

CHM 112 - EXAM 1
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Name _____

Section _____

This test is administered under the auspices of the Mercer University Honor Code.

Some Potentially Useful Equations

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

$$\Delta H = q_p$$

$$\Delta H = \Delta E + P\Delta V$$

$$q = C\Delta T$$

$$q = c_s m \Delta T$$

$$E_{\text{cell}}^{\circ} = E_{\text{cathode}}^{\circ} - E_{\text{anode}}^{\circ}$$

$$\Delta E = q + w = q - P\Delta V$$

$$S = k_H P$$

$$E_{\text{cell}}^{\circ} = \frac{RT}{nF} \ln K$$

$$\ln \frac{K_2}{K_1} = \frac{\Delta H}{R} \left(\frac{1}{T_1} - \frac{1}{T_2} \right)$$

$$\Delta S_{\text{vap}} = \frac{\Delta H_{\text{vap}}}{T_b}$$

$$v = \frac{4}{3}\pi r^3 \text{ (sphere)}$$

$$\ln \frac{P_2}{P_1} = \frac{\Delta H_{\text{vap}}}{R} \left(\frac{1}{T_1} - \frac{1}{T_2} \right)$$

$$P_A = P_A^{\circ} X_A$$

$$\text{pH} = \text{p}K_a + \log \frac{[\text{base}]}{[\text{acid}]}$$

$$\Delta P = P_A^{\circ} X_B$$

$$\Delta T_b = K_b m$$

$$\Delta T_f = K_f m$$

$$\pi = MRT$$

$$\ln \frac{[A]_t}{[A]_0} = -kt$$

$$t_{1/2} = \frac{0.6931}{k}$$

$$\frac{1}{[A]_t} = kt + \frac{1}{[A]_0}$$

$$t_{1/2} = \frac{1}{k[A]_0}$$

$$k = Ae^{-E_a/RT}$$

$$\ln \frac{k_2}{k_1} = \frac{E_a}{R} \left(\frac{1}{T_1} - \frac{1}{T_2} \right)$$

$$PV = nRT$$

$$E_{\text{cell}} = E_{\text{cell}}^{\circ} - \frac{0.0592}{n} \log K$$

$$\Delta H^{\circ} = \sum_{i=1}^{\text{prod}} n_i \Delta H_i^{\circ} - \sum_{j=1}^{\text{react}} n_j \Delta H_j^{\circ}$$

$$\Delta G^{\circ} = \Delta H^{\circ} - T\Delta S^{\circ}$$

$$\Delta S^{\circ} = \sum_{i=1}^{\text{prod}} n_i S_i^{\circ} - \sum_{j=1}^{\text{react}} n_j \Delta S_j^{\circ}$$

$$\Delta G = \Delta G^{\circ} + RT \ln Q$$

$$\Delta G^{\circ} = \sum_{i=1}^{\text{prod}} n_i \Delta G_i^{\circ} - \sum_{j=1}^{\text{react}} n_j \Delta G_j^{\circ}$$

$$\Delta G^{\circ} = -RT \ln K$$

$$w_{\text{max}} = -nFE_{\text{cell}}$$

$$\Delta G^{\circ} = -nFE_{\text{cell}}^{\circ}$$

$$E_{\text{cell}} = E_{\text{cell}}^{\circ} - \frac{RT}{nF} \ln K$$

$$h\nu = -Z^2 \left(\frac{1}{n_{\text{initial}}^2} - \frac{1}{n_{\text{final}}^2} \right) \text{Ry}$$

$$E_n = -\frac{Z^2}{n^2} \text{Ry} = -\frac{Z^2}{n^2} 2.18 \times 10^{-18} \text{ J}$$

$$r_n = \frac{n^2}{Z} a_o = \frac{n^2}{Z} 0.529 \text{ \AA}$$

$$\mu_{\text{rms}} = \sqrt{\frac{3RT}{M}}$$

$$\frac{\dot{A}}{B} = \frac{N_A}{N_B} \sqrt{\frac{M_B}{M_A}}$$

$$\lambda = \frac{1}{\sqrt{2\pi d^2 N/V}}$$