

Chemistry-4311
November 7, 2014

Quiz #8

Name Key

$R = 1.987 \text{ cal K}^{-1} \text{ mol}^{-1} = 8.314 \text{ J K}^{-1} \text{ mol}^{-1} = 0.08206 \text{ L atm K}^{-1} \text{ mol}^{-1}$
 $K = ^\circ\text{C} + 273.15$, $F = 96,500 \text{ C/mole}$

1. Matching (Use a letter only once)

For the biological standard state, pH is e.

In bioenergetics chemical reactions are coupled with the free energies of the two reactions j together.

An oxidation reaction a electrons.

In an electrochemical cell, oxidation occurs at the b.

For the Scatchard eq., $Y/[L] = n/K - Y/K$, the slope of a plot of $Y/[L]$ vs Y is d.

- a. releases
- b. anode
- c. multiplied
- d. $-1/K$
- e. 7
- f. takes
- g. cathode
- h. 1
- i. K
- j. added

2. Identify the following processes as exothermic or endothermic

Protein unfolding endo.

A chemical reaction with a negative ΔH_r° exo.

Clustering of water molecules to make a water droplet exo.

Freezing of water to make ice exo.

3. Consider a reaction with ΔH_r° equal to 25 kJ and ΔS_r° equal to 60 J/K. At what temperature does ΔG_r° become negative?

$$\Delta G_r^\circ = \Delta H_r^\circ - T\Delta S_r^\circ, \text{ at constant } T$$

$$0 = \Delta H_r^\circ - T\Delta S_r^\circ$$

$$\Delta S_r^\circ = \Delta H_r^\circ / T$$

$$T = \Delta H_r^\circ / \Delta S_r^\circ$$

$$= 25 \times 10^3 \text{ J} / 60 \text{ J/K} = 416.7 \text{ K}$$