

Date Planned : / /	Daily Tutorial Sheet-10	Expected Duration : 90 Min		
Actual Date of Attempt : / /	Level-2	Exact Duration :		

116.	If an endothermic reaction is	non-spontaneous	at freezing	point of w	ater becomes	feasible at i	ts boiling
	point then :						

(A) ΔH is -ve, ΔS is +ve

(B) ΔH and ΔS both are +ve

(C) ΔH and ΔS both are –ve

(D) $\Delta H \text{ is } + \text{ve, } \Delta S \text{ is } - \text{ve}$

117. Select the correct statement(s) about entropy S.

(A) $S_{(vapour)} > S_{(solid)} > S_{(liquid)}$

(B) $S_{(vapour)} > S_{(liquid)} > S_{(solid)}$

(C) $S_{\text{(vapour)}} < S_{\text{(liquid)}} < S_{\text{(solid)}}$

(D) $S_{(vapour)} = S_{(liquid)} > S_{(solid)}$

118. A particular reaction at 27°C for which $\Delta H > 0$ and $\Delta S > 0$ is found to be non-spontaneous. The reaction may proceed spontaneously if :

(A) The temperature is decreased

(B) The temperature is kept constant

(C) The temperature is increased

(D) It is carried in open vessel at 27°C

119. In the conversion of limestone to lime, $CaCO_3(s) \longrightarrow CaO(s) + CO_2(g)$ the values of ΔH° and ΔS° are $+179.1 \text{ kJ mol}^{-1}$ and $160.2 \text{ J K}^{-1} \text{ mol}^{-1}$ respectively at 298 K and 1 bar. Assuming that, ΔH° and ΔS° do not change with the temperature above which conversation of limestone to lime will be spontaneous is:

(A) 1118 K

(B) 1008 K

(C) 1200 K

(D) 845 K

120. Standard entropy of X_2 , Y_2 and XY_3 are 60, 40 and $50 \,\mathrm{J \, K^{-1} \, mol^{-1}}$ respectively. For the reaction :

 $\frac{1}{2}X_2 + \frac{3}{2}Y_2 \longrightarrow XY_3, \, \Delta H = -\,30\,kJ \ \ to \ be \ at \ equilibrium, \ the \ temperature \ will \ be \ :$

(A) 1000 K

(B) 1250 K

(C) 500 K

(D) 750 K

121. The incorrect expression among the following is:



(A)
$$\frac{\Delta G_{System}}{\Delta S_{Total}} = -T$$

(B) In isothermal process, $w_{\text{(reversible)}} = - nRT \ln \left(\frac{V_f}{V_i} \right)$

(C) $\ln K = \frac{\Delta H^{\circ} - T\Delta S^{\circ}}{RT}$

(D) $K = e^{-\Delta G^{\circ}/RT}$

122. A reaction has $\Delta H = -33 \text{ kJ}$ and $\Delta S = -58 \text{ J/K}$. This reaction would be:

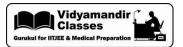
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(A) spontaneous at all temperatures

(B) non-spontaneous at all temperatures

(C) spontaneous above a certain temperature only

(D) spontaneous below a certain temperature only



123. Animals operate under conditions of constant pressure and most of the processes that maintain life are isothermal (in a broad sense). How much energy is available for sustaining this type of muscular and nervous activity from the combustion of 1 mol of glucose molecules under standard conditions at 37°C (blood temperature)? The entropy change is + 182.4 JK⁻¹ for the reaction stated above.

 $\Delta H_{combustion}[glucose] = -2808 \text{ kJ}$

- **(A)** –2754.4 kJ
- **(B)** −2864.5 kJ
- (C) -56.5 kJ
- **(D)** −2808 kJ
- 124. One gram sample of oxygen undergoes free expansion from 0.75 L to 3.0 L at 298 K. Calculate ΔS , q, w, ΔH and ΔE
 - (A) $\Delta S = 0.36 \text{ JK}^{-1}$

(B) W = 227.97 J

(C) q = -227.97 J

(D) $\Delta H = 107.28 J$

125. Given that:

$$\Delta G_f^0(CuO) = -30.4 \text{ kcal/mole}$$

$$\Delta G_f^0(Cu_2O) = -34.98 \text{ kcal/mole } T = 298 \text{ K}$$

Now on the basis of above data which of the following predictions will be most appropriate under the standard conditions and reversible reaction.

- (A) Finely divided form of CuO kept in excess O_2 would be completely converted to Cu_2O
- (B) Finely divided form of Cu_2O kept in excess O_2 would be completely converted to CuO
- (C) Finely divided form of CuO kept in excess $\rm O_2$ would be converted to a mixture of CuO and Cu $_2$ O (having more of CuO)
- (D) Finely divided form of CuO kept in excess O_2 would be converted to a mixture of CuO and Cu_2O (having more of Cu_2O)

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