



Chapter 3

Traffic Light Study Guide

Section	Page	I can ...	Red	Amber	Green
3.1	182	State the <i>first law of thermodynamics</i> .	☐	☐	☐
	183	State the <i>second law of thermodynamics</i> .	☐	☐	☐
	183 - 184	Write the <i>Boltzmann equation</i> and state the <i>third law of thermodynamics</i> .	☐	☐	☐
	184	State how a system's temperature affects its <i>thermal disorder</i> and its Δ thermal disorder when heat is added or removed.	☐	☐	☐
	185 - 186	Calculate the entropy change and thus determine the spontaneity of a reaction, given the reactants' and products' <i>standard entropies</i> (S°).	☐	☐	☐
3.2	191 - 192	Provide the formula for the change of <i>Gibb's Free Energy</i> (ΔG) and relate a reaction's free energy to its spontaneity.	☐	☐	☐
	192, 196	Predict the spontaneity of a reaction, given the signs of ΔH and ΔS . In cases where those signs are the same, relate spontaneity to temperature.	☐	☐	☐
	193	Relate a reaction's change of Free Energy (ΔG) to the amount of recoverable energy it releases.	☐	☐	☐
	193	State the value of ΔG for a reaction at equilibrium.	☐	☐	☐
	194 - 195	Use the <i>Gibbs-Helmholtz Equation</i> to calculate a <i>Standard Free Energy Change</i> (ΔG°) at Standard Temperature.	☐	☐	☐
	196	Use <i>Free Energies of Formation</i> to calculate a Standard Free Energy Change (ΔG°) at Standard Temperature.	☐	☐	☐
	197 - 198	Use the <i>Gibbs-Helmholtz Equation</i> to calculate a Standard Free Energy Change (ΔG) at Non-Standard Temperatures.	☐	☐	☐
3.3	205 - 206	Calculate the change of Free Energy (ΔG) for a reaction mixture with gaseous species at Non-Standard Pressures. Determine the direction the reaction will proceed to achieve equilibrium.	☐	☐	☐
	207 - 209	Convert a Standard Free Energy change (ΔG°) into K_{eq} (and vice-versa).	☐	☐	☐
	210	Draw diagrams showing how Free Energy changes during the course of exergonic and endergonic reactions at constant temperature.	☐	☐	☐