Vidyamandir Classes
Gurukul for IITJEE & Medical Preparation

| Date Planned : __ / __ / __ | Daily Tutorial Sheet-8 | Expected Duration : 90 Min |
| Actual Date of Attempt : __ / __ / __ | Level-2 | Exact Duration :_____ |

96. The enthalpy of vaporization of chloroform is $29.4 \, \text{kJ mol}^{-1}$ at its normal boiling point of 61.7°C. What is the entropy of condensation of chloroform at this temperature?

(A) $-57.3 \, \text{R}$ (B) $-10.6 \, \text{R}$ (C) $-1.18 \, \text{R}$ (D) $10.6 \, \text{R}$

97. Combustion of sucrose is used by aerobic organisms for providing energy for the life sustaining processes. If all the capturing of energy from the reaction is done through electrical process (non P-V work) then calculate maximum available energy which can be captured by combustion of 34.2 gm of sucrose.

Given : $\Delta H_{combustion} (\text{sucrose}) = -6000 \, \text{kJ mol}^{-1}, \Delta S_{combustion} = 180 \, \text{J / K mol}$

and body temperature is 300 K :

(A) 600 kJ   (B) 594.6 kJ   (C) 5.4 kJ   (D) 605.4 kJ

98. The freezing of any liquid to a solid is expected to have :

(A) a positive ΔH and a positive ΔS (B) a negative ΔH and a positive ΔS

(C) a positive ΔH and a negative ΔS (D) a negative ΔH and a negative ΔS

99. Industrial acetylene gas (ethyne, C_2H_2) is made by the high temperature decomposition of ethane gas, C_2H_6, at 300°C, according to the following equation: $C_2H_{6(g)} \longrightarrow C_2H_{2(g)} + 2H_{2(g)}$

(A) $\Delta_r G^O > \Delta_r H^O$ and $\Delta_r S^O > 0$ (B) $\Delta_r G^O < \Delta_r H^O$ and $\Delta_r S^O < 0$

(C) $\Delta_r G^O < \Delta_r H^O$ and $\Delta_r S^O > 0$ (D) $\Delta_r G^O > \Delta_r H^O$ and $\Delta_r S^O < 0$

*100. Which one of the following statements is (are) true ?

(A) For a given transfer of energy, the increase in entropy is directly proportional to the absolute temperature.

(B) $Br_2(g)$ has a lower entropy than $Br_2(\ell)$

(C) The standard free energy of formation of $Hg(\ell)$ is zero

(D) Endothermic reactions with a negative entropy change are always non-spontaneous

101. Consider the reaction below at 298 K :

$$C(\text{graphite}) + 2H_2(g) \longrightarrow CH_4(g)$$

$\Delta_f H^O(\text{kJ / mol})$ -74.9

$S_m^O (\text{J / K / mol})$ $+5.6$ $+130.7$ $+186.3$

Which statement below is correct?

(A) $\Delta_r G^O$ is $-50.8 \, \text{kJ}$ and the reaction is driven by enthalpy only

(B) $\Delta_r G^O$ is $-50.8 \, \text{kJ}$ and the reaction is driven by entropy only

(C) $\Delta_r G^O$ is $+50.8 \, \text{kJ}$ and the reaction is driven by enthalpy and entropy

(D) $\Delta_r G^O$ is $-50.8 \, \text{kJ}$ and the reaction is driven by enthalpy and entropy

102. Given :　　　　　　　　$\Delta_f H^o$(kJ / mol)　　　S_m^o (J / K / mol)

　　　$CCl_4(\ell)$　　　　　　−135.4　　　　　　215.4

　　　$CCl_4(g)$　　　　　　−103.0　　　　　　308.7

　　　What is the boiling point of carbon tetrachloride ?

　　　(A)　　8.25°C　　　**(B)**　　74.3°C　　　**(C)**　　92.3°C　　　**(D)**　　45.8°C

103. Calculate the change in molar Gibbs energy of carbon dioxide gas at 20°C when it is isothermally compressed from 1.0 bar to 2.0 bar.　　　⏵

　　　(A)　　2.4 kJ/mol　　**(B)**　　−2.4 kJ / mol　　**(C)**　　1.7 kJ / mol　　**(D)**　　−1.7 kJ / mol

104. Calculate $\Delta_r S_{sys}^o$ for the following reaction at 373 K :

　　　$CO(g) + H_2O(g) \longrightarrow CO_2(g) + H_2(g)$

　　　$\Delta_r H^o = -4.1 \times 10^4 J,\ \Delta_r S_{univ}^o = 56\ J / K$

　　　(A)　　−54 J / K　　**(B)**　　−166 J / K　　**(C)**　　+54 J / K　　**(D)**　　+166 J / K

105. A certain process releases 64.0 kJ of heat, which is transferred to the surroundings at a constant pressure and a constant temperature of 300 K. For this process $\Delta S_{surr.}$ is :

　　　(A)　　64.0 kJ　　　**(B)**　　−64.0 kJ　　　**(C)**　　−213 J / K　　　**(D)**　　None of these