Daily Tutorial Sheet-5	Level-1

61.(C) $C_{12}H_{22}O_{11} + 12O_2 \longrightarrow 12CO_2 + 11H_2O$

1 mole $C_{12}H_{22}O_{11} \rightarrow 1350$ k cal / mole

$\frac{161}{342}$ mole $\rightarrow \frac{1350}{1} \times \frac{161}{342} = 635.5$ kcal / mole

62.(A) $C_{(graphite)} + O_{2(g)} \longrightarrow CO_{2(g)}$

↓ Standard elemental form ↓ Standard elemental form

So, $\Delta H_f^{\circ}(CO_2) = -x_1$ Cal

63.(C) $C_{(graphite)} + O_{2(g)} \longrightarrow CO_{2(g)} \quad \Delta H = -x_1$ **.... (i)**

$CO_{(g)} + \frac{1}{2} O_{2(g)} \longrightarrow CO_{(g)} \quad \Delta H = -x_2$ **....(ii)**

(i) – (ii)

$C_{(graphite)} + \frac{1}{2} O_2(g) \longrightarrow CO \quad \Delta H = (x_2 - x_1)$

64.(D) Formation of a compound (ΔH_f) is represented by the reaction of its constituents atoms in their basic elemental form. Hence only 1 is correct.

$N_2 + O_2 \longrightarrow 2NO \quad \Delta H = x_1$

$\frac{1}{2} N_2 + \frac{1}{2} O_2 \longrightarrow NO \quad \Delta H = \frac{x_1}{2}$

65.(A) $Q_V = \Delta U$

$Q_P = \Delta H = ?$

Also $\Delta H = \Delta U + \Delta n_{(g)} RT$

$\Delta H = 40kJ + (2-1) \times 8.314 \times 300 \times 10^{-3} = 40 + (8.314 \times 0.3) = 40 + 2.4942$

$\Delta H = 42.5kJ$

66.(A) $CH_4 + C_2H_6 + C_3H_6 \longrightarrow C_6H_{14}$

Product molecules has same number of C and H as the total number of C and H in reactant but has higher bond energy corresponding to extra $C-C$ bonds.

67.(B) $H_{2(g)} + \frac{1}{2} O_{2(g)} \longrightarrow H_2O_{(\ell)}$

$\Delta H_f = ?$

In the above reaction for 1 mole formation of H_2O we need to burn 2g H_2 molecule

$\therefore \quad \Delta H_f(H_2O) = -2 \times 143$ kJ / mol $= -286$ kJ / mol

68.(D) $C_{(s)\ graphite} + O_{2(g)} \longrightarrow CO_{2(g)}$. The above reaction indicates both formation of CO_2 and combustion of Carbon.

69.(D) $CaCl_2 \cdot 6H_2O + aq \longrightarrow CaCl_2(aq) \quad \Delta H = +3.5\,Kcal\,mol^{-1}$ **..... (i)**

$CaCl_2(s) + 6H_2O(\ell) \longrightarrow CaCl_2 \cdot 6H_2O \quad \Delta H = -23.2\,Kcal$ **..... (ii)**

Adding (i) and (ii)

$$CaCl_2(s) + aq \longrightarrow CaCl_2(aq)$$

Heat of solution of $CaCl_2 = 3.5 + (-23.2) = -19.7\,kcal$

70.(A) $NaCl(s) \longrightarrow Na^+ + Cl^-$ **..... (i)**

$Na^+ + Cl^- + (aq) \longrightarrow NaCl(aq)$ **..... (ii)**

Adding (i) and (ii) : $\Delta U = nC_p\Delta T$

Heat of solution of $NaCl(s) = 788 + (-784) = 4\,kJ / mol$

71.(C) $\frac{1}{2}N_{2(g)} + \frac{3}{2}H_2(g) \longrightarrow NH_3(g)$

$\Delta H_f = (B.E)_R - (BE)_p$

$\frac{1}{2}(x_1) + \frac{3}{2}(x_2) - 3x_3$

72.(C) $H_{2(g)} + \frac{1}{2}O_2(g) \longrightarrow H_2O_{(g)}$

$\Delta H_1 = x_1 + \frac{x_2}{2} - 2x_3$

$H_2O_{(\ell)} \longrightarrow H_2O_{(g)} \quad \Delta H_2 = x_4$

Now $\Delta H_1 - \Delta H_2$

Gives $H_{2(g)} + \frac{1}{2}O_{2(g)} \longrightarrow H_2O_{(\ell)} \quad \Rightarrow \quad \Delta H_{net} = x_1 + \frac{x_2}{2} - 2x_3 - x_4$

73.(D) $C + O_2 \longrightarrow CO_2$

Defined for complete combustion

74.(A) $3(BE_{P-H}) = 953$

$(BE_{P-H}) = 953 / 3$

$4 \times (BE_{P-H}) + (BE)_{P-P} = 1485$

$\therefore \quad (BE)_{P-P} = 1485 - 4 \times \frac{953}{3} = 214.33\,kJ / mol$

75.(C) Adding all equation, we get

$x_1 + x_2 - x_3 - x_4 =$ Enthalpy change when Cl^+Cl^- is formed