

Name: _____

SOL REVIEW WS

Nomenclature, molar mass, products of reactions, mole conversions

Part I: Name the following compounds:

HINT: Molecular = 2 nonmetals – use prefixes

Ionic = anything else – just state the name of the cation then anion (use roman numerals if it is a cation w/ multiple charges)

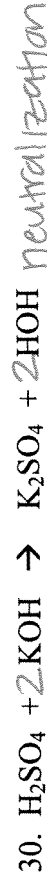
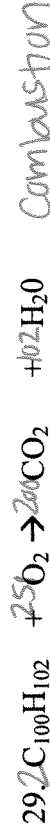
1. NaCl Sodium Chloride	2. KMnO ₄ potassium permanganate	3. Mg ₃ PO ₄ magnesium phosphate
4. H ₂ O Dihydrogen monoxide	5. CO carbon monoxide	6. N ₂ O ₄ dinitrogen tetraoxide
7. CuSO ₄ copper (II) sulfate	8. Cu ₂ O copper (I) oxide	9. NH ₄ NO ₃ ammonium nitrate
10. Al ₂ O ₃ aluminum oxide	11. Fe ₂ O ₃ iron (III) oxide	12. K ₂ O potassium oxide
13. CCl ₄ carbon tetrachloride	14. SnO tin (II) oxide	15. NCl ₃ nitrogen trichloride

Part II: Write formulas and calculate the molar mass.

Name	Formula	Molar Mass
16. Beryllium Nitride Be ⁺² N ⁻³	Be ₃ N ₂	69.057 g/mol
17. Aluminum Permanganate	Al(MnO ₄) ₃	383.8 g/mol
18. Triselenium Pentabromide	Se ₃ Br ₅	636.38 g/mol

19. Lithium Nitrite	LiNO ₂	52.98 g/mol
20. Lithium Nitride	Li ₃ N	172.95 g/mol
21. Copper (II) Nitrate	Cu(NO ₃) ₂	187.57 g/mol
22. Copper(I) Sulfide	Cu ₂ S	159.16 g/mol
23. Carbon dioxide	CO ₂	44.01 g/mol
24. Lead (IV) Phosphate	Pb ₃ (PO ₄) ₄	1001.48 g/mol

Part III: Balance the following reactions & determine the type of reaction (synthesis/combination, decomposition, single-replacement, double-replacement, neutralization, combustion)



Part IV: Answer these questions, using the balanced equation and your periodic table (for molar masses). **SHOW ALL WORK**



31. 20.0 grams of aluminum will react with how many grams of ferric oxide (Fe_2O_3)?

$$\begin{array}{l|l|l|l} 20.0 \text{ g Al} & | & 1 \text{ mol Al} & | & 1 \text{ mol Fe}_2\text{O}_3 & | & 159.7 \text{ g} \\ \hline & & 26.98 \text{ g} & & 2 \text{ mol Al} & & \end{array} = 59.2 \text{ g Fe}_2\text{O}_3$$

32. 10.0 moles of ferric oxide (Fe_2O_3) will produce how many moles of iron?

$$\begin{array}{l|l|l} 10.0 \text{ mol Fe}_2\text{O}_3 & | & 2 \text{ mol Fe} \\ \hline & & 1 \text{ mol Fe}_2\text{O}_3 \end{array} = 20.0 \text{ mol Fe}$$

33. 5.0 grams of ferric oxide (Fe_2O_3) and 10 grams of aluminum will produce how many grams of aluminum oxide?

$$\begin{array}{l|l|l|l|l|l|l} 5.0 \text{ g Fe}_2\text{O}_3 & | & 1 \text{ mol Fe}_2\text{O}_3 & | & 1 \text{ mol Al}_2\text{O}_3 & | & 101.96 \text{ g} \\ \hline & & 159.7 \text{ g} & & 1 \text{ mol Fe}_2\text{O}_3 & & \end{array} = 3.2 \text{ g Al}_2\text{O}_3$$

$$\begin{array}{l|l|l|l|l|l|l} 10 \text{ g Al} & | & 1 \text{ mol Al} & | & 1 \text{ mol Al}_2\text{O}_3 & | & 101.96 \text{ g} \\ \hline & & 26.98 \text{ g} & & 2 \text{ mol Al} & & \end{array} = 18.9 \text{ g Al}_2\text{O}_3$$

Part V: Use the Gas Laws to answer the following questions.

SHOW ALL WORK

Charles' Law: $V_1/T_1 = V_2/T_2$

Boyle's Law: $P_1V_1 = P_2V_2$

Avogadro's Law: $V_1/n_1 = V_2/n_2$

Combined Ideal Gas Law: $\frac{P_1V_1}{n_1T_1} = \frac{P_2V_2}{n_2T_2}$

Ideal Gas Law: $PV = nRT$

$$R = 8.31 \frac{\text{L}\cdot\text{KPa}}{\text{mol}\cdot\text{K}} ; 0.0821 \frac{\text{L}\cdot\text{atm}}{\text{mol}\cdot\text{K}} ; 62.4 \frac{\text{L}\cdot\text{mmHg}}{\text{mol}\cdot\text{K}}$$

AT STP: 1 mol = 22.4 L of gas

$P_{\text{total}} = P_1 + P_2 + P_3 \dots$

34. What is the volume in liters of 10.0 moles of nitrogen gas at 200. Kelvin, and 4.5 atm?

$$V = \frac{nRT}{P} = \frac{(10.0 \text{ mol})(0.0821 \frac{\text{L}\cdot\text{atm}}{\text{mol}\cdot\text{K}})(200. \text{K})}{4.5 \text{ atm}} = 36. \text{ L}$$

35. 10.0 liters of a gas at 700. mmHg will have what volume at 400. mmHg?

$$P_1V_1 = P_2V_2 \quad (700. \text{ mmHg})(10.0 \text{ L}) = (400. \text{ mmHg})(V_2)$$

$$V_2 = 17.5 \text{ L}$$

36. 20.0 liters of gas at 200. K will have what volume at 400. K?

$$\frac{V_1}{T_1} = \frac{V_2}{T_2} \quad \frac{20.0 \text{ L}}{200. \text{ K}} = \frac{V_2}{400. \text{ K}} \quad V_2 = 40.0 \text{ L}$$

37. At STP, how many liters will 23.93 moles of gas occupy?

$$23.93 \text{ mol gas} \times 22.4 \text{ L/mol gas} = 536.0 \text{ L}$$

38. A sealed flexible container with an initial volume of 1.0 L is occupied by a gas at a pressure of 150 kPa at 25°C. By changing the volume, the pressure of the gas increases to 600 kPa as the temperature is raised to 100°C. What is the new volume (in mL)?

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2} \quad (150 \text{ kPa})(1.0 \text{ L}) = (600 \text{ kPa})(V_2)$$

$$\frac{150 \text{ K}}{298 \text{ K}} = \frac{V_2}{373 \text{ K}} \quad V_2 = 313 \text{ mL}$$

39. Determine the total pressure of a gas mixture that contains oxygen, nitrogen, and helium if the partial pressures of the gases are $P_{\text{O}_2} = 20.0 \text{ kPa}$, $P_{\text{N}_2} = 46.7 \text{ kPa}$, and $P_{\text{He}} = 26.7 \text{ kPa}$.

$$P_T = P_{\text{O}_2} + P_{\text{N}_2} + P_{\text{He}} = 20.0 \text{ kPa} + 46.7 \text{ kPa} + 26.7 \text{ kPa}$$

$$P_T = 93.4 \text{ kPa}$$

Part VI: Fill in the table for the following subatomic particles.

Symbol	Name	Charge	Mass	Location within the atom
e ⁻	electron	-1	0	orbitals
p ⁺	proton	+1	1	nucleus
n ⁰	neutron	0	1	nucleus