

Date Planned : __ / __ / __	Daily Tutorial Sheet-9	Expected Duration : 90 Min
Actual Date of Attempt : __ / __ / __	Level-2	Exact Duration : _____

*106. Which of the following is (are) correct?

- (A) Absolute value of heat content of the system can't be determined using calorimetry
 (B) Absolute value of entropy can't be known
 (C) Absolute value of internal energy can't be known
 (D) Absolute value of Gibbs energy can't be determined

*107. When ice melts at 1°C:

- (A) an increase in entropy (B) a decrease in enthalpy
 (C) a decrease in free energy (D) process is spontaneous

108. The standard enthalpy of formation of $\text{H}_2\text{O}(\text{g})$ at 298 K is $-241.8 \text{ kJ mol}^{-1}$. Calculate $\Delta_f H^\circ$ at 373 K.

Assume that C_p is independent of temperature. $C_p, \text{H}_2\text{O}(\text{g}) = 33.6 \text{ JK}^{-1} \text{ mol}^{-1}$; $C_p, \text{H}_2(\text{g}) = 28.8 \text{ JK}^{-1} \text{ mol}^{-1}$, C_p of $\text{O}_2(\text{g}) = 29.4 \text{ JK}^{-1} \text{ mol}^{-1}$

- (A) -242.6 kJ / mol (B) $+242.6 \text{ kJ / mol}$
 (C) $+24.26 \text{ kJ / mol}$ (D) -242.6 J / mol

109. Which substance in each of the following pairs would you expect to have the higher standard molar entropy?

- I. $\text{C}_2\text{H}_2(\text{g})$ or $\text{C}_2\text{H}_6(\text{g})$ II. $\text{CO}_2(\text{g})$ or $\text{CO}(\text{g})$ III. $\text{I}_2(\text{s})$ or $\text{I}_2(\text{g})$

The correct choice is :

- (A) $\text{C}_2\text{H}_2(\text{g})$, $\text{CO}_2(\text{g})$, $\text{I}_2(\text{s})$ (B) $\text{C}_2\text{H}_6(\text{g})$, $\text{CO}_2(\text{g})$, $\text{I}_2(\text{s})$
 (C) $\text{C}_2\text{H}_2(\text{g})$, $\text{CO}_2(\text{g})$, $\text{I}_2(\text{g})$ (D) $\text{C}_2\text{H}_6(\text{g})$, $\text{CO}_2(\text{g})$, $\text{I}_2(\text{g})$

110. $\Delta_f H^\circ$ for solid-to-liquid transition for proteins A and B are $2.73 \text{ kcal mol}^{-1}$ and $3.03 \text{ kcal mol}^{-1}$. The two melting points are 0°C and 30°C respectively. The entropy changes ΔS_A and ΔS_B at two transition temperatures are related as:

- (A) $\Delta S_A = \Delta S_B$ (B) $\Delta S_A < \Delta S_B$ (C) $\Delta S_A > \Delta S_B$ (D) $\Delta S_B = \frac{303 \Delta S_A}{273}$

111. For the auto-ionization of water at 25°C , K_{eq} for $\text{H}_2\text{O}(\ell) \rightleftharpoons \text{H}^+(\text{aq}) + \text{OH}^-(\text{aq})$ is 10^{-14} . What is $\Delta_r G^\circ$ for the above reaction?

- (A) $\approx 8 \times 10^4 \text{ J}$ (B) $\approx 3.5 \times 10^4 \text{ J}$
 (C) $\approx 10^4 \text{ J}$ (D) None of these

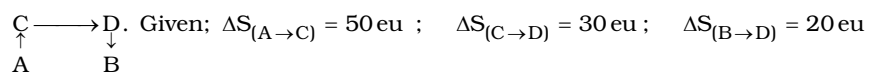
112. For a particular reversible reaction at temperature T, ΔH and ΔS were found to be both +ve. If T_e is the temperature at equilibrium, the reaction would be spontaneous when:

- (A) $T_e > T$ (B) $T > T_e$
 (C) T_e is 5 times T (D) $T = T_e$

113. Which of the following reaction define ΔG_f° ? ▶

- (A)** $\text{C(diamond)} + \text{O}_2(\text{g}) \longrightarrow \text{CO}_2(\text{g})$ **(B)** $\frac{1}{2}\text{H}_2(\text{g}) + \frac{1}{2}\text{F}_2(\text{g}) \longrightarrow \text{HF}(\text{g})$
(C) $\text{H}_4\text{P}_2\text{O}_7 + \text{H}_2\text{O} \longrightarrow 2\text{H}_3\text{PO}_4$ **(D)** $\text{SO}_2(\text{g}) + \frac{1}{2}\text{O}_2(\text{g}) \longrightarrow \text{SO}_3(\text{g})$

114. The direct conversion of A of B is difficult, hence it is carried out by the following shown path ▶



Where eu is entropy unit, then $\Delta S_{(\text{A} \rightarrow \text{B})}$ is :

- (A)** +100 eu **(B)** +60 eu **(C)** -100 eu **(D)** -60 eu

115. A schematic plot of $\ln K_{\text{eq}}$ versus inverse of temperature for a reaction is shown below : ▶

The reaction must be :

- (A)** Highly spontaneous at ordinary temperature
(B) One with negligible enthalpy change
(C) Endothermic
(D) Exothermic

