Post-Midterm 2 Equations

$$\mathrm{pH} = \mathrm{p}K_a + \log\frac{\left[\mathrm{A}^-\right]}{\left[\mathrm{HA}\right]} \qquad c = \lambda \times v \qquad \Delta E = hv \qquad \lambda = \frac{h}{mv} \qquad E_n = -\frac{R_H}{n^2}$$

Midterm 2 Equations

$$w = -p\Delta V \qquad \Delta U = U_{final} - U_{initial} = q + w \qquad \Delta H = \Delta U + p\Delta V$$

$$\Delta_r H^o = \sum m\Delta_f H^o\left(\text{products}\right) - \sum n\Delta_f H^o\left(\text{reactants}\right) \qquad \Delta_r H^o = \sum m\mathrm{BE}\left(\text{reactants}\right) - \sum n\mathrm{BE}\left(\text{products}\right)$$

$$q = c \times m \times \Delta T \qquad \text{Rate} = \frac{1}{v_{\mathrm{X}}}\frac{\Delta\left[\mathrm{X}\right]}{\Delta t} \qquad \text{Rate} = k\left[\mathrm{A}\right]^m\left[\mathrm{B}\right]^n \ldots$$

$$k = Ae^{-\frac{E_a}{RT}} \qquad \left[\mathrm{A}\right]_t - \left[\mathrm{A}\right]_o = -kt \qquad \ln\frac{\left[\mathrm{A}\right]_o}{\left[\mathrm{A}\right]_t} = kt$$

$$\frac{1}{\left[\mathrm{A}\right]_t} - \frac{1}{\left[\mathrm{A}\right]_o} = kt \qquad \ln\left(\frac{k_2}{k_1}\right) = -\frac{E_a}{R}\left(\frac{1}{T_2} - \frac{1}{T_1}\right) \qquad K = K_c\left(RT\right)^{\Delta n(\text{gas})}$$

$$\ln\left(\frac{K_2}{K_1}\right) = -\frac{\Delta_r H^o}{R}\left(\frac{1}{T_2} - \frac{1}{T_1}\right) \qquad ax^2 + bx + c = 0 \qquad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\mathrm{pH} = -\log\left[\mathrm{H_3O^+}\right] \qquad \mathrm{pOH} = -\log\left[\mathrm{OH^-}\right] \qquad \mathrm{pH} + \mathrm{pOH} = 14$$

$$K_a \times K_b = K_w \qquad pK_a = -\log K_a \qquad pK_b = -\log K_b$$

Midterm 1 Equations

$$T\left(\text{in K}\right) = T\left(\text{in }^{\circ}\mathrm{C}\right) + 273.15\ \mathrm{K} \qquad n = \frac{m}{M} \qquad \%\ \text{Yield} = \frac{\text{actual yield}}{\text{theoretical yield}}$$

$$c\left(\mathrm{mol/L}\right) = \frac{n}{V} \qquad m\left(\mathrm{mol}/kg\right) = \frac{n_{solute}}{m_{solvent}} \qquad c_1V_1 = c_2V_2$$

$$pV = nRT \qquad \frac{p_1V_1}{T_1} = \frac{p_2V_2}{T_2} \qquad p_T = p_1 + p_2 + p_3 + \ldots$$

$$p_A = X_A \times p_T \qquad X_A = \frac{n_A}{n_T} \qquad d = \frac{m}{V} = \frac{p \cdot MM}{RT}$$

$$E_K = \frac{1}{2}m\mathrm{v}^2 \qquad u_{rms} = \sqrt{\frac{3RT}{M}} \qquad \frac{Rate\ A}{Rate\ B} = \sqrt{\frac{M_B}{M_A}}$$

$$\left(p + \frac{n^2a}{V^2}\right)\left(V - nb\right) = nRT$$