

REVIEW AND PRACTICE 2

1. A backyard swimming pool is filled with 26 000 L of water at 19 °C. How much thermal energy (heat) must be added to the pool to raise the water temperature to 27 °C?

2. Diborane gas reacts with chlorine gas by the following thermochemical equation.



- (a) What is the molar enthalpy change for the reaction with respect to chlorine gas.
(b) Draw a potential energy diagram for the reaction.

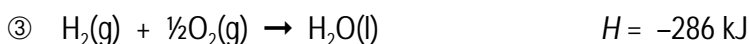
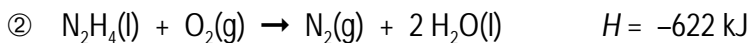
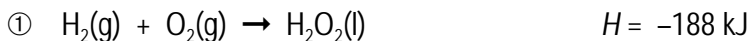
3. Using bond energies, estimate the enthalpy change for the dehydration of ethane-1,2-diol vapour.



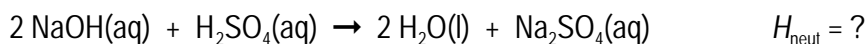
4. Using enthalpies of formation, find the enthalpy change for the production of glucose by photosynthesis.



5. Using the three thermochemical equations given below, apply Hess's law to find the enthalpy change for the reaction between hydrazine and hydrogen peroxide, $\text{N}_2\text{H}_4(\text{l}) + 2 \text{H}_2\text{O}_2(\text{l}) \rightarrow \text{N}_2(\text{g}) + 4 \text{H}_2\text{O}(\text{l})$.



6. A chemistry student is using calorimetry to find the molar enthalpy change with respect to sodium hydroxide for the following neutralization reaction.



In a calorimeter, she mixes 50.0 mL of 1.0 mol/L NaOH(aq) and 50.0 mL of 1.0 mol/L H₂SO₄(aq). The initial temperature of both solutions before mixing was 20.6 °C. The mixed solutions reached a temperature of 27.3 °C. Complete the analysis (state any assumptions).