

CEM 152 - Spring 2009 – Exam 2

M = mega = 10^6 k = kilo = 10^3
m = milli = 10^{-3} μ = micro = 10^{-6}
n = nano = 10^{-9} p = pico = 10^{-12}
 $1\text{\AA} = 10^{-8}$ cm

$\pi = 3.1415926$

$1 \text{ amu} = 1.660 \times 10^{-27} \text{ kg}$

$N_A = 6.022 \times 10^{23}$

$g = 9.8 \text{ m/s}^2$

$R = 8.314 \text{ m}^3\text{Pa/molK}$

$R = 8.314 \text{ J/molK}$

$R = 0.08206 \text{ Latm/molK}$

slope = $\Delta y/\Delta x$

$K = ^\circ\text{C} + 273.15$

$^\circ\text{C} = (5/9)(^\circ\text{F} - 32)$

$^\circ\text{F} = (9/5)(^\circ\text{C}) + 32$

$1 \text{ Pa} = 1 \text{ kg/ms}^2 = 1 \text{ Nm}^{-2}$

$1 \text{ atm} = 1.01325 \times 10^5 \text{ Pa}$

$1 \text{ atm} = 760 \text{ torr} = 760 \text{ mm Hg}$

$1 \text{ bar} = 10^3 \text{ mbar} = 10^5 \text{ Pa}$

$F=Wd \quad F=mg$

$P = F/A \quad P = h\rho g \quad P = nRT/V$

$d = M/V \quad d=PM/RT$

$P_1 = (n_1/n_T)P_T = X_1P_T$

average K.E. = $1/2 m\mu^2$

$$\mu = \sqrt{\frac{3RT}{M}} \quad \frac{r_1}{r_2} = \sqrt{\frac{M_2}{M_1}}$$

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

$$\ln P = \frac{-\Delta H_{\text{vap}}}{RT} + C$$

$$s = \frac{q}{m \times \Delta T}$$

$$\Delta H = H_{\text{products}} - H_{\text{reactants}}$$

$$S_g = kP_g$$

$$P_A = X_A P^\circ_A$$

$$\Delta T_b = K_b m$$

$$\Delta T_f = K_f m$$

$$\pi = (n/V)RT = MRT$$

$$\ln [A]_t = -kt + \ln [A]_0$$

$$\frac{1}{[A]_t} = kt + \frac{1}{[A]_0} \quad t_{1/2} = \frac{0.693}{k}$$

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

$$k = A e^{-E_a/RT}$$

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