

Quiz #6

Name Key

1. Matching (Use a letter only once)

For a non-ideal solution the activity a of the solvent is f.

When a solute is added to a solvent, the solvent's boiling point is c.

At equilibrium for a chemical reaction, ΔG_r equals h.

If the temperature is increased for an exothermic reaction, the equilibrium constant a.

The equilibrium constant varies versus temperature according to i.

a. decreases

b. $a = \gamma P$

c. elevated

d. $-RT \ln K$ e. $\ln(K_2/K_1) = \Delta G_r^\circ(T_2)/\Delta G_r^\circ(T_1)$ f. $a = \gamma x$

g. increases

h. zero

i. $\ln(K_2/K_1) = -(\Delta H_r^\circ/R)(T_2^{-1} - T_1^{-1})$

j. lowered

2. Describe the following transport mechanisms through a membrane:

a. Simple diffusion -

Diffusion through a membrane, usually through a pore

b. Facilitated diffusion -

transporter molecule, e.g. a protein, carries the molecule through a membrane.

c. Active transport -

transport against a concentration and/or concentration gradients. Free energy for the process comes from a chemical rxn.

3. The equilibrium constant for a chemical reaction is 10 at 298 K and 1,000 at 400 K. Calculate ΔH_r° for the chemical reaction.

$$\ln \frac{1,000}{10} = \frac{-\Delta H_r^\circ}{R} \left[\frac{1}{400} - \frac{1}{298} \right]$$

$$\Delta H_r^\circ = 44.7 \text{ kJ}$$