mccord - ch301
— FINAL —

??? class only - 513XX

??? Dec XX, 2012

A-Z in ???

Be sure and write your name on this test copy. Turn in ALL materials (exam, bubblesheet, and scratch paper) when you are finished with the exam.

Unit 1

$R = 0.08206$ L·atm/mol·K

$R = 62.36$ L·torr/mol·K

$R = 8.314$ J/mol·K

$N_{\mathrm{A}} = 6.022 \times 10^{23}$ mol^{-1}

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

1 bar $= 10^{5}$ Pa

1 atm $= 14.7$ psi

$PV = nRT$ $\qquad$ $x_{\mathrm{A}} = P_{\mathrm{A}}/P_{\mathrm{total}}$

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

$P_{\mathrm{total}} = P_{\mathrm{A}} + P_{\mathrm{B}} + P_{\mathrm{C}} + \cdots$

$v_{\mathrm{rms}} = \left(\dfrac{3RT}{M}\right)^{1/2}$ $\qquad$ $E_{\mathrm{k}} = U = \dfrac{3}{2}RT$

Unit 2

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

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

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

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

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

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

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

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

$\Delta U = q_{\mathrm{v}} = n\,C_{\mathrm{v}}\,\Delta T$

$\Delta H = q_{\mathrm{p}} = n\,C_{\mathrm{p}}\,\Delta T$

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

$\Delta S = q_{\mathrm{rev}}/T$ $\qquad$ $S = k \ln W$

$\Delta S = n\,C_{\mathrm{v}} \ln\left(\dfrac{T_2}{T_1}\right)$ $\qquad$ $\Delta S = n\,C_{\mathrm{p}} \ln\left(\dfrac{T_2}{T_1}\right)$

$C_p = C_v + R$

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

$\Delta H^{\circ}_{\mathrm{rxn}} = \sum n\Delta H^{\circ}_{\mathrm{f}}(\mathrm{prod}) - \sum n\Delta H^{\circ}_{\mathrm{f}}(\mathrm{react})$

$\Delta H_{\mathrm{rxn}} = \sum BE_{\mathrm{reactants}} - \sum BE_{\mathrm{products}}$

$\Delta G^{\circ}_{\mathrm{rxn}} = \sum n\Delta G^{\circ}_{\mathrm{f}}(\mathrm{prod}) - \sum n\Delta G^{\circ}_{\mathrm{f}}(\mathrm{react})$

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

$G = H - TS$ $\qquad$ $\Delta G = \Delta H - T\Delta S$

$\Delta S_{\mathrm{trans}} = \Delta H_{\mathrm{trans}}/T_{\mathrm{trans}}$