

**FINAL EXAM
STUDY GUIDE**

| <i>Topic</i> | <i>Text Reference</i> |
|---|---|
| <u>CHAPTER 18</u> | |
| <ul style="list-style-type: none"> • Know the 1st Law of Thermodynamics and the relationship between internal energy, heat and work • Know the convention for the signs of heat and work • Determine the work in a chemical reaction from the pressure and change in volume • Calculate the internal energy of a system from given data • Calculate the enthalpy of a reaction from enthalpy of formation data • Know the definition of entropy and how it affects the spontaneity of a process • Determine the spontaneity of a process from the 2nd Law of Thermodynamics • Calculate the change in entropy of an equilibrium from enthalpy and temperature • Predict the sign of the entropy change in a reaction without knowing the entropies of formation • Calculate ΔS_{surr}, and predict the signs of ΔS_{sys} and ΔS_{univ} from data • Use $(\Delta H - T\Delta S)$ as a criteria for the spontaneity of reaction • Know Free Energy and its relation to spontaneity of a process • Calculate ΔG° for a reaction from ΔH° and ΔS° • Evaluate the effect of ΔH, ΔS, and T on spontaneity or reactions • Calculate $\Delta S^\circ_{\text{rxn}}$ from standard molar entropies (S°) • Calculate ΔG° for a reaction from the standard free energies of formation (ΔG_f°) • Calculate the non-standard change in free energy (ΔG) from ΔG° and Q values • Calculate the ΔG° at various temperatures other than 25°C • Calculate temperature at which a reaction becomes spontaneous • Calculate the equilibrium constant at various temperatures from ΔG° values | <p>Notes</p> <p>Notes</p> <p>Notes</p> <p>Notes</p> <p>Notes</p> <p>18.2-18.3</p> <p>18.3</p> <p>18.3</p> <p>18.3</p> <p>18.4</p> <p>Notes</p> <p>18.5</p> <p>18.5</p> <p>18.5</p> <p>18.5</p> <p>18.6</p> <p>18.8</p> <p>18.8</p> <p>Notes</p> <p>18.9</p> <p>18.9</p> |
| <u>CHAPTER 19</u> | |
| <ul style="list-style-type: none"> • Assign oxidation numbers and determine oxidized and reduced species in a redox reaction • Determine oxidizing and reducing agents in a redox reaction • Balance redox reactions in acidic or basic solutions using the half-reaction method • Know the characteristics of voltaic and electrolytic cells • Sketch a voltaic cell, assign electrodes and determine which half-reaction occurs at each • Interpret the shorthand notation for voltaic cells • Use standard reduction potentials to determine the standard cell potential (E°_{cell}) • Know the relationship of maximum work to the cell potential (E_{cell}) • Determine the relative strength of oxidizing and reducing agents from standard reduction potentials • Calculate ΔG° for a cell from its standard cell potential (E°_{cell}), and vice versa • Calculate equilibrium constant (K) from cell potential, and vice versa • Calculate the cell potential under non-standard conditions using Nernst equation • Sketch an electrolytic cell, assign electrodes and determine which half-reaction occurs at each • Predict the products of electrolysis for a molten salt mixture | <p>Notes</p> <p>Notes</p> <p>19.2</p> <p>Notes</p> <p>19.3</p> <p>19.3</p> <p>19.4</p> <p>Notes</p> <p>Notes</p> <p>19.5</p> <p>19.5</p> <p>19.6</p> <p>19.8</p> <p>19.8</p> |