

MET 200 Atmospheric Processes & Phenomena

Fall 2013

Study Guide for Quiz 1

The lectures that will be covered in the quiz include:

Intro lecture, scientific method, observing the atmosphere

Chapter 1

Temperature, and heat transfer

Chapter 2 + p 198-204

Nature of radiation, heat balance

Chapter 2

Seasons and diurnal cycles in Hawaii

Chapter 3

Importance of water, heat capacity, latent heat

Chapter 4

Humidity/hydrological cycle

Chapter 4

Cloud formation

Chapter 5

I will provide a list of equations that will be useful for the quiz and will include the value of all constants in these equations. The following questions will be covered in the quiz.

- What do we mean by the word science?
- What are the advantages and disadvantages for each of polar and geostationary orbits?
- What are the strengths and weaknesses of each of three types of satellite images posted on <http://weather.hawaii.edu> and discussed in lecture? What distinguishes these three types of images?
- Weather maps use UTC time. What is this and how does it compare with HST?
- What are isobars and isotherms?
- Can you define force? energy? work? power? what are the units of each?
- What is the difference between kinetic energy and potential energy?
- How are pressure and temperature related?
- What is the difference between heat capacity, specific heat, latent heat and sensible heat?
- How is heat transferred in the atmosphere?
- Can you give a summary of the laws of radiation (see lecture 3)?
- Given the temperature of two objects (planets, stars, etc.), compare the radiant emissions (per m^2) at the surface of each.
- Given the temperature of an object, what will the wavelength of maximum radiant energy be?
- What is the solar constant for Mars? With that knowledge, what is the surface temperature of Mars neglecting its thin atmosphere?
- What is albedo? What is a black body?
- What is at the heart of all the unusual physical properties of water?
- What does the saturation vapor pressure depend on?
- How is relative humidity calculated?
- What is the best time of day to water your lawn? Why?
- What is the difference between mixing ratio, specific humidity?
- What is the difference between dew point, and wet bulb temperature?
- Why is the SW coast of the US drier than the SE coast of the US?
- What is needed for cloud formation?
- What is the impact of surface tension on cloud drop formation?
- What are common mechanisms for cooling the air?