Things to Memorize: Thermodynamics

Modes of Heat Transfer

- There are three modes of heat transfer:
  - **Conduction** - When objects are in physical contact. Metals in particular are quite good at this.
  - **Convection** - Is due to the flow of a fluid. Liquids, gasses, and plasmas are all fluids.
  - **Thermal Radiation** is heat transfer due to electromagnetic waves (usually infrared, but can be other types as well.) This is the only mode that does not require a *medium*.

Kinetic Theory

- The temperature of a gas is related to the average kinetic energy of the atoms or molecules in the gas.
  - As the speed of molecules increases, the temperature increases.
  - When molecules collide with their surroundings (such as a container), some of the energy is transferred out of the gas, causing the temperature to decrease.

PV Diagrams

- The area under a PV diagram is work.
- Be extra careful with units and powers of ten on this type of graph.

Heat and Internal Energy

- Heat (Q) must be transferred from one object to the other.
- Internal Energy (or internal thermal energy) is the total kinetic energy of all the molecules in a gas. It affects temperature.

Laws of Thermodynamics

- **0^{th} Law**:
- **1^{st} Law**:
- **2^{nd} Law**:

Gas Laws

- The Combined Gas Law: $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$
- The Ideal Gas Law