000 version | last name | first name | signature

CH301 Final Exam Fall 2016

refer to external sheet for the periodic table and other constants

$c = 3.0 \times 10^8$ m/s

$R = 0.08206$ L atm/mol K

$R = 8.314$ J/mol K

$h = 6.626 \times 10^{-34}$ J·s

1 atm = 760 torr

Unit 1

$PV = nRT$ $\quad x_A = P_A/P_{total}$

$P(V - nb) = nRT$

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

$P_{total} = P_A + P_B + P_C + \cdots$

$v_{rms} = \sqrt{\frac{3RT}{M}}$ $\quad E_k = U = \frac{3}{2}RT$

Unit 2

$E = h\nu$ $\quad c = \lambda \cdot \nu$

$\frac{1}{2}mv^2 = h\nu - \Phi$

Rydberg : $\nu = \mathcal{R}\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)$

$\mathcal{R} = 2.178 \times 10^{-18}$ J

$\mathcal{R} = 1.097 \times 10^7$ m^{-1}

$\mathcal{R} = 3.29 \times 10^{15}$ s^{-1}

Unit 3

(no formulas for unit 3)

Unit 4

$\Delta U = q + w$ $\quad H = U + PV$

$w = -P\Delta V$ $\quad w = -\Delta nRT$

$\Delta U = \Delta H - P\Delta V$

$\Delta U = \Delta H - \Delta nRT$

$\Delta U = q_v = n\,C\,\Delta T$

$\Delta H = q_p = n\,C\,\Delta T$

$q_{cal} = q_{water} + q_{hardware}$ $\quad q_{sys} = -q_{cal}$

$\Delta S = q_{rev}/T$ $\quad S = k \ln \Omega$

$\Delta S = n\,C \ln\left(\frac{T_2}{T_1}\right)$

$\Delta H_{rxn} = \Delta H_1 + \Delta H_2 + \Delta H_3 + \cdots$

$\Delta H^\circ_{rxn} = \sum n\Delta H^\circ_f(\text{prod}) - \sum n\Delta H^\circ_f(\text{react})$

$\Delta H_{rxn} = \sum BE_{breaking} - \sum BE_{making}$

$\Delta G^\circ_{rxn} = \sum n\Delta G^\circ_f(\text{prod}) - \sum n\Delta G^\circ_f(\text{react})$

$\Delta S^\circ_{rxn} = \sum nS^\circ(\text{prod}) - \sum nS^\circ(\text{react})$