

CHM1032 Study Guide for Exam 3 (Chapters 7 & 8)
Revised April 1, 2015

This may NOT be a complete list of what will be on the Test. You must also study class notes, the homework, and the textbook. This is just a study guide to help you.
You still have to know everything on Exam 1 & 2. ☹

Know definitions and identify examples of: physical change, chemical change, chemical reaction, physical and chemical properties, writing a chemical equation, reactants, products, balanced equation, coefficients, combination reactions, decomposition reactions, single replacement reactions, double replacement reactions, oxidation, reduction, oxidation-reduction reactions, the mole, Avogadro's number, molar mass, Law of Conservation of Mass, mole-to-mole ratio, mole ratio, mole-mole factor, activation energy, exothermic reaction, endothermic reaction, rates of reactions, factors affecting rates of reactions, catalyst, properties of gases, kinetic molecular theory of gases, pressure (P), temperature (T), volume (V), n = number of moles of gas, Boyle's Law, Charles' Law, Guy-Lussac's Law, Avogadro's Law, direct relationship, inverse relationship, the Combined Gas Law, STP = Standard Temperature and Pressure, molar volume of gases, partial pressure, total pressure, Dalton's Law of Partial Pressures.

- 1) Be able to write a chemical equation, given the chemicals and physical states in words. (still have to know chemical names and formulas)
- 2) Be able to balance a chemical equation.
- 3) Be able to identify types of reactions.
- 4) Be able to assign oxidation numbers to any element in any compound, and be able to identify the species being oxidized or reduced in a given reaction.
- 5) Be able to use Avogadro's number to convert between number of moles and number of objects.
- 6) Be able to calculate the number of moles of elements in a chemical formula
- 7) Be able to state or calculate the molar mass of any element or chemical compound. (The Periodic Table will always be supplied during tests.)
- 8) Be able to use the molar mass to convert between grams and moles.
- 9) Be able to write mole-to-mole ratios, and use them as conversion factors.
- 10) Given moles of any substance in a reaction, be able to calculate moles of any other substance in the reaction (using mole-to-mole ratio).
- 11) Given grams of any substance in a reaction, be able to calculate moles of any other substance in the reaction (using molar mass and mole-to-mole ratio).
- 12) Given moles of any substance in a reaction, be able to calculate grams of any other substance in the reaction (using mole-to-mole ratio and molar mass).
- 13) Given grams of any substance in a reaction, be able to calculate grams of any other substance in the reaction (using mole-to-mole ratio and two different molar masses).
- 14) Be able to convert between any pressure, volume or temperature units.
- 15) Be able to use the Combined Gas Law in calculations
- 16) Be able to use the Molar Volume of a gas to convert between number of moles and volume.
- 17) Be able to do calculations using Dalton's Law of Partial Pressures.
- 18) Study all the "Health Notes" Sections; for example, Hyberbaric Chambers on p. 274.
- 19) See also, "Key Terms" at the end of Chapters 7 & 8, class notes, and homework problems.

Know:

1 mole items = 6.022×10^{23} items , where items can be atoms, molecules, donuts, etc.

1 atm = 760 mm Hg = 760 Torr

1 mm Hg = 1 Torr

Combined Gas Law:
$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

STP, $T = 0^\circ\text{C} = 273.15\text{ K}$, and $P = 1\text{ atm} = 760\text{ Torr} = 760\text{ mm Hg}$

Molar volume of a gas: 1 mole of a gas = 22.4 liters

For a mixture of Ne, Ar, and N_2 gases, Dalton's Law of Partial Pressures would be:

$$P_{\text{total}} = P_{\text{Ne}} + P_{\text{Ar}} + P_{\text{N}_2}$$

Given:

1 atm = 14.7 psi