Daily Tutorial Sheet-2	Level-1

16.(C) $C_{(diamond)} \longrightarrow C_{(graphite)}$ $\Delta H = -2\,kJ$

$C_{(graphite)} \longrightarrow C_{(g)}$ $\Delta H = 725\,kJ$ $\quad\therefore$ $C_{(diamond)} \longrightarrow C_{(g)}$ $\Delta H = 723\,kJ$

17.(C) By definition

18.(B) $BaCl \cdot 2H_2O + aq \longrightarrow BaCl_2(aq)$ $\Delta H_1 = 200\,kJ\,mol^{-1}$ **....... (i)**

$BaCl_2 + aq \longrightarrow BaCl_2 \cdot 2H_2O$ $\Delta H_2 = -150\,kJ\,mol^{-1}$ **....... (ii)**

Adding equation (i) and (ii)

$\Delta H_3 = \Delta H_1 + \Delta H_2$

$BaCl_2 + aq \longrightarrow BaCl_2(aq)$

Heat of solution of $BaCl_2 = 200 + (-500) = 50$ kJ

19.(C) O_2 is present in its standard state.

20.(B) $\Delta H = \dfrac{\text{Heat released}}{\text{mole}}$

78g of $X \longrightarrow 1\,\text{mole}$

1g of $X \longrightarrow \dfrac{1}{78} = 0.0128\,\text{mole}$

$\Delta H_{fusion} = \dfrac{160}{1000 \times 0.0128} = 12.48\,kJ/mol$

21.(C) Fact

Bond dissociation energy in polyatomic molecule is average of all bond energies. But in diatomic molecule dissociation energy in equal to bond energy.

22.(D) $C(g) + O_2 \longrightarrow CO_2(g); \Delta H = -y$ ....(i)

$C(d) \longrightarrow C(g); \Delta H = -1.89$ kJ .....(ii)

Adding equations (i) and (ii), we get :

$C(g) + C(d) + O_2 \longrightarrow CO_2 + C(g); \Delta H = -y + 1.89$ kJ or $C(d) + O_2 \longrightarrow CO_2; \Delta H = -y + 1.89$ kJ

Hence, the combustion of graphite is less than diamond by 0.945 kJ.

23.(D) Graphite is a standard state of carbon and CH_3OH in liquid state is also standard state.

24.(C) $I(g) + Cl(g) \longrightarrow ICl(g)$ $\Delta H_f(ICl) = 17.57\,J/mol$

$121.34 + 106.96 - (I - Cl) = 17.57$

$121.34 + 106.96 - 17.57 = (I - Cl)$

Bond dissociation $(I - Cl)$ bond $= 210.73\,J/mol$

25.(B) By definition

26.(A) In formation of $H_2O(g)$, some energy is required to convert $H_2O(l)$ into $H_2O(g)$, so less energy is released in the formation of $H_2O(g)$.

$\therefore \Delta H_2 > \Delta H_1$

27.(C) 10 m mole NH_4OH + 10 m mole HCl $\Rightarrow$ x kJ heat is released

$\therefore$ For 1 mole $\Rightarrow$ 100 x kJ heat is released

$\therefore$ $\Delta H = -100x$ kJ/mol

For 1 mole NaOH + 1 mole HCl, $\Delta H = y$ kJ / mol $\therefore$ Heat of dissociation of $NH_4OH = -100x - y$

28.(C) The heat of neutralisation of strong acid and strong base is constant because it is infact heat of formation of water by H^+ and OH^-. Its value is almost equal to -57.3 kJ.

29.(A) HCl is more stable than HF.

30.(C) Standard heat of formation of substance is the amount of heat evolved or absorbed when one mole of substance is formed from its elements in their standard states.

$\because$ Graphite is the standard state of carbon and hydrogen is found in form of H_2.

$\therefore$ Standard heat of formation of methane is $C(\text{graphite}) + 2H_2(g) \longrightarrow CH_4(g)$