

## Test 4 Equations that you need to memorize

### Chapter 7

$$\text{Formal charge} = \left( \begin{array}{c} \# \text{ of} \\ \text{valence } e^- \end{array} \right) - \left( \begin{array}{c} \# \text{ of} \\ \text{nonbonding } e^- \end{array} \right) - \left( \begin{array}{c} \# \text{ of bonds} \\ \text{to that atom} \end{array} \right)$$

$$\Delta H^\circ = \sum (\text{Energies of bonds broken}) - \sum (\text{Energies of bonds formed})$$

$$\text{Bond order of bond} = \left( \frac{\text{number of bonding lines}}{\text{number of bonding locations}} \right)$$

### Chapter 9

$$1 \text{ atm} = 760 \text{ mmHg} = 760 \text{ torr}$$

For a gas in a single set of conditions

$$PV = nRT \quad \text{*** P is in atm, V is in liters, T is in Kelvin, and R is } 0.0821 \frac{\text{L atm}}{\text{mol K}}$$

$$PVMM = gRT \quad \text{*** P is in atm, V is in liters, T is in Kelvin, g is in grams, and R is } 0.0821 \frac{\text{L atm}}{\text{mol K}}$$

$$PMM = DRT \quad \text{*** P is in atm, MM is in } \frac{\text{g}}{\text{mol}}, \text{ T is in Kelvin, D is in } \frac{\text{g}}{\text{L}}, \text{ and R is } 0.0821 \frac{\text{L atm}}{\text{mol K}}$$

For a gas transitioning from one to another set of conditions

$$\frac{P_1 V_1}{n_1 T_1} = \frac{P_2 V_2}{n_2 T_2} \quad \text{*** V and P may be in any units but T must be in Kelvin and n must be in moles}$$

For a gas with multiple components

$$P_{\text{total}} = P_A + P_B + P_C + \dots$$

$$\chi_A P_{\text{total}} = P_A$$

$$P_{\text{total}} = P_{\text{gas}} + P_{\text{water}}$$

$$\overline{\text{KE}} = \frac{3}{2} RT \quad \text{*** T is in Kelvin and R is } 8.314 \frac{\text{J}}{\text{mol K}}$$

$$v_{\text{rms}} = \sqrt{\frac{3RT}{MM}} \quad \text{*** T is in Kelvin, MM is in } \frac{\text{kg}}{\text{mol}}, \text{ and R is } 8.314 \frac{\text{J}}{\text{mol K}}$$