

CHEMISTRY 1110 REVIEW MATERIALS

The student will be responsible for the material described in this document. The materials are to be found in Chapters 1 and 2 of the text: **CHEMISTRY**, Canadian Edition, by Olmsted, Williams, Burk (1st edition). Representative problems on each topic are assigned and the student is encouraged to do these problems as well as any others he/she may wish to do. The student will be held responsible for these materials and will be tested on it during the first exam as well as on the final exam.

CHAPTER 1: FUNDAMENTAL CONCEPTS OF CHEMISTRY

1.1 Atoms, Molecules and Compounds:

- The Atomic Theory Today.
- A First Look at the Periodic Table.
- 7. Compounds: Introduction to Bonding.
- 8. Compounds: Formulas, Names, and Masses

1.2 Measurements in Chemistry:

- Unit
- Unit Conversion
- Significant Figures.

1.4 Counting Atoms: The Mole:

- The Mole
- Molar Mass
- Mass-mole-atom Conversion

1.5 Amounts of Compounds

- Molar Mass of Chemical Compounds
- Mass-mole-number Conversion of Compounds
- Determine the Formula of Unknown Compound.

1.6 Aqueous Solutions

- Molarity
- Concentration of Ionic Solutions
- Dilutions

1.7 Writing and Balancing Chemical Equations.

1.8 Stoichiometry of Chemical Reactions

Supplemental Topic in Stoichiometry: Back Titration

End of Chapter Problems from Chapter 1: 1.99, 1.105, 1.106, 1.107, 1.109, 1.110

(The answers to the odd-numbered questions can be found at the end of the textbook.)

Answer to 1.106:

Mass of C = $97.46 \text{ mg CO}_2 \times (12.0/44.0) = 26.58 \text{ mg C}$; that is 2.215 mmol C;
Mass of H = $20.81 \text{ mg H}_2\text{O} \times (2.0/18.0) = 2.31 \text{ mg H}$; that is 2.31 mmol H;
Mass of N = $38.39 \text{ mg} \times 3.8\% = 1.4706 \text{ mg N}$; that is 0.1050 mmol N;
Mass of O = $38.70 - 26.58 - 2.31 - 1.4706 = 8.3394 \text{ mg O}$; that is 0.5212 mmol O.
Therefore the formula is : $\text{C}_{2.215} \text{H}_{2.31} \text{N}_{0.1050} \text{O}_{0.5212}$, that is $\text{C}_{21}\text{H}_{22}\text{NO}_5$.

Answer to 1.110: 6.53kg of LiOH required.

CHAPTER 2: THE BEHAVIOUR OF GASES

2.1 Pressure

2.2 Describing Gases

- The Ideal Gas Equation

2.3 Gas Mixtures

- Dalton's Law of Partial Pressure

2.4 Gas Stoichiometry

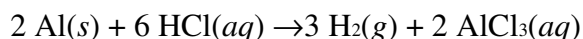
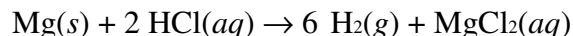
2.6 Addition Gas Properties

- Determination of Molar Mass
- Gas Density
- Rate of Gas Movement

End of Chapter Problems from Chapter 2: 2.47, 2.51, 2.53, 2.97, 2.103, 2.105, 2.107.
(The answers to the odd-numbered questions can be found at the end of the textbook.)

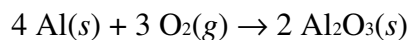
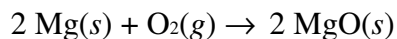
ADDITIONAL QUESTION:

- (a) A sample of Mg-Al alloy has the mass of 0.263g. The sample was reacted with excess HCl and the hydrogen gas was collected. A total of 1.38×10^{-2} moles of hydrogen gas were collected. The balanced chemical equations for the reactions of Mg and Al with HCl are as follows:



Calculate the % Mg in the alloy.

- (b) A sample of Mg-Al alloy has the mass of 0.263g. The sample was reacted with excess $\text{O}_2(g)$ and a total of 0.483 g of oxides (MgO and Al_2O_3) is collected. The balanced chemical equations for the reactions of Mg and Al with $\text{O}_2(g)$ are as follows:



Calculate the % Mg in the alloy.

NOTE: Your answer for parts (a) and (b) should be the same since they all involve the sample Mg-Al alloy. If you get slightly different answers, it is only because of rounding off errors in your calculations.

Answer: 23% Mg by mass.