Date Planned : __ / __ / __	**Daily Tutorial Sheet-4**	**Expected Duration : 90 Min**
Actual Date of Attempt : __ / __ / __	**Level-1**	**Exact Duration :________**

46. A process is taking place at constant temperature and pressure. Then for ideal gas :

(A) $\Delta H = \Delta E$ **(B)** $\Delta H = T\Delta S$ **(C)** $\Delta H = 0$ **(D)** $\Delta S = 0$

47. In view of the signs of $\Delta_r G^\circ$ for the following reactions:

$$PbO_2 + Pb \longrightarrow 2PbO, \Delta_r G^\circ < 0\,; \qquad SnO_2 + Sn \longrightarrow 2SnO, \Delta_r G^\circ > 0$$

Which oxidation states are more characteristic for lead and tin?

(A) For lead + 4, for tin + 2 **(B)** For lead + 2, for tin + 2

(C) For lead + 4, for tin + 4 **(D)** For lead + 2, for tin + 4

48. A plot of lnK against 1/T (abscissa) is expected to be a straight line with intercept on y coordinate axis equal to :

(A) $\frac{\Delta S^\circ}{2.303\,R}$ **(B)** $\frac{\Delta S^\circ}{R}$ **(C)** $-\frac{\Delta S^\circ}{R}$ **(D)** $R \times \Delta S^\circ$

49. The correct relationship between free energy change in a reaction and the corresponding equilibrium constant K_c is :

(A) $\Delta G = RT \ln K_c$ **(B)** $-\Delta G = RT \ln K_c$

(C) $\Delta G^\circ = RT \ln K_c$ **(D)** $-\Delta G^\circ = RT \ln K_c$

50. For the reaction at 298 K

$$A(g) + B(g) \rightleftharpoons C(g) + D(g)\,; \Delta H^\circ = -29.8 \text{ kcal}, \Delta S^\circ = -0.100 \text{ kcal K}^{-1}$$

What is the value of ΔG°?

(A) 1 **(B)** 0 **(C)** 2 **(D)** 4

51. Unit of entropy is :

(A) $JK^{-1}\,mol^{-1}$ **(B)** $J\,mol^{-1}$ **(C)** $J^{-1}K^{-1}\,mol^{-1}$ **(D)** $JK\,mol^{-1}$

52. For a system in equilibrium, $\Delta G = 0$ under conditions of constant :

(A) Temperature and pressure **(B)** Temperature and volume

(C) Pressure and volume **(D)** Energy and volume

53. The entropy change for the reaction $H_2(g) + Cl_2(g) \longrightarrow 2HCl(g)$ will be :

[Given that, $S^\circ(HCl) = 187\ JK^{-1}\,mol^{-1}$, $S^\circ(H_2) = 131\,JK^{-1}\,mol^{-1}$ and $S^\circ(Cl_2) = 223\ JK^{-1}\,mol^{-1}$]

(A) $20\,JK^{-1}\,mol^{-1}$ **(B)** $-20\,JK^{-1}\,mol^{-1}$

(C) $167\,JK^{-1}\,mol^{-1}$ **(D)** $-167\,JK^{-1}\,mol^{-1}$

54. The free energy for a reaction having $\Delta H = 31400\,\text{cal}$, $\Delta S = 32\ \text{cal}\,K^{-1}mol^{-1}$ at $1000^\circ C$ is :

(A) $-9336\,\text{cal}$ **(B)** $-7386\ \text{cal}$ **(C)** $-1936\,\text{cal}$ **(D)** $+9336\,\text{cal}$

55. Spontaneous adsorption of a gas on solid surface is an exothermic process because :

(A) ΔH increases for system **(B)** ΔS increases for gas

(C) ΔS decreases for gas **(D)** ΔG increases for gas

56. The enthalpy change for the transition of liquid water to steam is $40.8\,\text{kJ mol}^{-1}$ at 373 K. What is the entropy of vaporization of water in J/mol K ?

(A) 209.4 **(B)** 109.4 **(C)** 250.0 **(D)** –209.4

57. Which of the following statements is true?

(A) ΔG is always less than ΔH

(B) ΔG is always more than ΔH

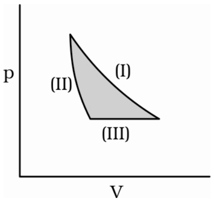
(C) ΔG is always proportional to ΔH

(D) ΔG may be lesser, greater or equal to ΔH

58. In a reversible process, $\Delta S_{\text{system}} + \Delta S_{\text{surrouding}}$ is :

(A) > 0 **(B)** < 0 **(C)** ≥ 0 **(D)** $= 0$

59. Consider the following cyclic process

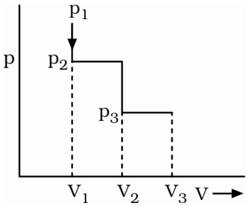


I : Isothermal II : Adiabatic III : constant-pressure process

Sum of the work and heat in the above is :

(A) zero **(B)** pV **(C)** R **(D)** –pV

60. The following diagram represents the (p-V) changes of a gas. Thus, total work done is :



(A) $p_2(V_2 - V_1) + p_3(V_3 - V_2)$ **(B)** $p_1(V_2 - V_1) + p_3(V_3 - V_2)$

(C) $p_2(V_3 - V_1) + p_3(V_2 - V_1)$ **(D)** $p_2(V_3 - V_2) + p_3(V_2 - V_1)$