Daily Tutorial Sheet-11	Numerical Value Type

126.(7.43) $\Delta H - \Delta U = \Delta nRT = 3 \times 8.314 \times 298 = -7432\,J = -7.43\,kJ$

127.(5) Now, heat evolved during neutralization of 10 mL of each acid and base is twice the heat evolved during neutralization of 5 mL of each acid and base but the quantity of solution taking heat is also doubled thus, same temperature rise is noticed.

128.(104) $2H_2 \longrightarrow 4H; \quad \Delta H = 208\,kcal$

$H - H \longrightarrow 2H; \Delta H = \dfrac{208}{2}\,kcal$

129.(4) $Cu(g) \longrightarrow Cu^+(g) + e; \quad \Delta H = 745\,kJ\,mol^{-1}$

$I(g) + e \longrightarrow I^-(g); \quad \Delta H = -295\,kJ\,mol^{-1}$

Adding $Cu^+(g) + I^-(g) \longrightarrow CuI(g); \quad \Delta H^\circ = -446\,kJ\,mol^{-1}$

$Cu(g) + I(g) \longrightarrow CuI(g); \quad \Delta H^\circ = 4\,kJ\,mol^{-1}$

130.(14) $\dfrac{1}{2}N_2 + O_2 \longrightarrow NO_2; \quad \Delta H = 8\,kcal$ ..... (i)

$N_2 + 2O_2 \longrightarrow N_2O_4; \quad \Delta H = 2\,kcal$ ..... (ii)

By equation $(i) \times 2 - (ii)$

$2NO_2 \longrightarrow N_2O_4; \quad \Delta H = -14.0\,kcal$

131.(400) $\in_{A-A} = x \quad \in_{A-B} = x \quad \in_{B-B} = x/2$

$\dfrac{1}{2}A_2 + \dfrac{1}{2}B_2 \rightarrow AB$

$\dfrac{1}{2}x + \dfrac{x}{4} - x = -100 \quad \Rightarrow \quad x = 400$

132.(550) $\Delta H = -2 \times \left[2 \times \in_{O-H}\right] + 2 \times \in_{H-H} + \in_{O=O} = -4 \times 220 + 2 \times 105 + 120 = -550\,kJ$

133.(10) $\Delta H = \dfrac{2.5 \times 16}{4} = -10\,kcal\,mol^{-1}$

134.(196) By equation (i) + (ii).

$2Na + Cl_2 \longrightarrow 2NaCl; \quad \Delta H = -196\,kcal$

135.(17) $\Delta H = (\Delta H_{comb}CH_4) - \left[\Delta H_{comb}C(s) + 2 \times \Delta H_{comb}H_2(g)\right] = 17\,cal$

136.(93) $\Delta H = -2\left[3 \times \in_{N-H}\right] + \in_{N \equiv N} + 3 \times \in_{H-H} = -2 \times 3 \times 391 + 945 + 436 \times 3 = -93\,kJ$

137.(427) $\Delta H = -2 \in_{H-Cl} + \in_{H-H} + \in_{Cl-Cl}$

$-182 = -2 \times a + 430 + 242$

$a = 427\,kJ\,mol^{-1}$

138.(11.4) 0.2 mole of HNO_3 is neutralized by 0.2 mole of NaOH to give heat $= 57 \times 0.2 = 11.4\,kJ$

139.(–2.7) $\Delta n = 2 - 0 = 2$

$\Delta H = \Delta U + \Delta n(g)RT = 2100 + \left(\dfrac{2 \times 300 \times 8.314}{4.18}\right) \quad \Rightarrow \quad \Delta G = \Delta H - T\Delta S$

140.(314.8) $C(s) + O_2(g) \longrightarrow CO_2(g), \qquad \Delta H = -393.5\,kJ\,mol^{-1}$

44 g CO_2 is formed then heat released is $= 393.5\,kJ\,mol^{-1}$

35.2 g CO_2 is formed then heat released $= \frac{393.5 \times 35.2}{44}\,kJ = 314.8\,kJ$