ATMO 101 – Weather and Climate Midterm Study Sheet

Chapters 1 through 5 – Exam Thursday 2/15/2018

Worth 100 points Multiple Choice & True/False Questions

You are responsible for the following words:

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

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.

<u>Examples:</u>

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