag _____

2. Write the symbols for the following elements.

   sodium _____

   phosphorus _____

   fluorine _____

   magnesium _____

   potassium _____

   calcium _____

   zinc _____

   iron _____

3. Using a periodic table, record the atomic number for the following elements:

   gold (Au) copper (Cu)

4. Using a periodic table, record the atomic mass for the following elements to one decimal place:

   chlorine (Cl) calcium (Ca)

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5. Complete the following table. Use the information provided in the chart – not a periodic table – to determine atomic masses, but you may refer to a periodic table to name the element.

Element	Atomic Number	Atomic Mass	Protons	Neutrons	Electrons
	82			125	
			18	40	
barium		137			
		89			50

6. Match the unit with its description:

_____	1. amount of substance	A.	amu or u
_____	2. density	B.	g
_____	3. mass	C.	g/mL
_____	4. molar mass	D.	g/mole
_____	5. molecular mass	E.	L
_____	6. volume	F.	mole

7. Complete the following questions concerning the element **oxygen:**

   a. Number of protons _____

   b. Electron configuration _____

   c. Number of electrons (neutral atom) _____

   d. Number of valence electrons _____

   e. Electron-dot diagram (Lewis dot) _____

   f. Ion most commonly formed by oxygen _____

   g. Is the ion in part (f) an anion or a cation? _____

   h. Define these terms:

      Anion - _____

      Cation - _____

8. Draw electron-dot diagrams for:

   a. potassium _____ c. phosphorus _____

   b. nitrogen _____ d. krypton _____

9. What type of chemical bond (ionic or covalent) will most likely form between:

   a. sodium and chlorine _____ b. carbon and oxygen _____

10. Define these terms:

    ionic bond - _____

    covalent bond - _____

11. Name **and provide the correct charge** for these polyatomic ions:

SO_4	_____	NH_4	_____
NO_3	_____	OH	_____
PO_4	_____	CO_3	_____
CrO_4	_____	Cr_2O_7	_____

12. Write chemical formulas for the compounds:

a. sodium chloride _____
b. ammonium sulfate _____
c. potassium nitrate _____
d. calcium hydroxide _____
e. magnesium fluoride _____
f. lead(II) phosphate _____
g. dinitrogen pentoxide _____
h. sulphur trioxide _____

13. Name the following:

a. CO _____
b. CO_2 _____
c. Na_2SO_4 _____
d. H_2O_2 _____
e. $(NH_4)_2CO_3$ _____

14. List the seven diatomic molecules, using proper notation:

15. Calculate the molar masses of the following:

a. H_2O b. $CaCO_3$ c. $(NH_4)_3PO_4$ d. $Al(OH)_3$

16. Solve for x:

a. $39 = \frac{x^2}{5.2}$ b. $20 = \frac{4x}{5}$ c. $2.5 \times 10^{-8} = \frac{(6.2 \times 10^{-2})(8.3 \times 10^{-3})}{x}$

17. Liquid water is produced when hydrogen gas and oxygen gas combine.

a. List the reactant(s) in this reaction _____

b. List the product(s) _____

c. Write a balanced equation for the reaction, including physical states

d. 286 kJ of energy are released during the formation of one mole of water.

Therefore, is the reaction endothermic or exothermic? _____

e. Rewrite the equation but now also include the energy term within the equation.

18. Perform the necessary calculations for the following questions, expressing the final answer to the correct number of significant digits. It is not necessary to show work.

a. An empty beaker has a mass of 32.41 g. When some water is placed in the beaker, the total mass is 33.7822 g. Find the mass of the water.

b. Convert 275 mL to litres.

c. Ethyl alcohol has a density of 0.789 g/mL. Calculate the mass of 25.0 mL of this liquid.

19. Balance the following equations:

a. $Zn + HCl \rightarrow ZnCl_2 + H_2$

b. $Fe_2(SO_4)_3 + KOH \rightarrow K_2SO_4 + Fe(OH)_3$

c. $Fe + O_2 \rightarrow Fe_2O_3$

20. Predict the products of the following reactions:

a. Na_3PO_4 + HCl $\rightarrow$ _____

b. Mg + H_2CO_3 $\rightarrow$ _____

21. Write a net ionic equation for: Cu(s) + 2 $AgNO_3$(aq) $\rightarrow$ $Cu(NO_3)_2$ (aq) + 2 Ag(s)

22. Perform the following calculations. Show your work.

a. Calculate the mass of 0.500 mol of CO.

b. How many moles of KOH are present in a 25.0 g sample of the substance?

23. In a reaction between sulfur and oxygen, 80.0 g of sulfur dioxide is formed. What mass of sulfur was burned?

$$S + O_2 \rightarrow SO_2$$

24. What mass of silver is precipitated (formed) when 40.0 g of copper reacts with an excess of silver nitrate in solution, according to the following equation:

$$Cu_{(s)} + 2\ AgNO_{3(aq)} \rightarrow Cu(NO_3)_{2(aq)} + 2\ Ag_{(s)}$$

25. (Challenge question) Some antacid products contain aluminium hydroxide, $Al(OH)_3$, to neutralize excess stomach acid. What volume of a 0.10 mol/L stomach acid, HCl, can be neutralized by 912 mg of aluminium hydroxide. The reaction is shown:

$$3\ HCl + Al(OH)_3 \rightarrow AlCl_3 + 3\ H_2O$$