**Answers to Hess’s Law Worksheet**

1. ∆H = -137 kJ
2. ∆H = -1628 kJ
3. ∆H = -486 kJ
4. ∆H = 256 kJ
5. ∆H = -6387 kJ
6. Using these three equations the molar heat of combustion of calcium can be calculated :

(1) Ca(s) + 2 H2O(l) → Ca2+(aq) + 2 OH−(aq) + H2(g) Δ*H* = -432 kJ

(2) CaO(s) + H2O(l) → Ca2+(aq) + 2 OH−(aq) Δ*H* = -80 kJ

(3) H2(g) + 1/2 O2(g) → H(2)O(l) Δ*H* = -286 kJ

Inverting equation 2 to give (2a) :

(2a) Ca2+(aq) + 2 OH− (aq) → CaO(s) + H2O(l) Δ*H* = +80 kJ

Addition of equations 1, 2a and 3 gives the equation for the combustion of calcium :

(1) Ca(s) + 2 ~~H~~~~2~~~~O~~~~(1)~~ → ~~Ca~~~~2+~~~~(aq)~~ + ~~2 OH~~− (~~aq)~~+ ~~H~~~~2(g)~~ Δ*H* = -432 kJ

(2a) ~~Ca~~~~2+~~~~(aq)~~ + ~~2 OH~~− ~~(aq)~~→ CaO(s) + ~~H~~~~2~~~~O~~~~(1)~~ Δ*H* = -80 kJ

(3) ~~H~~~~2(g)~~ + 1/2 O2(g) → ~~H~~~~(2)~~~~O~~~~(1)~~ Δ*H* = -286 kJ

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Ca(s) + 1/2 O2(g) → CaO(s) Δ*H* = -638 kJ

1. 1403.7 kJ
2. -3270 kJ
3. 0.292 moles