Daily Tutorial Sheet-7	Level-2

86.(A) Lattice energy $= 4 - (-784)\,kJ/mol = +788\,kJ/mol$

87.(B) Exchange of both matter and energy is taking place.

88.(A) $C(graphite) \rightleftharpoons C(diamond)$

$\Delta H = \Delta U + P\Delta V \Rightarrow \quad \Delta U - \Delta H = -P\Delta V \Rightarrow -5\times10^{10}\times(V_{diamond} - V_{graphite})$ [1 bar = $10^5\,N/m^2$]

$= -5\times10^{10}\,\frac{N}{m^2}\times\left(\frac{12}{3}-\frac{12}{2}\right)\times10^{-6}\,m^3$ [For 1 mole] = 100 kJ/mol

89.(D) $3O_2(g) \longrightarrow 2O_3(g) \qquad \Delta_f H^o_{O_3} = 143$ kJ/mol [O_3 is less stable than O_2]

$\frac{1}{2}N_2(g) + \frac{1}{2}O_2(g) \longrightarrow NO(g) \qquad \Delta_r H^o_{NO} = 90$ kJ/mol [NO is highly reactive i.e. high energy species]

$\frac{1}{2}H_2(g) + \frac{1}{2}I_2(s) \longrightarrow 2HI(g) \qquad \Delta_f H^o_{HI} = 26.5$ kJ/mol

[$I_2(s)$ has to be sublimed and then dissociated to form HI and this requires energy]

90.(A) $\underset{1mol}{AOH} + \underset{xmol}{HCl} \longrightarrow ACl + H_2O\ ;\ \Delta H = -12250\,cal = -12250\,x\,cal$

$\underset{1mol}{BOH} + \underset{(1-x)mol}{HCl} \longrightarrow BCl + H_2O\ ;\ \Delta H = -13000\,cal = -13000(1-x)\,cal$

$12500 = 12250x + 13000(1-x)$

$12500 = 12250x + 13000 - 13000x$

$x = 0.67$

$\frac{x}{1-x} = \frac{0.67}{0.33} = 2:1$

91.(B) $XeF_4(g) \longrightarrow Xe(g) + 4F(g) \qquad \Delta_a H = ?$

$XeF_4(g) \longrightarrow Xe^+(g) + F^-(g) + F_2(g) + F(g) \qquad \Delta_r H_1 = 292$ kcal/mol

$Xe(g) \longrightarrow Xe^+(g) + e^- \qquad \Delta_r H_2 = 279$ kcal/mol

$F_2(g) \longrightarrow 2F(g) \qquad \Delta_r H_3 = 38$ kcal/mol

$F(g) + e^- \longrightarrow F^-(g) \qquad \Delta_r H_4 = -85$ kcal/mol

$\Rightarrow$ Required $\Delta_r H = \Delta_r H_1 - \Delta_r H_2 + \Delta_r H_3 - \Delta_r H_4 = 292 - 279 + 38 - (-85) = 136$ Kcal/mol

$\Rightarrow \quad \Delta_{mean,\ bond}\ \Delta_{Xe-F} = \frac{1}{4}\times136 = 34$ kcal/mol

92.(BC) $\Delta_C H^-_{graphite} < \Delta_C H^-_{diamond}$

$\Rightarrow$ Diamond has greater affinity for oxygen i.e. Diamond is more reactive (i.e. less stable) than graphite.

93.(C) Fact

Look for defination of resonance energy

94.(BC) $C_2H_6 \equiv$ Has no resonance 1, 3-butadiene $\equiv$ Has resonance $[CH_3 \cdots CH_2 \cdots CH_2 \cdots CH_3]$

$N_2O \equiv$ Has no Resonance $[N \equiv N \longrightarrow O]$ 1, 3-cyclohexadiene = Has resonance