

10. An inversion represents an extremely stable atmosphere because a parcel of air that rises into an inversion will eventually become \_\_\_\_\_ and \_\_\_\_\_ dense than the air surrounding it.
- warmer, more
  - warmer, less
  - colder, more
  - colder, less
11. Subsidence inversions are best developed with \_\_\_\_\_ pressure areas because of the \_\_\_\_\_ air associated with them.
- high, sinking
  - high, rising
  - low, sinking
  - low, rising
12. The moist adiabatic rate is different from the dry adiabatic rate because:
- saturated air is always unstable
  - an unstable air parcel expands more rapidly
  - unsaturated air is always stable
  - latent heat is released inside a parcel of rising saturated air
  - a parcel of saturated air weighs less than a parcel of unsaturated air

### True-False

- \_\_\_\_\_ 1. Convection can take place over water.
- \_\_\_\_\_ 2. Most thunderstorms do not penetrate very far into the stratosphere because the stratosphere is a layer of unstable air.
- \_\_\_\_\_ 3. Air motions tend to be downward around the outside of a cumulus cloud.
- \_\_\_\_\_ 4. A conditionally unstable atmosphere is stable with respect to unsaturated air and unstable with respect to saturated air.
- \_\_\_\_\_ 5. Radiational cooling of the surface at night tends to make the lower atmosphere unstable.
- \_\_\_\_\_ 6. When cloud elements become arranged in rows they are called cloud streets.
- \_\_\_\_\_ 7. In a conditionally unstable atmosphere, the environmental lapse rate will be greater than the moist adiabatic rate and less than the dry adiabatic rate.
- \_\_\_\_\_ 8. Lowering an entire layer of air will generally make it more unstable.
- \_\_\_\_\_ 9. Warming the air aloft will tend to make the atmosphere more unstable.
- \_\_\_\_\_ 10. If you were to take a trip this summer from Ohio to Nevada, you would probably observe the bases of afternoon cumulus clouds increasing in height above the ground as you travel westward.

**Fill in the Blank**

1. The merging of cloud droplets by collision is called \_\_\_\_\_.
2. An amount of precipitation measured to be less than one hundredth of an inch is called a \_\_\_\_\_.
3. The two main substances used in cloud seeding are \_\_\_\_\_ and \_\_\_\_\_.
4. The growth of a precipitation particle by the collision of an ice crystal or snowflake with a liquid droplet at temperatures below freezing is called \_\_\_\_\_.
5. A cold raindrop (or partially melted snowflake) that freezes into a pellet of ice in a deep, subfreezing layer of surface air is called \_\_\_\_\_.
6. Water droplets that exist at temperatures below freezing are said to be \_\_\_\_\_.
7. Cold rain that falls through a rather shallow layer of subfreezing air and freezes upon striking a surface is called \_\_\_\_\_.
8. Rain that falls from a cloud but evaporates before reaching the surface is called \_\_\_\_\_.
9. The process of ice crystals (or snowflakes) sticking together is called \_\_\_\_\_.

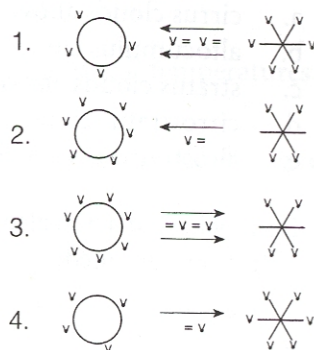
**Multiple Choice**

1. Brittle, crunchy pieces of snowlike ice that usually fall as a shower from a cumuliform cloud are:
  - a. sleet
  - b. freezing rain
  - c. snow grains
  - d. snow pellets
  - e. hail
2. When the atmospheric relative humidity is below 100 percent, liquid cloud droplets may grow larger by condensation because of the:
  - a. solute effect
  - b. water effect
  - c. curvature effect
  - d. hydrophobic effect
  - e. adiabatic effect

3. Which of the adjacent illustrations best describes the ice-crystal process of rain formation?

- a. 1
- b. 2
- c. 3
- d. 4

Droplet                      Ice Crystal



Note: v is a water vapor molecule.

4. Of the clouds listed below, which would most likely produce drizzle?

- a. cumulus
- b. stratus
- c. altostratus
- d. cumulus congestus
- e. cumulonimbus

5. If it is raining on one side of the street but not on the other, it is a good bet that the rain is falling from:

- a. a nimbostratus cloud
- b. an altocumulus cloud
- c. a stratus cloud
- d. an altostratus cloud
- e. a cumulonimbus cloud

6. Which of the following is *not* considered an important factor in the production of rain by the collision-coalescence process?

- a. the updrafts in the cloud
- b. the number of ice crystals in the cloud
- c. the cloud thickness
- d. the relative size of the droplets
- e. the cloud's liquid water content

7. Which below best describes the shape of a large falling raindrop about 5 mm (5000 micrometers) in diameter?

- a. spherical
- b. tear drop
- c. square
- d. elongated like that of a cylinder
- e. slightly elongated and flattened on the bottom

8. Which of the following conditions would be most suitable for natural cloud seeding?
  - a. cirrus clouds above altostratus clouds
  - b. altocumulus clouds above stratus clouds
  - c. stratus clouds above ground fog
  - d. cirrostratus clouds above stratocumulus clouds
  - e. altostratus clouds above stratus clouds
  
9. Lumpy ice particles, also known as snow pellets, that form in a cloud usually by the process of accretion are called:
  - a. sleet
  - b. glaze
  - c. graupel
  - d. snow grains
  - e. snow flakes
  
10. Hail forms inside this cloud:
  - a. castellanus
  - b. cumulonimbus
  - c. stratocumulus
  - d. cumulus humilis
  - e. lenticular
  
11. The freezing of supercooled droplets by contact with a nucleus is called:
  - a. coalescence
  - b. riming
  - c. homogeneous freezing
  - d. contact freezing

### True-False

- \_\_\_ 1. It is never too cold to snow.
- \_\_\_ 2. Ice nuclei are more abundant than condensation nuclei.
- \_\_\_ 3. You would use a wooden stick to measure rainfall in the tipping bucket rain gauge.
- \_\_\_ 4. Inside a cloud, when the relative humidity is 100 percent, larger cloud droplets evaporate more quickly than do the smaller cloud droplets.
- \_\_\_ 5. Snow can reach the surface when the surface air temperature is considerably above freezing as long as the surface air is not saturated.
- \_\_\_ 6. Doppler radar can measure rainfall intensity as well as the speed at which falling rain is moving horizontally toward or away from the radar antenna.
- \_\_\_ 7. Much of the rain that falls in middle and high latitudes of North America begins as snow.