1. Everything in the previous study guides
2. Heat and temperature

What are heat and temperature?

What are their units?

Deferent unit systems to measure temperature: ºC, ºF, K and the conversion of units.

Thermal expansion.

Specific heat. (Problem solving: mixing of substances of different temperatures.)

How is the heat transferred between substances? Conduction, convection and radiation. What are the quantitative relations in some ways (conduction or radiation) of transferring heat?

3. Ideal Gas:

What are the variables to describe the state of an ideal gas? Pressure, Volume, Temperature, and mole number. What are some other state variables - Internal energy

What is the equation for ideal gas? And what is R?

What is internal energy? How does it related with temperature?

What is heat and work? What are their signs and what are their relation with P,V and T?

Graphically describe a process. (P-V, V-T and P-T graph)

What are examples of common processes of isobaric, isothermal, isochoric, and adiabatic? What do they look like graphically? What are the work, heat and internal energy in all the above process?

Thermodynamics first law: $\Delta U+W=Q$ Is this work W here the work done **by** the gas **to** external world or done **to** the gas **by** external world?

How do we calculate them from a P-V graph or any other graph?

What are the U, Q, W for a complete cycle consisting of various processes?

4. Simple Harmonic motion and wave

Position vs time equation for simple harmonic motion.

Condition of simple harmonic motion happens.

Wave equation.

Parameters related with waves: amplitude, phase, frequency, wave velocity, wavelength. Are any of them depend on each other or do they have any relationship among them?

5. Interference of waves and Doppler effect. (Qualitative only)