

## HESS' LAW 1

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Given :

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| (1) | $\text{C}_6\text{H}_6\text{(l)} + 6 \text{H}_2\text{(g)} \longrightarrow 3 \text{C}_2\text{H}_6\text{(g)}$                | $\Delta H = - 336.393 \text{ kJ}$ |
| (2) | $\text{C}_2\text{H}_6\text{(g)} + \text{Cl}_2\text{(g)} \longrightarrow 2 \text{CH}_3\text{Cl(g)}$                        | $\Delta H = - 79.496 \text{ kJ}$  |
| (3) | $\text{C}_7\text{H}_8\text{(l)} + \text{HCl(g)} \longrightarrow \text{C}_6\text{H}_6\text{(l)} + \text{CH}_3\text{Cl(g)}$ | $\Delta H = - 48.953 \text{ kJ}$  |
| (4) | $2 \text{C(s)} + 3 \text{H}_2\text{(g)} \longrightarrow \text{C}_2\text{H}_6\text{(g)}$                                   | $\Delta H = - 84.517 \text{ kJ}$  |
| (5) | $\frac{1}{2} \text{H}_2\text{(g)} + \frac{1}{2} \text{Cl}_2\text{(g)} \longrightarrow \text{HCl(g)}$                      | $\Delta H = - 92.048 \text{ kJ}$  |
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|--------------------------|---|-----------------------------------|
| rev (3)                  | $\text{C}_6\text{H}_6\text{(l)} + \text{CH}_3\text{Cl(g)} \longrightarrow \text{C}_7\text{H}_8\text{(l)} + \text{HCl(g)}$ | $\Delta H = + 48.953 \text{ kJ}$  |
| rev (1)                  | $3 \text{C}_2\text{H}_6\text{(g)} \longrightarrow \text{C}_6\text{H}_6\text{(l)} + 6 \text{H}_2\text{(g)}$                | $\Delta H = + 336.393 \text{ kJ}$ |
| $\frac{1}{2} \times (2)$ | $\frac{1}{2} \text{C}_2\text{H}_6\text{(g)} + \frac{1}{2} \text{Cl}_2\text{(g)} \longrightarrow \text{CH}_3\text{Cl(g)}$  | $\Delta H = - 39.748 \text{ kJ}$  |
| rev (5)                  | $\text{HCl(g)} \longrightarrow \frac{1}{2} \text{H}_2\text{(g)} + \frac{1}{2} \text{Cl}_2\text{(g)}$                      | $\Delta H = + 92.048 \text{ kJ}$  |
| $\frac{7}{2} \times (4)$ | $7 \text{C(s)} + \frac{21}{2} \text{H}_2\text{(g)} \longrightarrow \frac{7}{2} \text{C}_2\text{H}_6\text{(g)}$            | $\Delta H = - 295.810 \text{ kJ}$ |
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