

Chemistry 1105 Spring 2024 Test 2

Thursday, February 29, 2024

Time: 1 hour 50 minutes

Name: _____

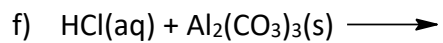
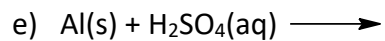
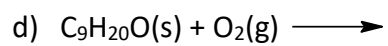
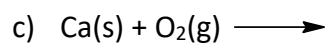
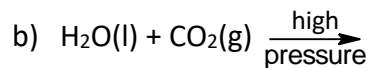
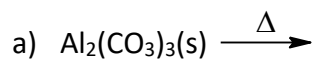
Student #: _____

*This test consists of **six** pages of questions, a page containing the names, symbols, and masses of the elements, and a periodic table. Please ensure that you have a complete test and, if you do not, obtain one from me **immediately**. There are **42** marks available. Good luck!*

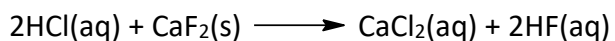
1) **[8 marks]** Complete the following table:

Compound Formula	Compound Name
HCl(g)	
	hydrosulphuric acid
HClO	
	nitric acid
Fe(OH) ₂	
	calcium hydroxide
ClF ₃	
	diphosphorus tetrachloride

2) **[10 marks]** Complete and balance the following reactions. Assume a reaction occurs in each case. Give only the molecular equation for each reaction. Be sure to indicate the phases of the products.



3) **[3 marks]** Given the following balanced molecular equation:

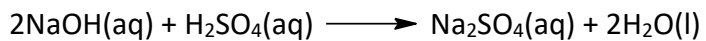


a) Give the full ionic equation.

b) Identify any spectator ions.

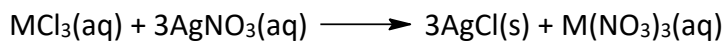
c) Give the net ionic equation.

4) **[3 marks]** A 25.00-mL aliquot of H_2SO_4 required 12.50 mL of 0.08000 M NaOH for titration:



What was the concentration of the original H_2SO_4 solution?

- 5) **[3 marks]** In one experiment, 398.6 mg of MCl_3 (where M is a mystery element) was reacted with excess $AgNO_3$:



A total of 1285.3 mg of $AgCl$ (143.321 g/mol) was collected. What is the mystery element, M?

- 6) **[3 marks]** A 7.4551-gram sample of KCl (74.551 g/mol) was dissolved in enough water to make 100.0 mL of solution **A**. A 10.00 mL aliquot of solution **A** was taken and diluted to 250.0 mL to form solution **B**. What are the concentrations of solutions **A** and **B**?

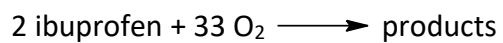
7) **[3 marks]** Calculate the percent by mass of Na_2SO_4 (142.041 g/mol) in a solution that has a density of 1.0905 g/mL and a concentration of Na_2SO_4 of 0.76774 M.

8) **[3 marks]** Calculate the percent by mass of each element in $\text{Al}_2(\text{SO}_4)_3$.

9) **[6 marks]** Ibuprofen is 75.6935 percent carbon, 8.7948 percent hydrogen, and the rest oxygen, all by mass.

a) What is the empirical formula of ibuprofen?

b) A 313-mg sample of ibuprofen requires 801.1 mg of oxygen for complete combustion, according to the balanced reaction:



What is the molecular formula of ibuprofen?