

Homework Atmosphere:

(Declarative Knowledge)

SWYK Quiz

SYST 460

Atmosphere

What is an atmosphere?

- A. A layer of fluids surrounding an object.
- B. A layer of gas surrounding a planet or moon.
- C. A cloud of gas that allows us to breathe.
- D. A layer of oxygen that surrounds a planet or moon.

What is the most common gas in the atmosphere?

- A. oxygen
- B. carbon dioxide
- C. nitrogen
- D. methane

What gas makes up around 21% of our atmosphere?

- A. methane
- B. oxygen
- C. nitrogen
- D. carbon dioxide

What happens to temperature as you go higher in the troposphere?

- A. it gets hotter
- B. it gets colder
- C. it stays the same
- D. it is always changing

What happens to temperature as you go higher in the stratosphere?

- A. it stays the same
- B. it gets hotter
- C. it gets colder
- D. it is always changing

What makes up less than 1% of the atmosphere

- A. oxygen
- B. nitrogen
- C. carbon dioxide
- D. water vapor and other gases

Homework Atmosphere:

(Procedural Knowledge)

- 1) Plot Normalized Temperature, Pressure, Density, and Sonic Velocity θ , δ , σ , a (x-axis) vs Altitude (y-axis from -1000 ft to 43,000 ft) for Standard Atmosphere.

See equations and constants from Slides 16 and 17.

- 2) Using the data from the plot compute the Standard Atmosphere Temperature (i.e. T) at H=20,000, 30, 000 and 40, 000 ft. Report results in Fahrenheit and Celsius

Note: $T_{(^{\circ}R)} = \theta * T_0$

Note: $T_0 = 518.67$

Note: Conversion from Rankine to Fahrenheit $\rightarrow T_{(^{\circ}F)} = T_{(^{\circ}R)} - 459.67$

Note: Conversion from Rankine to Celsius $\rightarrow T_{(^{\circ}C)} = (T_{(^{\circ}R)} - 491.67) \times 5/9$

- 3) The ISA model is used as a reference to compare actual atmospheric conditions. When the actual atmospheric conditions are different they are described by the term Delta ISA (Δ ISA). For example, if at 30,000 ft the actual temperature is -55 degrees F and ISA temperature is -66 degrees F, the Delta ISA is Actual Temp – Standard Temp (i.e. -55 – (-66) = +11 degrees).

Define Delta ISA when actual Temperature is -55 degrees F at H=20,000, 30, 000 and 40, 000 ft.