Date Planned : __ / __ / __	Daily Tutorial Sheet-3	Expected Duration : 90 Min
Actual Date of Attempt : __ / __ / __	Level-1	Exact Duration :_____

31. A hypothetical reaction $A \rightarrow 2B$, proceeds through following sequence of steps

I. $A \rightarrow C;\ \Delta H = q$ **II.** $C \rightarrow D;\ \Delta H = v$ **III.** $\frac{1}{2}D \rightarrow B;\ \Delta H = x$

Then the heat of reaction is :

(A) $q - v + 2x$ **(B)** $q + v - 2x$ **(C)** $q + v + 2x$ **(D)** $q + 2v - 2x$

32. The value of ΔE for combustion of 16 g of CH_4 is -885389 J at 298 K. The ΔH combustion for CH_4 in $J\,mol^{-1}$ at this temperature will be : (Given that, $R = 8.314\,JK^{-1}\,mol^{-1}$)

(A) –55337 **(B)** –880430 **(C)** –885389 **(D)** –890344

33. The value of enthalpy change (ΔH) for the reaction $C_2H_5OH(l) + 3O_2(g) \longrightarrow 2CO_2(g) + 3H_2O(l)$, at 27°C is $-1366.5 kJ\ mol^{-1}$.

The value of internal energy change for the above reaction at this temperature will be:

(A) –1371.5 kJ **(B)** –1369.0 kJ **(C)** –1364.0 kJ **(D)** –1361.5 kJ

34. The sublimation energy of I_2 (s) is 57.3 kJ/mol and the enthalpy of fusion is 15.5 kJ/mol. The enthalpy of vaporization of I_2 is :

(A) 41.8 kJ/mol **(B)** –41.8 kJ / mol **(C)** 72.8 kJ/mol **(D)** –72.8 kJ / mol

35. The standard enthalpy of formation of NH_3 is $-46.0 kJ\ mol^{-1}$. If the enthalpy of formation of H_2 from its atoms is $-436\ kJ\ mol^{-1}$ and that of N_2 is $-712 kJ\ mol^{-1}$, the average bond enthalpy of N – H bond in NH_3 is :

(A) $-964\ kJ\ mol^{-1}$ **(B)** $+352\ kJ\ mol^{-1}$ **(C)** $+1056\ kJ\ mol^{-1}$ **(D)** $-1102\ kJ\ mol^{-1}$

36. $C_2H_2 + \frac{5}{2}O_2 \longrightarrow 2CO_2 + H_2O$; $\Delta H = -310$ kcal

$C + O_2 \longrightarrow CO_2$; $\Delta H = -94$ kcal

$H_2 + \frac{1}{2}O_2 \longrightarrow H_2O$; $\Delta H = -68$ kcal

On the basis of the above equations, ΔH_f (enthalpy of formation) of C_2H_2 will be :

(A) –148 kcal **(B)** + 54 kcal **(C)** –54 kcal **(D)** + 80 kcal

37. The enthalpy of formation of NH_3 is $-46 kJ\ mol^{-1}$. The enthalpy change for the reaction $2NH_3(g) \rightarrow N_2(g) + 3H_2(g)$ is :

(A) + 184 kJ **(B)** + 23 kJ **(C)** + 92 kJ **(D)** + 46 kJ

38. Consider the reaction, $N_2 + 3H_2 \longrightarrow 2NH_3$ carried out at constant temperature and pressure. If ΔH and ΔU are the enthalpy and internal energy changes for the reaction, which of the following expressions is true?

(A) $\Delta H > \Delta U$ **(B)** $\Delta H < \Delta U$ **(C)** $\Delta H = \Delta U$ **(D)** $\Delta H = 0$

39. The relation between ΔH and ΔU is :

(A) $\Delta H = \Delta U + RT$ **(B)** $\Delta H = \Delta U - \Delta_g nRT$

(C) $\Delta H = \Delta U + \Delta_g nRT$ **(D)** $\Delta U = \Delta H + \Delta_g nRT$

40. The bond energy is the energy required to :

(A) Dissociate one mole of the substance

(B) Dissociate bond in 1 kg of the substance

(C) Break one mole of similar bonds

(D) Break bonds in one mole of substance

41. For an ideal gas, the heat of reaction at constant pressure and constant volume are related as :

(A) $H + E = pV$ **(B)** $E = H + p\Delta V$

(C) $q_p = q_v + \Delta_g nRT$ **(D)** None of these

42. The heat of formations for CO_2 (g), H_2O (*l*) and CH_4 (g) are $-400\ kJ\ mol^{-1}$, $-280\ kJ\ mol^{-1}$ and $-70\ kJ\,mol^{-1}$ respectively. The heat of combustion of CH_4 in $kJ\,mol^{-1}$ is :

(A) 800 **(B)** −160 **(C)** −890 **(D)** −90

43. Using the following thermochemical equations :

I. $S(\text{rhombic}) + \frac{3}{2}O_2(g) \longrightarrow SO_3(g)$; $\Delta H = -2x\ kJ\ mol^{-1}$

II. $SO_2(g) + \frac{1}{2}O_2(g) \longrightarrow SO_3(g)$; $\Delta H = -y\ kJ\ mol^{-1}$

Find out the heat of formation of SO_2 (g) in $kJ\,mol^{-1}$.

(A) (2x + y) **(B)** (x + y) **(C)** 2x − y **(D)** $(y - 2x)$

44. Calculate ΔH in kJ for the following reaction : $C(g) + O_2(g) \longrightarrow CO_2(g)$

Given that, $H_2O(g) + C(g) \longrightarrow CO(g) + H_2(g)$; $\Delta H = +131\,kJ$

$CO(g) + \frac{1}{2}O_2(g) \longrightarrow CO_2(g)$; $\Delta H = -282\,kJ$

$H_2(g) + \frac{1}{2}O_2(g) \longrightarrow H_2O(g)$; $\Delta H = -242\,kJ$

(A) −393 **(B)** + 393 **(C)** + 655 **(D)** −655

45. For the reaction, $A(g) + 2B(g) \longrightarrow 2C(g) + 3D(g)$ the change of enthalpy at $27^\circ C$ is 19 kcal. The value of ΔE is:

(A) 21.2 kcal **(B)** 17.8 kcal **(C)** 18.4 kcal **(D)** 20.6 kcal