Name: _____

NATS 101 Introduction to Weather and Climate, Section 54, Fall 2005
Homework #2: Due at beginning of lecture Thursday, 6 October 2005.

1. When a water droplet forms in a cloud, is heat energy *taken from* or *released into* the air around it? Explain your answer. [5]

2. Which would have a greater impact on the greenhouse effect, removing all the CO_2 from the atmosphere or removing all the H_2O? Explain your answer. (Hint: see Fig. 2.9 in your book.) [5]

3. Why is the daily temperature range less on days with low (stratus) clouds than on days with high (cirrostratus) clouds? (Hint: which cloud is colder?) [5]

4. How is it that air in the Arctic can have a higher relative humidity than air in the desert of Arizona but contain less water vapor? [5]

5. Describe the following cloud types and indicate at what level(s) they are observed in the atmosphere: [18]

a. Cumulus

b. Stratus

c. Cirrus

d. Cumulonimbus

e. Altostratus

f. Cirrocumulus

6. Why do you see your breath on a cold morning? (Hint: you cannot see water vapor only liquid water droplets.) [5]

7. Under which set of conditions would you expect laundry hanging out on a line to dry most quickly? [5]

	Air Temperature (°F)	Relative Humidity	Wind Speed (MPH)
a.	60	75%	20
b.	40	75%	20
c.	60	50%	20
d.	40	50%	10
e.	60	75%	10

8. Why are evaporative coolers popular in Arizona? Why are they *not* as popular during the summer months (monsoon season)? (Hint: Is evaporation a heating or a cooling process?) [6]

9. Which of the following is *not* conserved as a parcel is raised *dry* adiabatically? [5]

a. mixing ratio

b. absolute humidity

c. heat content

d. relative humidity

10. The percentage of water vapor in the air relative to saturation is [5]

a. mixing ratio

b. absolute humidity

c. relative humidity

d. specific humidity

11. A high water vapor pressure indicates [5]

a. a relatively large number of water vapor molecules in the air

b. a relatively small number of water vapor molecules in the air

c. a relatively high rate of evaporation

d. an abundant supply of condensation nuclei in the air

12. Which of the following would cause relative humidity to decrease? [5]

a. cooling the air

b. warming the air

c. increasing the actual water vapor pressure

d. decreasing the saturation water vapor pressure

13. As the air temperature increases, with no addition of water vapor to the air, the dew point will [5]

a. remain the same

b. increase

c. decrease

d. increase and become equal to the air temperature

14. The term “cirro” tells you something about a cloud’s [5]

a. composition

b. appearance

c. altitude

d. motion

15. Which cloud types as associated with rain? What term in their name refers to rain? [5]

16. Use the following data to plot the environmental temperature profile on the blank skew-T form provided. Also plot the environmental dew point profile. What is the surface mixing ratio? At what level (in mb) is the condensation level?

Pressure (mb)	Air Temperature (°C)	Dew Point (°C)
1000	26.7	21.9
950	22.9	20.1
902	20.3	18.3
851	17.9	15.6
803	15.8	13.0
750	13.7	9.2
701	10.1	5.7
652	6.2	4.6
602	2.7	0.8
502	-4.7	-8.0
400	-14.3	-22.0
300	-31.2	-43.5
200	-53.7	-62.6
100	-74.5	-84.7