

AOSC 431 Mid-Term #2 (11/1/16) Potential Topics (FALL 2016)

1. First Law of Thermodynamics
 - a. General application. Build on material from first mid-term.
2. Dry adiabatic processes and Poisson's equation
 - a. Be able to derive from first law
 - b. Application to compute T or P
 - c. Potential temperature with reference pressure of 1000mb
 - d. Conservation, dry adiabatic, on a skew-T
 - e. Dry adiabatic lapse rate (g/c_p), know where this comes from
3. Heat engines
 - a. Relevance, be able to describe
 - b. Carnot cycle, examples in atmosphere (hurricane, Hadley circulation)
4. Enthalpy
 - a. Describe in words, state variable
 - b. Conservation, dry static energy
5. Work and energy on a skew T
6. Entropy
 - a. dq/T , state variable, be able to describe
7. Water vapor saturation
 - a. Be able to describe process
 - b. Sub/Super/Saturated
 - c. Saturation vapor pressure
 - d. Relevant moisture variables: RH, dew point temperature
8. Latent Heating
 - a. Be able to describe, Constants will be given
9. Clausius-Clapeyron Equation
 - a. Be able to identify
 - b. Apply to compute saturation vapor pressure, dew point temperature, etc.
 - c. Vapor pressure with respect to ice versus liquid
 - d. Saturation mixing ratio
10. Moisture variables on Skew-T
 - a. T, T_d , w, w_s , dew point depression
 - b. LCL
 - c. Moist adiabats
 - d. Equivalent potential temperature
 - e. Wet bulb temperature

Constants as needed will be provided. It is expected that students can work through some of the important, simpler derivations.

However, students should be able to interpret equations, describe the contents, and manipulate/rearrange to solve problems. Students should also know the names of equations (i.e. hydrostatic) and how to apply them when they are provided.