

Chapters 1 through 5 – Exam Thursday 2/16/2017

Worth 100 points Multiple Choice & True/False Questions

You are responsible for the following words:

<p>Chapter 1 troposphere stratosphere mesosphere thermosphere ionosphere temperature inversion ozone aerosols carbon dioxide radiosonde weather climate air pressure air density</p>	<p>Chapter 2 albedo thermals Kelvin Scale Fahrenheit Scale Celsius Scale ultraviolet radiation Infrared radiation black body aurora borealis aurora australis summer solstice winter solstice vernal equinox autumnal equinox greenhouse effect</p>	<p>Chapter 3 radiation cooling isotherm daily range of temperature annual range of temperature mean daily temperature mean annual temperature heating degree-day cooling degree-day growing degree-day wind-chill index</p>
<p>Chapter 4 advection fog radiation fog upslope fog evaporation fog dew-point temp relative humidity hydrologic cycle saturated air condensation evaporation precipitation transpiration frost dew virga</p>	<p>Chapter 5 adiabatic process dry adiabatic rate moist adiabatic rate environmental lapse rate absolutely stable absolutely unstable conditionally stable orographic uplift rain shadow cloud seeding collision-coalescence ice-crystal (Bergeron) Process supercooled droplet</p>	<p>Chapter 5 (con't) ice nuclei sleet drizzle freezing rain (glaze) rime virga</p>

Make flash cards, re-write your notes, have friends quiz you... do whatever you need to do to know these words!

TOP 20 TOPICS YOU NEED TO KNOW (Ch 1 and Ch 2)

- 1) Composition of the First Atmosphere of the Earth
- 2) Composition of the Primeval Atmosphere
- 3) Composition of the Modern (current) Atmosphere (Gases and Particles)
- 4) Layers and Boundaries of the Atmosphere (names), how and why temperature changes with height
- 5) How and Why Pressure changes with increasing height, know standard surface pressure value
- 6) The difference between weather and climate
- 7) Definition of Temperature and Heat, know the different temperature scales (boiling & freezing)
- 8) Know when energy is absorbed or released during changes of state (e.g. solid→liquid→gas)
- 9) Methods of Heat Transfer (Conduction, Convection, Radiation)
- 10) Types of Electromagnetic Radiation
- 11) Know what wavelength the Sun and Earth predominately emit
- 12) Know the THREE Laws of Radiation
- 13) Know what the “Atmospheric Window” Is
- 14) Be able to explain/describe the Greenhouse Effect and which Gases are responsible
- 15) Know the difference between reflection, scattering, absorption and emission.
- 16) Know what “Albedo” means, and what the Earth’s albedo is
- 17) Be able to describe how clouds interact with radiation (warming and/or cooling the Earth)
- 18) Be able to describe Earth-Sun relationships (rotation, revolution, eccentricity, tilt)
- 19) Know why we have seasons (and what would change them – stronger or weaker)
- 20) Understand the Seasons, Equinoxes, Solstices and Length of Daylight

Ch 1 & 2 EXAMPLE True or False:

These questions are based on the lecture notes and text book readings. Below are some examples of the types of questions I could ask. They, obviously, won’t be the exact ones on the midterm but something similar.

Examples:

- | | | |
|---|------|-------|
| 1) Temperature increases in the stratosphere due to ozone. | True | False |
| 2) The sun emits gamma radiation but not radio waves. | True | False |
| 3) The albedo of the Earth is 0.8. | True | False |
| 4) Ultraviolet radiation has a shorter wavelength than AM radio waves. | True | False |
| 5) The intensity of the seasons would change if the Earth’s tilt changed. | True | False |
| 6) Greenhouse gasses cool the Earth. | True | False |
| 7) Clouds are only responsible for warming the Earth. | True | False |
| 8) The Aurora Borealis is located in the Ionosphere. | True | False |
| 9) Dust and volcanic ash are considered aerosols. | True | False |
| 10) The Celsius scale has 180 divisions between boiling and freezing. | True | False |

Ch 1 & 2 EXAMPLE Multiple Choice:

- 11) The layer of the atmosphere that interacts with radio waves is:
a. Mesosphere b. Stratopause c. Ionosphere d. Troposphere
- 12) Which temperature is referred to as the “absolute scale”?
a. Celsius b. Kelvin c. Fahrenheit d. centigrade
- 13) The sun emits the majority of its energy as what type of radiation?
a. Visible b. Microwave c. Infrared d. Ultra Violet

- 14) During which process is energy released into the environment?
 a. Evaporation b. Condensation c. Sublimation d. Melting
- 15) During which celestial event is the Earth farthest from the sun and pointed towards the sun?
 a. Winter Solstice b. Vernal Equinox c. Summer Solstice d. Autumnal Equinox

TOP 25 TOPICS YOU NEED TO KNOW (Ch 3, Ch 4 and Ch 5)

- 1) Explain why at the surface during the day the air heats up and at night the air cools down.
- 2) Be able to explain what a temperature inversion is.
- 3) Be able to describe the different timescales we average temperature over and why.
- 4) Be able to list and briefly describe the various controls of temperature.
- 5) Be able to identify the effects of solar heating and ocean currents on global temperature.
- 6) Be able to draw a sketch showing changes in temperature over 24 hours with and without clouds.
- 7) Be able to describe the use of and how to calculate: heating, cooling and growing degree-days
- 8) Explain what the wind-chill index is and how it is used.
- 9) Be able to draw a simple sketch of “the hydrologic cycle” and explain each part
- 10) Know if energy is released or required for the various aspects of the hydrologic cycle.
- 11) Be able to differentiate between the different measurements of humidity.
- 12) Know what the term “saturated” means and how it is connected to humidity and the water cycle.
- 13) Be able to describe what the term dew-point temperature means and how it is related to clouds.
- 14) Be able to differentiate between dew and frost and explain how each is formed.
- 15) Be able to identify, describe and sketch the different types of fog.
- 16) Be able to identify the different cloud types in photographs and know their approximate heights.
- 17) Know the difference between the dry, moist and environmental lapse rates.
- 18) Describe differences between conditionally stable, absolutely stable and absolutely unstable air.
- 19) Know the “recipe” for making a cloud.
- 20) Be able to identify and draw the four primary ways for causing air to rise.
- 21) Be able to describe and sketch a diagram for the collision-coalescence process.
- 22) Be able to describe and sketch a diagram for the ice-crystal (Bergeron) process.
- 23) Where on earth does the collision-coalescence process dominate? The Bergeron process?
- 24) Describe the vertical atmospheric conditions require for the different types of precipitation.
- 25) Be able to describe the process and draw a diagram for hail stone formation.

Ch 3, 4 & 5 EXAMPLE True or False:

These questions are based on the lecture notes and text book readings. Below are some examples of the types of questions I could ask. They, obviously, won’t be the exact ones on the quiz but something similar.

Examples:

- | | | |
|---|------|-------|
| 1) Altocumulus clouds are composed only of ice | True | False |
| 2) Growing degree-days are crop dependent. | True | False |
| 3) Radiation fog is the dominant fog type found in the Great Plains. | True | False |
| 4) Air is saturated when temperature and dew point temperature are equal. | True | False |
| 5) Frost is frozen dew. | True | False |
| 6) The dominate type of fog in coastal northern CA is upslope fog. | True | False |
| 7) Rain drops are teardrop shaped. | True | False |
| 8) The DALR and WALR are both used for rising air. | True | False |

- | | | |
|---|------|-------|
| 9) Relative Humidity describes the actual water content in the air. | True | False |
| 10) Cold air can “hold” more water vapor than warm air. | True | False |
| 11) Lenticular clouds are always found over the open ocean. | True | False |
| 12) A cooling degree-day occurs when temperatures are under 65°F. | True | False |

Ch 3, 4 & 5 EXAMPLE Multiple Choice:

- 13) The Dry Adiabatic Lapse Rate is:
- | | |
|------------------|----------------|
| a. 10°F/ 1000 m | b. 1°C/1000 m |
| c. 10°F/ 1000 ft | d. 10°C/1000 m |
- 14) Collision-Coalescence is the process which describes
- | | |
|---------------------|------------------------|
| a. CCN activation | b. cloud development |
| c. aurora formation | d. warm rain formation |
- 15) Which term is not associated with icy precipitation types
- | | |
|----------------|-------------|
| a. fallstreaks | b. flurries |
| c. virga | d. blizzard |
- 16) Hailstones form in which type of clouds?
- | | |
|-------------|-----------------|
| a. cirrus | b. cumulonimbus |
| c. mammatus | d. stratus |
- 17) In an unstable atmosphere, a lifted parcel of air will tend to _____.
- | | |
|---------|--------------------------------|
| a. rise | b. remain at the same level |
| c. sink | d. advect to a colder location |