CHM 330 - EXAM 2
Prof. A.J. Pounds
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Name_____ **Section**_____

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

Some Potentially Useful Equations and Constants

rate=k	$[A]_t = -kt + [A]_0$	$t_{\frac{1}{2}} = \frac{[A]_0}{2k}$	$k = Ae^{-E_a/RT}$
rate=$k[A]$	$[A]_t = [A]_0 e^{-kt}$	$t_{\frac{1}{2}} = \frac{\ln 2}{k}$	$\ln \frac{[A]_t}{[A]_0} = -kt$
rate=$k[A]^2$	$\frac{1}{[A]_t} = kt + \frac{1}{[A]_0}$	$t_{\frac{1}{2}} = \frac{1}{[A]_0}$	$\ln \frac{k_2}{k_1} = \frac{E_a}{R}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)$

$$n_i = \frac{e^{-\beta\epsilon_i}}{\sum_j e^{-\beta\epsilon_j}} \qquad \beta = 1/kT$$

$$\langle v \rangle = \int_0^\infty vp\left(v\right) dv = \sqrt{\frac{8RT}{\pi M}} \qquad \langle v \rangle_{\text{mp}} = \sqrt{\frac{2RT}{M}}$$

$$\langle v^2 \rangle = \int_0^\infty v^2 p\left(v\right) dv = \frac{3RT}{M} \qquad \ln\left(W!\right) \approx W \ln W - W$$

$$W = \frac{N!}{n_1! n_2! \ldots n_R!} \qquad S = k_{\text{B}} \ln W$$

$$\ln\left(\frac{P_2}{P_1}\right) = -\frac{\Delta \tilde{H}_\phi}{R}\left[\frac{1}{T_2} - \frac{1}{T_1}\right] \qquad \Delta S_{\text{vap}} = \frac{\Delta H_{\text{vap}}}{T_b} \approx 88 \text{ J} \cdot \text{K}^{-1} \text{ mol}^{-1}$$

$$w = \Delta G = f\Delta x = \gamma \Delta A_s \qquad T_f = T_f^0 - \Delta T$$

$$T_b = T_b^0 + \Delta T \qquad P_{\text{vap}} = XP^0$$

$$\lambda = \frac{RT}{\sqrt{2} N_A P \sigma} \qquad c\left(x,t\right) = \frac{1}{\sqrt{4\pi D t}} e^{\left(-\frac{x^2}{4Dt}\right)}$$

$$\langle v_{\text{rel}} \rangle = \sqrt{\frac{16RT}{\pi M}} \qquad \langle d^2 \rangle = \frac{2(RT)^{\frac{3}{2}} t}{\sqrt{M\pi} N_A p \sigma}$$

$$1 \text{ atm} = 760 \text{ Torr} = 101325 \text{ Pa} = 1.01325 \text{ bar}$$

$$h = 6.62607015 \times 10^{-34} \text{ J·s}$$

$$k_b = 1.380649 \times 10^{-23} \text{ J·K}^{-1}$$

$$N_A = 6.02214076 \times 10^{23} \text{ mol}^{-1}$$

$$R = k_b N_A$$