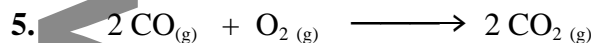
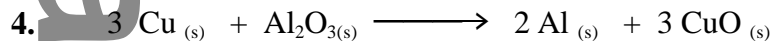
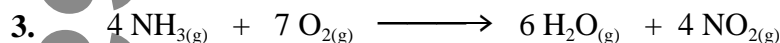
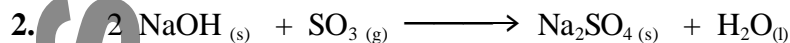
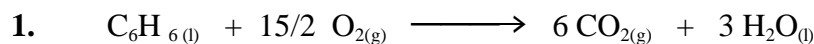


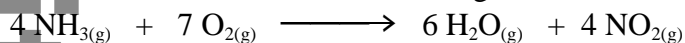
Standard Heats of Reaction and Hess' Law

Determine the heat of reaction for the following using Hess' Law of Summation of Heat and ΔH_f^0 values Thermochemical Data Sheet .

$$\text{Enthalpy change for a reaction} = \Delta H_{\text{rxn}}^0 = \sum [D H_f^0(\text{products})] - \sum [D H_f^0(\text{reactants})]$$

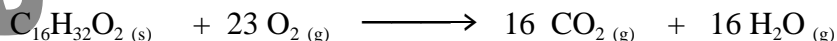


6. When ammonia is oxidised according to the following equation:



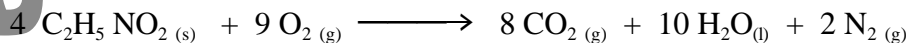
1132.0 kJ are evolved, determine the heat of formation of ammonia, $\text{NH}_{3(g)}$.

7. The molar heat of combustion of palmitic acid, $\text{C}_{16}\text{H}_{32}\text{O}_2$ (s) is $-9948.4 \text{ kJ mol}^{-1}$.



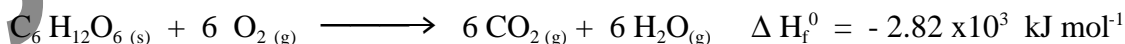
Determine the molar enthalpy of formation of palmitic acid.

8. One of the "building blocks" for proteins such as those in muscles and sinews is amino acid called glycine, $\text{C}_2\text{H}_5\text{NO}_2$. The equation for its combustion is:



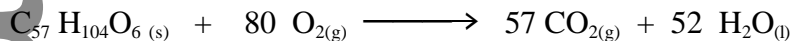
The value of its heat of combustion is $-973.49 \text{ kJ mol}^{-1}$. Calculate the heat of formation for glycine.

9. Glucose undergoes combustion according to the following equation:



Determine the enthalpy of formation for glucose.

10. The reaction that occurs when a typical fat, glycerol trioleate, is metabolized in the body is:



a) 37.8 kJ is evolved when 1.00 g of this fat (Molar Mass = 884) is metabolized.

Calculate the molar enthalpy of formation of fat in kJ mol^{-1} .

b) How many kilojoules of energy must be in the form of heat if you want to get rid of 1.00 pound (454 g) of this fat by combustion?

Answers

1. -3267.4 kJ 2. 3. -1397.6 kJ 4. $+1203.8 \text{ kJ}$ 5. -566 kJ
 6. -612.5 kJ 7. -216.4 kJ 8. -1258.1 kJ 9. -991.8 kJ 10. -71654.7 kJ