

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)

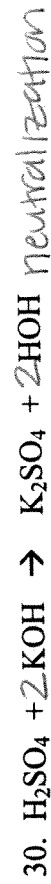
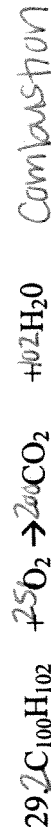
1. NaCl Sodium Chloride	2. KMnO ₄ potassium permanganate	3. Mg ₃ PO ₄ magnesium phosphate
4. H ₂ O Dihydrogen monoxide	5. CO carbon monoxide	6. N ₂ O ₄ dinitrogen tetraoxide
7. CuSO ₄ copper (II) sulfate	8. Cu ₂ O copper (I) oxide	9. NH ₄ NO ₃ ammonium nitrate
10. Al ₂ O ₃ aluminum oxide	11. Fe ₂ O ₃ 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)?

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

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

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

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

$$\begin{array}{l|l|l|l|l} 5.0 \text{ g Fe}_2\text{O}_3 & 1 \text{ mol Fe}_2\text{O}_3 & 1 \text{ mol Al}_2\text{O}_3 & 101.96 \text{ g} & \\ \hline & 159.7 \text{ g} & 1 \text{ mol Fe}_2\text{O}_3 & 1 \text{ mol Al}_2\text{O}_3 & \\ \hline & & & & \boxed{3.2 \text{ g Al}_2\text{O}_3} \\ 10 \text{ g Al} & 1 \text{ mol Al} & 2 \text{ mol Al} & 20.0 \text{ g} & \\ \hline & 26.98 \text{ g} & 2 \text{ mol Al} & 53.96 \text{ g} & \\ \hline & & & & \boxed{18.9 \text{ g Al}_2\text{O}_3} \end{array}$$

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: $P_1V_1 = P_2V_2$

$$n_1T_1 \quad n_2T_2$$

Ideal Gas Law: $PV = nRT$

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

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?

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

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

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

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

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

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

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

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

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)?

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

$$V_2 = \frac{373 \text{ K}}{313 \text{ K}} = \boxed{313 \text{ mL}}$$

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 $P_{\text{He}} = 26.7 \text{ kPa}$.

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

$$P_{\text{T}} = \boxed{93.4 \text{ kPa}}$$

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