

# Study Guide for Exam #4 (Ch. 10-11)

## Chem20, Elementary Chemistry

---

### MEMORIZE

- Electronic and Molecular Geometries by VSEPR Theory (handout)
- Perfect/nonpolar covalent (0.0-0.4  $\Delta\text{eN}$ ) polar covalent (0.5-2.0  $\Delta\text{eN}$ ) ionic (2.1+  $\Delta\text{eN}$ )
- 1 atm = 760 mmHg = 760 torr
- Boyle's Law:  $P_1V_1 = P_2V_2$
- Charles' Law:  $V_1/T_1 = V_2/T_2$
- Avogadro's Law:  $V_1/n_1 = V_2/n_2$
- Ideal Gas Law:  $PV = nRT$
- Universal Gas Constant:  $R = 0.0821 \text{ L}\cdot\text{atm}\cdot\text{mol}^{-1}\cdot\text{K}^{-1}$
- Dalton's Law of Partial Pressures:  $P_T = P_1 + P_2 + P_3\ldots$  OR  $P_1 = X_1 \cdot P_T$
- mole fraction = 
$$\frac{\text{mols of A}}{\text{total mols of mixture}}$$

### Chapter Ten

**I. Lewis Structures (10.3-10.5):** Know how to write the appropriate Lewis structure for both ionic and molecular compounds, including possible exceptions to the Octet Rule.

*Ex., Ch. 10: 37-38, 47-54, 59-60, 95-99*

**II. Resonance (10.6):** Know how to depict possible resonance structures for a molecule.

*Ex., Ch.10: 55-58*

**III. VSEPR Theory (10.7):** Know how to determine the electronic and molecular geometry for any molecule from the Lewis structure.

*Ex., Ch. 10: 65-66, 69-70, 73-76*

**IV. Polarity (10.8):** Know how to determine if a molecule is polar or nonpolar from the VSEPR geometries. Know how to indicate dipole moments. Know how to identify perfect covalent, polar covalent, or ionic bonds when given electronegativity values.

*Ex., Ch. 10: 83-86, 89-92, 97-98*

### Chapter Eleven

**I. Pressure (11.3):** Know how to convert in between units of pressure.

*Ex., Ch. 11: 27-32*

**II. The Simple Gas Laws (11.4-11.5, 11.7):** Know how to use Boyle's Law, Charles' Law, and Avogadro's Law in gas problems.

*Ex., Ch. 11: 33-36, 39-42, 45-48*

**III. The Ideal Gas Law (11.8, 11.10):** Know how to use the Ideal Gas Law in gas problems, including stoichiometry (chemical reactions).

*Ex., Ch. 11: 59-64, 67-72, 89-98, 105-106, 109-118*

**IV. Dalton's Law of Partial Pressures (11.9):** Know how to use both versions of Dalton's Law of Partial Pressures to calculate partial pressure, total pressure, or mole fraction for a mixture of gases. Know how to account for the vapor pressure of water when reaction gases are collected over water.

*Ex., Ch. 11: 75-78, 107-108, 119-120*