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| **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 $H_2O(g)$ at $298\,K$ is $-241.8\,kJ\ mol^{-1}$. Calculate $\Delta_r H^o$ at 373 K. Assume that $C_P$ is independent of temperature. $C_P,\ H_2O(g) = 33.6\,JK^{-1}\,mol^{-1}$; $C_P,\ H_2(g) = 28.8$ $JK^{-1}\,mol^{-1}$, $C_P$ of $O_2(g) = 29.4\,JK^{-1}\,mol^{-1}$

**(A)** $-242.6\,kJ / mol$ **(B)** $+242.6\,kJ / mol$

**(C)** $+24.26\,kJ / mol$ **(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.** $C_2H_2(g)$ or $C_2H_6(g)$ **II.** $CO_2(g)$ or $CO(g)$ **III.** $I_2(s)$ or $I_2(g)$

The correct choice is :

**(A)** $C_2H_2(g)$, $CO_2(g)$, $I_2(s)$ **(B)** $C_2H_6(g)$, $CO_2(g)$, $I_2(s)$

**(C)** $C_2H_2(g)$, $CO_2(g)$, $I_2(g)$ **(D)** $C_2H_6(g)$, $CO_2(g)$, $I_2(g)$

**110.** $\Delta_r H^o$ for solid-to-liquid transition for proteins A and B are $2.73\,kcal\ mol^{-1}$ and $3.03\,kcal\ mol^{-1}$. The two melting points are 0°C and 30°C respectively. The entropy changes $\Delta S_A$ and $\Delta S_B$ 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)** $\Delta S_B = \dfrac{303\,\Delta S_A}{273}$

**111.** For the auto-ionization of water at 25° C, $K_{eq}$ for $H_2O(\ell) \rightleftharpoons H^+(aq) + OH^-(aq)$ is $10^{-14}$. What is $\Delta_r G^o$ for the above reaction?

**(A)** $\simeq 8 \times 10^4\,J$ **(B)** $\simeq 3.5 \times 10^4\,J$

**(C)** $\simeq 10^4\,J$ **(D)** None of these

**112.** For a particular reversible reaction at temperature T, $\Delta H$ and $\Delta S$ 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 $\Delta G_f^\circ$ ?

**(A)** $C(\text{diamond}) + O_2(g) \longrightarrow CO_2(g)$ **(B)** $\frac{1}{2}H_2(g) + \frac{1}{2}F_2(g) \longrightarrow HF(g)$

**(C)** $H_4P_2O_7 + H_2O \longrightarrow 2H_3PO_4$ **(D)** $SO_2(g) + \frac{1}{2}O_2(g) \longrightarrow SO_3(g)$

**114.** The direct conversion of A of B is difficult, hence it is carried out by the following shown path $\begin{array}{ccc} C & \longrightarrow & D \\ \uparrow & & \downarrow \\ A & & B \end{array}$. Given; $\Delta S_{(A\to C)} = 50\,\text{eu}$ ; $\Delta S_{(C\to D)} = 30\,\text{eu}$ ; $\Delta S_{(B\to D)} = 20\,\text{eu}$

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

**(A)** $+100\,\text{eu}$ **(B)** $+60\,\text{eu}$ **(C)** $-100\,\text{eu}$ **(D)** $-60\,\text{eu}$

**115.** A schematic plot of $\ln K_{eq}$ 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