

This exam consists of 4 pages. Make sure you have one of each. Print your name at the top of each page now. A fifth page contains a periodic chart. You may tear it off and use it for scratch paper. Show your work on calculations, including unit conversions, and give answers in the correct units and appropriate number of significant figures.

In problems involving molecular and formula weights, you may use values rounded to the nearest 0.1 amu.

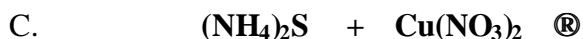
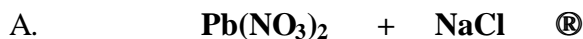
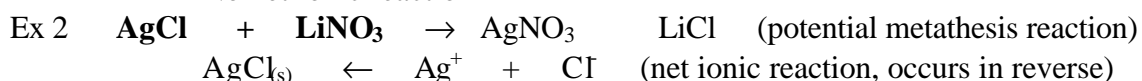
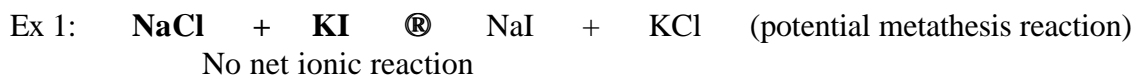
If anything confuses you or is not clear, raise your hand and ask!

Page	Points
1	_____
2	_____
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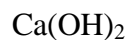
Points

- (18) 1. For the potential reactants in water below:
- Write the **balanced** potential metathesis equation in the **molecular form** showing the correct formula for the potential metathesis products.
 - Write a balanced **net ionic equation**, (or indicate **no net ionic equation** if there is none.)
 - If there is a net ionic equation, state whether the reaction should occur in the **forward** or **reverse** direction.
 - Be sure to indicate precipitates with (s), gases with (g), and weak electrolytes by writing the molecular formula rather than the ions

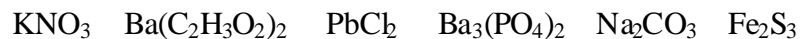
Examples:



(6) 2. Classify as **strong acid, weak acid, strong base, weak base, or salt**:



(6) 3. **Circle** the following compounds which are **insoluble** in water:



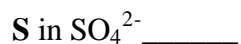
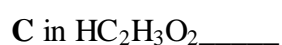
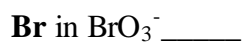
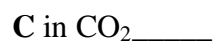
(12) 4. A 3.45 g sample of Mg(OH)₂ suspended in water required 38.5 mL of a solution of HCl to completely react with it in a titration experiment.

(a) Write the balanced molecular equation for the reaction.

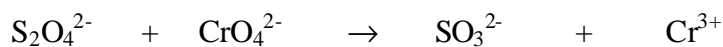
(b) Write the net ionic equation for the reaction.

(c) Calculate the molarity of the HCl solution. (Show your work).

(9) 5. Give the oxidation number of the indicated element in each of the following compounds or ions:



(13) 6. Given the following oxidation-reduction reaction:



- (a) Identify: The reagent being oxidized _____
 The reagent being reduced _____
 The oxidizing agent _____
 The reducing agent _____

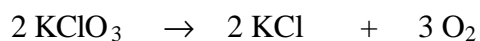
(b) Balance the equation **in acidic solution**.

(6) 7. State **Boyle's Law** in its mathematical form

(8) 8. A tank of gas with a volume of 3.6 L is under a pressure of 75 atmospheres at 30 °C. If the gas were completely released into plastic bag at 0.95 atmospheres pressure and 5 °C, what volume would the gas occupy in the bag?

- (8) 9. A tank of gas contains 20.2 g of N₂ and 15.1 g of O₂. The pressure in the tank is 12.0 atmospheres. What are the partial pressures of the N₂ and the O₂?

- (14) 10. Oxygen gas can be produced by the decomposition of potassium chlorate in the presence of a catalyst, according to the following reaction:



A sample of KClO₃ was decomposed in this fashion, and the oxygen was collected over water by displacing the water from an upended container. The volume of the oxygen collected was 1.56 L at a temperature of 20 °C. The atmospheric pressure was 755 torr, and the vapor pressure of water at 20 °C is 17.5 torr. Calculate the **moles** of KClO₃ and the **grams** of KClO₃ in the sample. (Show your work). **R = 0.08206 L-atm-mol⁻¹-K⁻¹.**