Competencies for CHEM 1110 - test 2: **29 items**

item	**Performance/Task:** The student will:	Tro - text sections
Reaction Stoichiometry		
1	Be able to do reaction stoichiometry problems if given a reaction.	4.2
2	Be able to do a limiting reactant stoichiometry problem.	4.3
3	Know the definition of percent yield.	4.3
4	Be able to do calculations which involve percent yield.	4.3
Solutions, Solution Reactions and Solution Stoichiometry		
5	Know the definition of molarity and be able to interconvert from grams or moles of solute and liters of solvent to molarity	4.4
6	Be able to calculate concentrations in a solution dilution problem	4.4
7	Be able to describe the properties of solutions, both electrolytic and non-electrolytic	4.5
8	Be able to recognize and write a precipitation reaction	4.6
9	Know what spectator ions are and how to identify them	4.7
10	Be able to recognize an "overall reaction" and be able to describe its usefulness for measurement purposes.	4.7
11	Be able to write and recognize net ionic reactions and be able to describe its usefulness for chemical reactions.	4.7
12	Be able to describe and recognize an acid or base by the Arrhenius definition	4.8
13	Be able to write and recognize the Arrhenius acid-base reaction	4.8
14	Know the definition of and be able to recognize a redox reaction.	4.9
15	Be able to do calculations involved with titrations.	16.14
The Perfect Gas Law		
16	Know the definition of pressure and the appropriate units	5.2
17	Be able to use the subset of gas laws: Boyle's, Charles', Amontons', Gay-Lussac's, Avogadro's**,** combined gas law. and the Dumas method.	5.3, 5.4
18	Be able to perform the Dumas method.	L14
19	Be able to use the ideal gas law to solve problems	5.5
20	Know the definition of STP and the significance/use of the value 22.4 L/mol at STP.	5.5
Dalton's Law		
21	Know the definition of mole fraction and be able to calculate it and interconvert it to other units. This should come later.	5.6
22	Be able to use Dalton's Law in problem solving.	5.6
23	Be able to work with vapor pressure together with Dalton's Law.	5.6
Combining the Perfect Gas Law with Stoichiometry Problems		
24	Be able to use the ideal gas equation in combination with reaction stoichiometry	5.7

Kinetic Molecular Theory		
25	Be able to describe the situation where there are independent particles as a gas and derive the expression for the molecular kinetic energy.	5.8
26	Be able to calculate the root mean square velocity of a molecule.	5.9
Graham's Law		
27	Be able to derive Graham's law from kinetic molecular theory.	5.9
28	Be able to use Graham's law for various practical examples.	5.9
van der Waal's Equation		
29	Be able to perform calculations using the van der Waal's equation and know the significance of the van der Waal's constants.	5.10