

Quiz #3

Name Key

$$R = 1.987 \text{ cal K}^{-1} \text{ mol}^{-1} = 8.314 \text{ J K}^{-1} \text{ mol}^{-1} = 0.08206 \text{ L atm K}^{-1} \text{ mol}^{-1}$$

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

1. Matching (Use a letter only once)

The entropy of liquid water is g than that of ice. ΔG is a if the process is spontaneous.According to the 2nd Law of Thermodynamics, the entropy of the universe i for all spontaneous processes.The Gibbs energy G is defined as dFor equilibrium between two phases, their molar h are equal.

- a. negative
- b. decreases
- c. entropies
- d. $G = H - TS$
- e. positive
- f. $G = U - TS$
- g. higher
- h. Gibbs energies
- i. increases
- j. lower

2. Select the correct equation for ΔS .Ideal gas expansion or compression: dHeating or cooling a pure substance without a phase change at constant P : aA phase transition at equilibrium: bMixing two ideal gases: eThe definition of dS : f

- a. $C_p \ln(T_2/T_1)$
- b. $\Delta H_{\text{trans}}/T_{\text{trans}}$
- c. $k_B \ln(w)$
- d. $nR \ln(V_2/V_1)$
- e. $-R(n_1 \ln x_1 + n_2 \ln x_2)$
- f. dq_{rev}/T

3. For a specific chemical reaction at 100°C , $\Delta H_r^\circ = 512 \text{ kJ/mol}$ and $\Delta S_r^\circ = 1.6 \text{ kJ/mol-K}$. What is ΔG_r° for this reaction?

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

$$= 512 \text{ kJ/mol} - 373 \text{ K} \times \frac{1.6 \text{ kJ}}{\text{mol-K}}$$

$$= -84.8 \text{ kJ/mol}$$