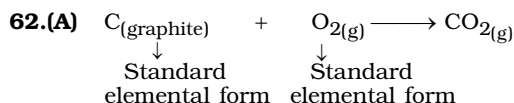
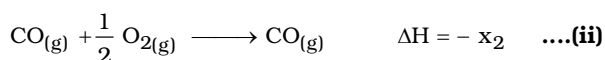
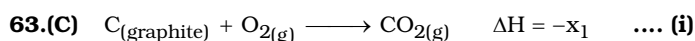



$$1 \text{ mole } \text{C}_{12}\text{H}_{22}\text{O}_{11} \rightarrow 1350 \text{ kcal / mole}$$

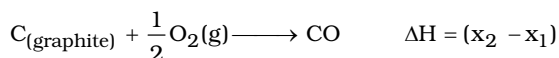
$$\frac{161}{342} \text{ mole} \rightarrow \frac{1350}{1} \times \frac{161}{342} = 635.5 \text{ kcal / mole}$$



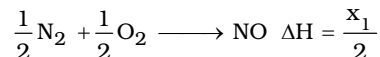
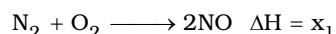
So, $\Delta H_f^\circ(\text{CO}_2) = -x_1 \text{ Cal}$



(i) – (ii)



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.

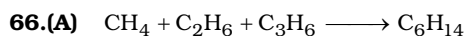


$$Q_p = \Delta H = ?$$

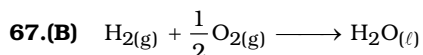
Also $\Delta H = \Delta U + \Delta n_{(g)}RT$

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

$$\Delta H = 42.5 \text{ kJ}$$



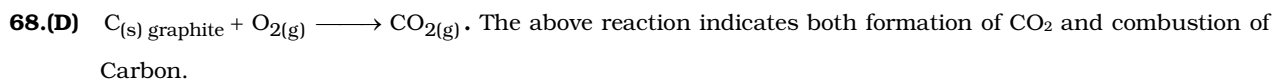
Product molecules has same number of C and H as the total number of C and H in reactant but has higher bond energy corresponding to extra C – C bonds.

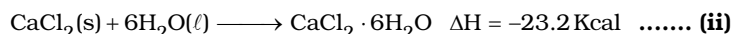
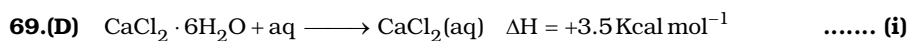


$$\Delta H_f = ?$$

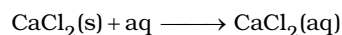
In the above reaction for 1 mole formation of H_2O we need to burn 2g H_2 molecule

$$\therefore \Delta H_f(\text{H}_2\text{O}) = -2 \times 143 \text{ kJ/mol} = -286 \text{ kJ/mol}$$

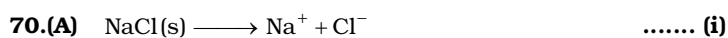




Adding (i) and (ii)

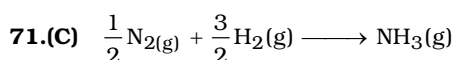


Heat of solution of $\text{CaCl}_2 = 3.5 + (-23.2) = -19.7 \text{ kcal}$



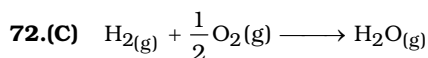
Adding (i) and (ii) : $\Delta U = nC_p \Delta T$

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

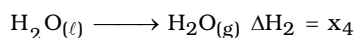


$\Delta H_f = (\text{B.E})_R - (\text{BE})_p$

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

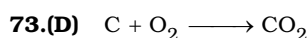


$\Delta H_1 = x_1 + \frac{x_2}{2} - 2x_3$



Now $\Delta H_1 - \Delta H_2$

Gives $\text{H}_{2(\text{g})} + \frac{1}{2} \text{O}_{2(\text{g})} \longrightarrow \text{H}_2\text{O}_{(\ell)} \quad \Rightarrow \quad \Delta H_{\text{net}} = x_1 + \frac{x_2}{2} - 2x_3 - x_4$



Defined for complete combustion

74.(A) $3(\text{BE}_{\text{P-H}}) = 953$

$(\text{BE}_{\text{P-H}}) = 953 / 3$

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

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

75.(C) Adding all equation, we get

$x_1 + x_2 - x_3 - x_4 = \text{Enthalpy change when } \text{Cl}^+\text{Cl}^- \text{ is formed}$