Name: _____ Student ID Number _____

ESS55: Earth's Atmosphere / Homework #7 (due 5/28/2009)

Multiple Choice
Identify the letter of the choice that best completes the statement or answers the question.

____ 1. The fog that forms along the Pacific coastline of North America is mainly this type:
a. radiation fog
b. upslope fog
c. frontal fog
d. advection fog
e. steam fog

____ 2. Fog that forms off the coast of Newfoundland is mainly a form of:
a. advection fog
b. frontal fog
c. steam fog
d. radiation fog
e. upslope fog

____ 3. If fog is forming at Denver, Colorado, and the wind is blowing from the east, then the fog is most likely:
a. advection fog
b. frontal fog
c. upslope fog
d. radiation fog

____ 4. In middle latitudes, which cloud will have the highest base?
a. cirrostratus
b. cumulonimbus
c. altostratus
d. cumulus

____ 5. Which of the following associations is <u>not</u> correct?
a. altostratus - middle cloud
b. cirrus - high cloud
c. stratocumulus - cloud of vertical development
d. cirrocumulus - high cloud
e. cumulonimbus - cloud of vertical development

____ 6. In middle latitudes, which cloud will have the lowest base?
a. cirrostratus
b. stratocumulus
c. altocumulus
d. cirrus

____ 7. Cirrus clouds are composed primarily of:
a. water droplets
b. water vapor
c. ice particles
d. salt aerosols

____ 8. An anvil-shaped top is most often associated with:
a. cumulonimbus
b. cumulus congestus
c. altocumulus
d. cumulus humilis

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____ 9. Hail is usually associated with what cloud?
   a. stratus
   b. cumulus
   c. stratocumulus
   d. altocumulus
   e. cumulonimbus

____ 10. The cloud with the greatest vertical growth is:
   a. cumulus congestus
   b. cumulus humilis
   c. cumulonimbus
   d. cirrocumulus

____ 11. If the environmental lapse rate is 5^{o} C per 1000 m and the temperature at the earth's surface is 25^{o} C, then the air temperature at 2000 m above the ground is:
   a. 25^{o} C
   b. 30^{o} C
   c. 20^{o} C
   d. 15^{o} C

____ 12. If a parcel of unsaturated air with a temperature of 30^{o} C rises from the surface to an altitude of 1000 m, the unsaturated parcel temperature at this altitude would be about:
   a. 10^{o} C warmer than at the surface
   b. 10^{o} C colder than at the surface
   c. 6^{o} C colder than at the surface
   d. impossible to tell from the data given

____ 13. If an air parcel is given a small push upward and it falls back to its original position, the atmosphere is said to be:
   a. stable
   b. unstable
   c. isothermal
   d. neutral
   e. adiabatic

____ 14. The rate at which the actual air temperature changes with increasing height above the surface is referred to as the:
   a. environmental lapse rate
   b. dry adiabatic rate
   c. moist adiabatic rate
   d. thermocline

____ 15. A rising parcel of air that does not exchange heat with its surroundings is an example of
   a. isothermal ascent
   b. an adiabatic process
   c. forced lifting
   d. advection

____ 16. The rate at which the temperature changes inside a rising (or descending) parcel of <u>saturated</u> air is called the:
   a. environmental lapse rate
   b. dry adiabatic lapse rate
   c. moist adiabatic lapse rate
   d. latent heat release rate

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____ 17. At the earth's surface, a rising saturated air parcel would cool most rapidly when its temperature is:
   a. 10 °F
   b. 32 °F
   c. 50 °F
   d. 68 °F
   e. 80 °F

____ 18. The difference between the "moist" and "dry" adiabatic rates is due to:
   a. the fact that saturated air is always unstable
   b. the fact that an unsaturated air parcel expands more rapidly than a saturated air parcel
   c. the fact that moist air weighs less than dry air
   d. the fact that latent heat is released by a rising parcel of saturated air

____ 19. The dry adiabatic lapse rate is _____ greater than the moist adiabatic lapse rate.
   a. never
   b. sometimes
   c. always

____ 20. Most thunderstorms do not extend very far into the stratosphere because the air in the stratosphere is:
   a. unstable
   b. stable
   c. too cold
   d. too thin
   e. too dry

____ 21. Which set of conditions, working together, will make the atmosphere the most <u>stable</u>?
   a. cool the surface and warm the air aloft
   b. cool the surface and cool the air aloft
   c. warm the surface and cool the air aloft
   d. warm the surface and warm the air aloft

____ 22. If the environmental lapse rate is less than the moist adiabatic rate, the atmosphere is:
   a. conditionally unstable
   b. absolutely stable
   c. absolutely unstable
   d. neutrally stable

____ 23. Which of the following environmental lapse rates would represent the most <u>unstable</u> atmosphere in a layer of unsaturated air?
   a. 3° C per 1000 m
   b. 6° C per 1000 m
   c. 9° C per 1000 m
   d. 11° C per 1000 m

____ 24. In a conditionally unstable atmosphere, the environmental lapse rate will be _____ than the moist adiabatic rate and _____ than the dry adiabatic rate.
   a. greater, less
   b. greater, greater
   c. less, greater
   d. less, less

____ 25. If an air parcel is given a small push upward and it continues to move upward on its own accord, the atmosphere is said to be:
   a. stable
   b. unstable
   c. buoyant
   d. dynamic

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____ 26. A completely dry air parcel which first rises and cools, and subsequently sinks and warms, is undergoing
   a. an irreversible pseudoadiabatic process
   b. a reversible adiabatic process
   c. an irreversible adiabatic process

____ 27. The most latent heat would be released in a _____ parcel of _____ saturated air.
   a. rising, warm
   b. rising, cold
   c. sinking, warm
   d. sinking, cold

____ 28. An adiabatic chart is a useful tool for determining
   a. a station model
   b. isobars
   c. the wind speed
   d. the lifting condensation level

____ 29. The name commonly used to describe the drier region observed on the downwind (leeward) side of a mountain range is:
   a. orographic
   b. inversion region
   c. rain shadow
   d. compression region

____ 30. The temperature an air parcel would have if it were moved to a pressure of 1000 mb at the dry adiabatic rate is called the :
   a. descending temperature
   b. adiabatic temperature
   c. potential temperature
   d. dew point temperature
   e. base temperature

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Answer Section

MULTIPLE CHOICE

1. D
2. A
3. C
4. A
5. C
6. B
7. C
8. A
9. E
10. C
11. D
12. B
13. A
14. A
15. B
16. C
17. A
18. D
19. C
20. B
21. A
22. B
23. D
24. A
25. B
26. B
27. A
28. D
29. C
30. C

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D 1.

A 2.

C 3.

A 4.

C 5.

B 6.

C 7.

A 8.

E 9.

C 10.

D 11.

B 12.

A 13.

A 14.

B 15.

C 16.

A 17.

D 18.

C 19.

B 20.

A 21.

B 22.

D 23.

A 24.

B 25.

B 26.

A 27.

D 28.

C 29.

C 30.