

Elemental Geosystems, 5e (Christopherson)

Chapter 5 Atmospheric Water and Weather

1) Earth is properly characterized as

- A) the land planet.
- B) a small star.
- C) the water planet.
- D) lacking a hydrosphere.

Answer: C

2) Water covers some _____ of Earth's surface.

- A) 50 percent
- B) 90 percent
- C) 25 percent
- D) 71 percent

Answer: D

3) Which of the following is correct?

- A) A person can survive for 8 to 12 days without food.
- B) The human body is about 50 percent water by weight.
- C) Humans can survive only 2 or 3 days without water.
- D) Earth is covered some 50 percent by water.

Answer: C

4) Water has a density of

- A) 0.5 g/cm.
- B) 1 g/cm.
- C) 2.5 g/cm.
- D) 15 g/cm.

Answer: B

5) When water freezes, its density

- A) increases.
- B) decreases.
- C) remains the same as in the liquid state.

Answer: B

6) Earth's water supply originated from

- A) asteroids.
- B) outgassing from within the Earth.
- C) gases expelled from the Sun, i.e., solar wind.
- D) photosynthesis.

Answer: B

7) The present quantity of water on Earth was achieved approximately _____.

- A) one million years ago
- B) 500 million years ago
- C) two billion years ago
- D) 10,000 years ago (end of ice age)

Answer: C

- 8) Eustasy refers to
- A) worldwide changes in land masses.
 - B) a steady-state equilibrium in the water system.
 - C) changes in water distribution related to the increase or decrease in quantities of ice.
 - D) worldwide changes in sea level.

Answer: D

- 9) During the height of the last ice age, approximately 18,000 years ago, sea level
- A) rose by a few hundred feet.
 - B) dropped by a few hundred feet.
 - C) remained constant.

Answer: B

- 10) Which of the following is true of the distribution of land and water on Earth?
- A) The Southern Hemisphere is dominated by water.
 - B) The Northern Hemisphere is dominated by water.
 - C) They are evenly distributed in both hemispheres.
 - D) Most of the water on Earth is fresh water.

Answer: A

- 11) The largest portion of fresh water today is located in
- A) clouds.
 - B) groundwater resources.
 - C) ice caps and glaciers.
 - D) the major rivers and lakes of the world.

Answer: C

- 12) Earth's oceans possess
- A) most of the fresh water on Earth.
 - B) about the same amount of water as is in the atmosphere.
 - C) fifty percent of Earth's waters.
 - D) ninety-seven percent of Earth's waters.

Answer: D

- 13) Which is true regarding water in rivers, streams, and the atmosphere?
- A) They contain 0.033 percent of the world's fresh water supply.
 - B) The total amount of water in these locations is equal to $14,250 \text{ km}^3$ (3400 mi^3).
 - C) On average, a water molecule travels through the hydrologic cycle in less than two weeks.
 - D) All of these are correct.

Answer: D

- 14) Other than ice sheets and glaciers, the largest repository of fresh water is located in
- A) lakes and saline seas.
 - B) groundwater.
 - C) soil moisture storage.
 - D) rivers and streams.

Answer: B

15) Water molecules bind tightly to one another. This is a result of

- A) hydrogen bonding.
- B) covalent bonding.
- C) atomic friction.
- D) molecular hold.

Answer: A

16) If water behaved like other compounds,

- A) icebergs would sink to the bottom of the oceans.
- B) the whole iceberg would float just below the surface.
- C) it would shrink as it cooled and froze.
- D) all of the above
- E) A and C only

Answer: E

17) Water is a good solvent because

- A) it expands when it freezes.
- B) it has an asymmetrical charge distribution (one end is positive and the other negative).
- C) it undergoes phase changes over a relatively narrow range of temperatures.
- D) it is transparent.

Answer: B

18) Surface tension and capillarity are the result of

- A) hydrogen bonding between water molecules.
- B) covalent bonding.
- C) atomic friction.
- D) molecular hold.

Answer: A

19) Water movement through the soil and water held in a straw above the surface of the liquid you are drinking result from a common phenomenon. What is this phenomenon?

- A) barometric pressure
- B) surface tension
- C) capillarity
- D) vacuum suction

Answer: C

20) The term deposition refers to

- A) water freezing to ice.
- B) ice melting to water.
- C) vapor condensing into liquid.
- D) water vapor freezing to ice.

Answer: D

21) What is the heat energy involved in the change of state, or phase, in water?

- A) mechanical heat
- B) sensible heat
- C) fusion heat
- D) latent heat

Answer: D

22) Which of the following is true regarding the evaporation of water?

- A) The phase change involves the latent heat of sublimation.
- B) The phase change involves the latent heat of evaporation.
- C) The phase change involves the latent heat of deposition.
- D) The phase change involves the sensible heat of vaporization

Answer: B

23) Both the latent heat of melting (heat of fusion) and the latent heat of freezing involve the absorption or release of _____ calories per gram of water changing state.

- A) 80
- B) 100
- C) 540
- D) 585

Answer: A

24) Which of the following phase changes involves the greatest number of calories?

- A) melting
- B) evaporation
- C) sublimation
- D) condensation

Answer: C

25) When water condenses, it _____ heat energy and _____ the surrounding air.

- A) absorbs; cools
- B) absorbs; heats
- C) releases; cools
- D) releases; heats

Answer: D

26) When frost forms, it

- A) warms the air by releasing 680 calories of heat energy to the air per gram of water.
- B) warms the air by releasing 80 calories of heat energy to the air per gram of water.
- C) cools the air by releasing 680 calories of heat energy to the air per gram of water.
- D) cools the air by releasing 80 calories of heat energy to the air per gram of water.

Answer: A

27) When water evaporates, it _____ heat energy and _____ the surrounding air.

- A) absorbs; cools
- B) absorbs heats
- C) releases; cools
- D) releases; heats

Answer: A

28) In order to melt two grams of ice, how many calories of heat energy must be added to the ice during its phase change? (specific heat of water = 1 cal/gm; heat of fusion = 85 cal/gm) (heat of vaporization = 585 cal/gm; heat of sublimation = 670 cal/gm)

- A) 2
- B) 170
- C) 172
- D) 1170
- E) 1340

Answer: B

29) The process of sublimation in the atmosphere produces

- A) fog.
- B) freezing rain.
- C) snowflakes.
- D) sleet.

Answer: C

30) In winter, freezing water can break pipes and even crack engine blocks. Why does this happen?

- A) Water expands in volume as it freezes in response to hydrogen bonding.
- B) Ice is denser than water.
- C) Water contracts as it cools and freezes.
- D) It occurs because of the latent heat of fusion.

Answer: A

31) Most of the precipitation and evaporation on Earth takes place over the

- A) land masses.
- B) oceans.
- C) poles of the planet.
- D) ice caps and glaciers combined.

Answer: B

32) Water vapor in the atmosphere is called

- A) water.
- B) deposition.
- C) sublimation.
- D) humidity.

Answer: D

33) Relative humidity is

- A) the amount of water vapor in the air compared to the normal amount.
- B) the amount of moisture in the air relative to your own sensible feelings.
- C) the amount of water vapor in the air at a given temperature expressed as a percentage of the moisture capacity of the air.
- D) a basically unused concept when it comes to weather topics.

Answer: C

34) The capacity of the air to hold water vapor is basically a function of

- A) the temperature of both the water vapor and the air.
- B) the water vapor content.
- C) freezing temperature.
- D) latent heat.

Answer: A

35) A mass of air always becomes saturated when it reaches the

- A) highest temperature of the day.
- B) lowest temperature of the day.
- C) specific humidity point.
- D) dew-point temperature.

Answer: D

- 36) A humidity measure that remains constant as temperature and pressure change, and which is expressed as a mass of water vapor per mass (g/kg) of air, is
- A) specific humidity.
 - B) vapor pressure.
 - C) relative humidity.
 - D) the dew-point.

Answer: A

- 37) As temperature increases during the day, relative humidity usually
- A) increases.
 - B) decreases.
 - C) remains the same.

Answer: B

- 38) Which of the following is used to measure relative humidity?
- A) wet and dry barometers
 - B) a damp piece of paper
 - C) instruments using human hair, or wet and dry bulb thermometers

Answer: C

- 39) The greater the difference in temperature between the wet bulb and dry bulb on a sling psychrometer, the _____ the air is and the _____ the relative humidity.
- A) drier; higher
 - B) drier; lower
 - C) wetter; higher
 - D) wetter; lower

Answer: B

- 40) The elevation at which the bottoms of clouds begin to form represents the elevation at which
- A) dew point occurs.
 - B) relative humidity reaches 100 percent.
 - C) absolute humidity reaches 100 percent.
 - D) both A and B
 - E) both A and C

Answer: D

- 41) Which of the following normally would be true of the humidity above the tropical rain forests of the world?
- A) The specific humidity would be high.
 - B) The relative humidity would be high.
 - C) The saturation vapor pressure would be high.
 - D) All of these are true.
 - E) None of these are true.

Answer: D

- 42) The general term that refers to the tendency of a parcel of air to either remain in place or change its initial position is _____.
- A) adiabatic
 - B) stability
 - C) conditional instability
 - D) stasis

Answer: B

- 43) An air parcel is considered unstable when it
- A) either remains as it is, or changes its initial position.
 - B) continues to rise until it reaches an altitude at which the surrounding air has a similar density.
 - C) resists displacement upward.
 - D) ceases to ascend.

Answer: B

- 44) A dry air parcel that is rising because of heat energy derived from the surface is
- A) stable.
 - B) unstable.
 - C) conditionally unstable.

Answer: B

- 45) All adiabatic temperature changes occur as a result of
- A) the addition or removal of heat energy from the air.
 - B) changes in the absolute humidity of the air.
 - C) expansion or compression of the air.

Answer: C

- 46) When the environmental lapse rate is between the dry and moist adiabatic lapse rates conditions are described as
- A) adiabatic.
 - B) stable.
 - C) conditionally unstable.
 - D) unstable.

Answer: C

- 47) Assume a warm air parcel near Earth's surface has a temperature of 21 degrees C (70 degrees F) and begins to rise upward. Assume it becomes saturated at 1000 m (3300 ft) altitude, and continues to rise to 2000 m (6600 ft) altitude. What would the approximate temperature of the parcel be at an elevation of 2000 m (6600 ft)?
- A) 7 degrees C (44.6 degrees F)
 - B) 8 degrees C (46.4 degrees F)
 - C) 9 degrees C (48.2 degrees F)
 - D) 5 degrees C (41.0 degrees F)

Answer: D

- 48) Air that is not saturated will cool or heat at a rate of _____ as it rises or descends, respectively.
- A) 10C degrees per 1000 m (5.5F degrees per 1000 ft)
 - B) 6C degrees per 1000 m (3.3F degrees per 1000 ft)
 - C) 6.4C degrees per 1000 m (3.5F degrees per 1000 ft)

Answer: A

- 49) The wet adiabatic rate is _____ than the dry adiabatic rate because _____.
- A) greater; condensation heats the air
 - B) greater; condensation cools the air
 - C) less; condensation heats the air
 - D) less; condensation cools the air

Answer: C

- 50) Areas between 25 degrees to 35 degrees latitude usually become _____ because this area is dominated by air that is sinking and being _____.
- A) deserts; cooled by expansion
 - B) deserts; heated by compression
 - C) rain forests; cooled by expansion
 - D) rain forests; heated by compression

Answer: B

- 51) As air sinks down the leeward side of a mountain, it will move into a region of _____ air pressure and will therefore be _____ by compression.
- A) higher; heated
 - B) higher; cooled
 - C) lower; heated
 - D) lower; cooled

Answer: A

- 52) An individual raindrop consists of approximately _____ moisture droplets.
- A) 2
 - B) 100
 - C) 1 million
 - D) 1 trillion

Answer: C

- 53) The condensation process requires
- A) dew-point temperatures alone.
 - B) condensation nuclei and saturated air.
 - C) moisture droplets.
 - D) condensation nuclei alone.

Answer: B

- 54) Clouds that have vertical development and produce precipitation are called
- A) stratocumulus.
 - B) cumulonimbus.
 - C) nimbostratus.
 - D) cumulus.

Answer: B

- 55) Which type of cloud would dominate the weather in a region of tropical rain forests?
- A) cirrus
 - B) altostratus
 - C) cumulonimbus
 - D) cirrocumulus

Answer: C

- 56) Which of the following are correctly matched?
- A) flat or layered clouds cumulus
 - B) puffy or globular clouds cirroform
 - C) puffy or globular clouds cumuliform
 - D) wispy clouds water droplets

Answer: C

57) Which of the following is a middle-level cloud type?

- A) cirrostratus
- B) stratocumulus
- C) cumulonimbus
- D) altostratus

Answer: D

58) Which of the following is true regarding cirrostratus clouds?

- A) They look like patches of cotton balls, or cotton balls arranged in lines.
- B) The sun's outline is just visible through these clouds.
- C) They form a veil of ice crystals that creates a halo around the Moon.
- D) They are sharply outlined, and billowy.

Answer: C

59) Which cloud type is specifically a good indicator of an arriving storm, say within the next 24 hours?

- A) fog
- B) cumulus
- C) stratocumulus
- D) cirrus

Answer: D

60) Florida has the highest thunderstorm frequency in the U.S. because

- A) the Florida peninsula heats to high temperatures during the day.
- B) mT air masses surround the peninsula.
- C) frequent, strong cold fronts occur in the Florida area.
- D) all of the above
- E) A and B only

Answer: E

61) Which type of cloud would you most likely see on a regular basis in a subtropical desert during the summer?

- A) nimbostratus
- B) cirrus
- C) cumulonimbus
- D) altostratus

Answer: B

62) Which of the following is incorrectly matched?

- A) fog a stratus cloud that is high in elevation off the ground
- B) cP coldest weather conditions in the Midwest
- C) precipitation rain, sleet, snow, hail
- D) cloud droplets condensation nuclei and water

Answer: A

63) Cooling of a surface overnight that chills the air layer directly above that surface may form

- A) an advection fog.
- B) an upslope fog.
- C) an evaporation fog.
- D) a radiation fog.

Answer: D

- 64) Fog often lingers in river valleys because
- A) the water in the river cools off faster at night than the land does.
 - B) cold air sinks into low areas such as river valleys.
 - C) some evaporation may occur from the river, thereby supplying moisture to the cooler atmosphere.
 - D) both A and B
 - E) both B and C

Answer: E

- 65) A fog that develops when warm, moist air blows over a cold current (such as the California Current) is an example of _____ fog.
- A) radiation
 - B) convection
 - C) advection
 - D) evaporation

Answer: C

- 66) On cool spring mornings, veils of fog can often be seen rising above warm lakes and ponds. This type fog is an example of _____ fog.
- A) radiation
 - B) convection
 - C) advection
 - D) evaporation

Answer: D

- 67) A radiation fog is most likely to develop when
- A) the nighttime air is very warm.
 - B) the sky is full of stratus clouds.
 - C) the sky is clear.
 - D) both A and B
 - E) both B and C

Answer: C

- 68) Weather is
- A) the climate of a region.
 - B) the short-term condition of the atmosphere.
 - C) the long-term atmospheric condition, including extremes that may occur.
 - D) a reference to temperature patterns only.

Answer: B

- 69) The scientific study of the atmosphere is
- A) weather.
 - B) climate.
 - C) meteorology.
 - D) geography.

Answer: C

- 70) Which is not true of weather-related damage?
- A) The cost has increased 500% during the last 20 years.
 - B) The cost has reached \$10 billion annually.
 - C) The damage has never exceeded \$90 billion worldwide.
 - D) Damage from just Hurricane Katrina will exceed \$130 Billion.

Answer: C

- 71) Over the last two decades, costs for weather-related destruction has, on an annual basis,
- A) decreased.
 - B) increased two-fold.
 - C) increased five-fold.
 - D) stayed about the same.

Answer: C

- 72) The transition from the Ice Age to the present warm conditions can best be considered an example of
- A) a change in weather.
 - B) a change in climate.
 - C) changes in the midlatitude wave-cyclone cycle.
 - D) transition from a cold front to a warm front.

Answer: B

- 73) Which of the following is false regarding air masses?
- A) An air mass initially reflects the characteristics of its source region.
 - B) They are homogenous in terms of temperature and humidity.
 - C) They may dominate half the depth of the troposphere.
 - D) Air masses tend to maintain their original characteristics as they migrate from their source regions.

Answer: D

- 74) Air masses that develop over Canada are examples of _____ air masses.

- A) mT
- B) mP
- C) cT
- D) cP

Answer: D

- 75) A well-developed, newly formed cP air mass would have which of the following characteristics?

- A) cold temperatures
- B) clear skies
- C) high pressure
- D) all of the above
- E) none of the above

Answer: D

- 76) Which of the following pressure systems reside within the source region for mP air masses?

- A) Bermuda high and Pacific high
- B) Aleutian low and Icelandic low
- C) Bermuda high and Icelandic low
- D) Aleutian low and Pacific high

Answer: B

- 77) A mT air mass is likely to be _____ than a cT air mass because the mT air mass _____.

- A) wetter; is warmer than the cT air mass
- B) wetter; forms over the ocean
- C) drier; is a cold air mass
- D) drier; forms under the equatorial low
- E) hotter; forms over the ocean

Answer: B

78) With respect to the three main lifting (cooling) mechanisms (local heating, orographic, and frontal), which of the following is correct?

- A) The greatest average annual rainfall on Earth is due to local heating and frontal activity.
- B) A single convective storm triggered by local heating affects large geographical regions.
- C) We do not get all three mechanisms within the United States.
- D) Given the necessary physical requirements, orographic precipitation is usually the most consistent type of the three.

Answer: D

79) Lake effect snow involves

- A) heavy snowfall on the leeward shores of Great Lakes.
- B) heavy snowfall on the windward shores of the Great Lakes.
- C) cP and cA air masses being humidified and warmed by the Great Lakes.
- D) A and C only
- E) all of the above

Answer: D

80) Which of the following would result in the modification of the air mass?

- A) A mT air mass moving across Texas.
- B) A cP air mass moving across the Great Lakes.
- C) A cT air mass moving across the Gulf of Mexico.
- D) An cA air mass moving across the Gulf of Alaska.
- E) all of the above

Answer: E

81) The Intertropical Convergence Zone is characterized by

- A) cold, dry rising air.
- B) cold, dry sinking air.
- C) warm, dry rising air.
- D) warm, wet rising air.

Answer: D

82) Summer afternoon thundershowers in the southeastern United States are more than likely a result of

- A) convective lifting.
- B) orographic lifting.
- C) frontal lifting.
- D) subtropical high pressure disturbance.

Answer: A

83) Orographic refers to

- A) convection stimulated principally by local heating.
- B) lifting along the edges of conflicting air masses.
- C) air mass modification and the formation of secondary air masses.
- D) forced uplift due to the presence of a physical barrier.

Answer: D

- 84) Which of the following does not occur during the development of a Chinook wind? (Assume rain occurs near the mountain summit.)
- A) expansion of the air as it rises up the windward side of the mountain
 - B) decrease in specific humidity of the air near the summit
 - C) decrease in relative humidity during the air's ascent up the windward side
 - D) decrease in relative humidity on the leeward side
 - E) compressional heating of the air on the leeward side

Answer: C

- 85) The place on Earth with the highest annual average rainfall is located in
- A) the United States.
 - B) the Amazon Basin.
 - C) Southeast Asia.
 - D) equatorial Africa.

Answer: A

- 86) The record precipitation received in a single year was
- A) in the United States.
 - B) in the Amazon in Brazil.
 - C) on the slopes of the Assam Hills in India.
 - D) in Southeast Asia.

Answer: C

- 87) The highest rainfall in the world occurs in an area where rainfall is generated by
- A) advective cooling of air masses over cold ocean currents.
 - B) orographic uplift of warm, moist air.
 - C) convective uplift of warm, moist air.
 - D) radiative cooling of cold, moist air.

Answer: B

- 88) The wetter, intercepting slope of a mountain is termed the _____ slope, whereas the drier, downwind slope is termed the _____ slope.
- A) left side; right side
 - B) west side; east side
 - C) windward; leeward
 - D) leeward; windward

Answer: C

- 89) Which of the following statements is true?
- A) When air is cooled, its ability to hold moisture decreases.
 - B) There is greater precipitation near the equator than near the poles.
 - C) Winters in Siberia should be very dry, with little precipitation.
 - D) Precipitation should occur when moist air rises over a mountain.
 - E) All of these are true.

Answer: E

- 90) When a cold front approaches, air pressure will initially _____ due to the displacement and uplift of _____ air.
- A) increase; cold
 - B) increase; warm
 - C) decrease; cold
 - D) decrease; warm

Answer: D

- 91) After a cold front passes, the temperature _____ and the pressure _____ (relative to the conditions that existed prior to the passage of the front).
- A) increases; increases
 - B) increases; decreases
 - C) decreases; increases
 - D) decreases; decreases

Answer: C

- 92) Which of the following is incorrectly matched?
- A) abruptly lifted warmer air cold front
 - B) drizzly precipitation warm front
 - C) cold front clear cold air and high clouds as the front approaches
 - D) hard rain and possible lightning cold front
 - E) squall line turbulent, changing wind patterns slightly ahead of a cold front

Answer: C

- 93) Which of the following is true of migrating centers of low pressure in the Northern Hemisphere?
- A) The winds diverge from the pressure system and spiral outward in a clockwise fashion.
 - B) These pressure systems tend to move east to west along storm tracks.
 - C) These pressure systems are characterized by converging, ascending air that spirals inward in a counterclockwise fashion.
 - D) They form only a minor weather pattern in the middle and higher latitudes.

Answer: C

- 94) The area along a cold front is described by which of the following?
- A) wind shifting and strong, warm air abruptly lifted by colder air
 - B) warm air being lifted gently and steadily over cooler air
 - C) an area of clear skies and north winds
 - D) the center of the cyclone, lowest pressure, counterclockwise winds

Answer: A

- 95) The area along a warm front is best described by which of the following?
- A) wind shifting and strong, warm air abruptly lifted by colder air
 - B) warm air being lifted gently and steadily over cooler air
 - C) an area of clear skies and north winds
 - D) mT air mass, warm, wet, and humid from the Gulf states

Answer: B

- 96) Storm tracks across the United States and Canada generally
- A) shift to the south in winter, and toward the north in summer.
 - B) move east to west.
 - C) move south to north.
 - D) exist in spring and fall only.

Answer: A

97) Occlusion in a midlatitude wave cyclone can occur because

- A) warm fronts travel more quickly than cold fronts.
- B) cold fronts travel more quickly than warm fronts.
- C) warm and cold fronts travel at the same speed.
- D) warm air sinks in low pressure areas.

Answer: B

98) In which of the following areas will thunderstorms not develop?

- A) in areas of orographic uplift
- B) in areas of surface convergence
- C) along frontal boundaries
- D) under areas of strong high pressure

Answer: D

99) Summer thunderstorms in the southern U.S. are usually produced by towering _____ clouds that form by _____.

- A) nimbostratus; convection
- B) nimbostratus; frontal uplift
- C) cumulonimbus; frontal uplift
- D) cumulonimbus; convergence
- E) cumulonimbus; convection

Answer: E

100) Hail forms

- A) when water falls from a cloud and freezes during its fall to the ground.
- B) every time water condenses onto dust particles.
- C) when water freezes inside a cloud while traveling in a convection current.
- D) when water vapor sublimates inside a cirrus cloud.

Answer: C

101) Which of the following is true?

- A) Lightning precedes thunder.
- B) Thunder is caused by rapid heating of the air.
- C) Thunder is caused by rapid expansion of the air.
- D) All of the above are true.
- E) A and B only

Answer: D

102) Hail generally forms

- A) within nimbostratus clouds.
- B) in association with warm front activity.
- C) within cumulonimbus clouds, and sometimes in association with cold front activity.
- D) in altocumulus and cirrocumulus clouds.

Answer: C

103) Which is not true of Derechos?

- A) They are caused by the same conditions that cause thunderstorms and tornadoes.
- B) They occur mainly from May to August.
- C) They have been measured at 57 m/s (128 mph).
- D) The winds travel in a curved path.
- E) They occur mainly in the Midwest and Southeast.

Answer: D

104) Derechos are

- A) named after the latin word for "hooked" or "curved".
- B) straight-line winds associated with thunderstorms.
- C) associated with gravity drainage.
- D) most common in the pacific northwest of the US.

Answer: B

105) The vast majority of tornadoes in the northern hemisphere exhibit _____ rotation because they are _____ pressure systems like all storms.

- A) counterclockwise; low
- B) counterclockwise; high
- C) clockwise; low
- D) clockwise; high

Answer: A

106) Which of the following is thought to be necessary for the development of a tornado?

- A) a horizontally rotating body of air generated by differences in wind speed between low-level and upper-level air flow
- B) a strong updraft
- C) a mesocyclone
- D) all of the above
- E) B and C only

Answer: D

107) Which of the following cloud types is associated with tornado development?

- A) cumulus
- B) nimbostratus
- C) altocumulus
- D) cumulonimbus

Answer: D

108) Tornadoes are ranked in terms of wind speed and related property damage using the _____ scale.

- A) Beaufort
- B) Fujita
- C) Mercalli
- D) Richter
- E) Saffir-Simpson

Answer: B

109) Hurricanes derive their energy from

- A) the latent heat of vaporization.
- B) the latent heat of fusion.
- C) the heat of condensation.
- D) the latent heat of sublimation.

Answer: C

110) Uplift and storm development occur on the _____ side of an easterly wave.

- A) northern
- B) southern
- C) eastern
- D) western

Answer: D

111) Which of the following is true of hurricanes in the western Atlantic?

- A) The peak months of occurrence are from August to October.
- B) They are generally called cyclones or typhoons in this part of the world.
- C) They are associated with the cool, southward-flowing Kuroshio current.
- D) They occur in association with local monsoonal winds.

Answer: A

112) Which part of a hurricane consists of dry, subsiding air?

- A) eye
- B) spiral bands
- C) eye wall (collar clouds)
- D) None of the above there are no dry conditions in a hurricane.

Answer: A

113) Why are the winds in a hurricane and tornado so strong?

- A) The pressure gradient is strong.
- B) The pressure at the center of the storm is very low.
- C) Tremendous amounts of condensation occur in the center of the storm.
- D) all of the above
- E) A and B only

Answer: D

114) Hurricanes die when they move over land because

- A) the Coriolis force is not sufficient to sustain them over land.
- B) the land temperature is not warm enough to sustain the low pressure system.
- C) evaporation and subsequent condensation are no longer sufficient to sustain them.
- D) all of these
- E) none of these

Answer: C

115) When hurricanes first form in the Northern Hemisphere, they usually travel from _____, and later from _____ as they move to higher latitudes.

- A) east to west; west to east
- B) west to east; east to west
- C) north to south; west to east
- D) any path is equally likely

Answer: A

- 116) Which of the following is incorrect?
- A) The most severe weather in a hurricane occurs in the spiral bands.
 - B) By definition, hurricanes have sustained winds that exceed 65 knots (119 kmph or 74 mph).
 - C) Mature hurricanes develop a central eye of calm conditions (in which it is often possible to see the sky) that is surrounded by a swirling eyewall.
 - D) Only about 10 percent of tropical disturbances intensify into a full-fledged hurricane or typhoon.

Answer: A

- 117) The annual frequency of tropical cyclones is greatest in the _____ Ocean.
- A) Pacific
 - B) Atlantic
 - C) Indian
 - D) South Atlantic

Answer: A

- 118) Which hurricane holds the western hemisphere records for lowest barometric pressure?
- A) Hurricane Camille.
 - B) Hurricane Wilma.
 - C) Hurricane Agnes.
 - D) Hurricane Gilbert.

Answer: B

- 119) Which of the following is false?
- A) \$8 billion worth of storm damage resulted from the 1995 hurricane season.
 - B) Annual hail damage costs more than \$750 million in the United States.
 - C) The May 3, 1999 tornado in Oklahoma caused a billion dollars worth of damage.
 - D) From 1950 to 2002 tornadoes caused more than \$25 billion worth of damage.
 - E) The frequency of tornadoes decreased during the 1990s.

Answer: E

- 120) Which is not true of the 2005 Atlantic Hurricane season?
- A) A new record for lowest barometric pressure in a western hemisphere hurricane was set.
 - B) A new record for most named storms was set.
 - C) The greatest 1 year damage total was recorded.
 - D) There were three category 5 hurricanes in the Gulf of Mexico at the same time.

Answer: D

- 121) All of the following have happened in the 1990s, except
- A) the second-highest number of hurricanes in a single year.
 - B) a substantial decline in the number and destructiveness of tornadoes.
 - C) the deadliest Atlantic hurricane of the century.
 - D) a major ice storm in New England.

Answer: B

- 122) The lowest sea-level pressure was recorded
- A) just off the coast of Bangladesh.
 - B) at Death Valley in California.
 - C) at the bottom of a tornado.
 - D) in the center of Typhoon Tip.

Answer: D

- 123) Strong and frequent Atlantic hurricanes
A) have not been a characteristic of the 1990s.
B) are common during La Niña episodes.
C) are common during El Niño episodes.
D) cannot be predicted with any significant accuracy.
Answer: B
- 124) The overall quantity of water on Earth is constantly fluctuating as evidenced by changes in sea level.
Answer: True False
- 125) Less than 3 percent of Earth's waters are classified as fresh water.
Answer: True False
- 126) Saline lakes are usually in tropical areas.
Answer: True False
- 127) Hydrogen bonding between water molecules produces the properties of surface tension and capillarity.
Answer: True False
- 128) The fact that water expands as it cools and freezes is an important physical weathering process.
Answer: True False
- 129) The bulk of the evaporation on Earth occurs over the continents.
Answer: True False
- 130) Sublimation produces snowflakes.
Answer: True False
- 131) The phase changes of water provide a significant amount of the energy that powers the general circulation of the atmosphere.
Answer: True False
- 132) The phase change from steam to water involves less energy than the phase change from ice to water.
Answer: True False
- 133) Air is saturated when the dew-point temperature and the air temperature coincide.
Answer: True False
- 134) The relatively dry air over the Sahara actually contains more water vapor than over relatively moist midlatitudes.
Answer: True False
- 135) The relative humidity of large air masses is useful in forecasting weather.
Answer: True False
- 136) The moist adiabatic rate (MAR) is less than the dry adiabatic rate (DAR) as a result of the release of the latent heat of condensation within the rising parcel of air.
Answer: True False
- 137) Unstable conditions are produced when a parcel of air sinks and heats at the wet adiabatic rate.
Answer: True False

- 138) When high-level air in the subtropics sinks, it is heated by compression and this raises its temperature and relative humidity.
Answer: True False
- 139) A small, puffy cumulus cloud can weigh as much as 1000 tons.
Answer: True False
- 140) The destructive energy associated with major storms is derived largely from the condensation of water.
Answer: True False
- 141) The collision-coalescence process of raindrop formation predominates in clouds at high latitudes.
Answer: True False
- 142) Stability refers to the tendency of a parcel of air to either remain as it is or change its initial position by lifting or falling.
Answer: True False
- 143) An air mass is a mass of air that may extend through the lower half of the troposphere and is homogenous in terms of temperature and humidity.
Answer: True False
- 144) Continental polar air masses of cold, dry air are more developed during the summer over North America than in winter.
Answer: True False
- 145) The interception of passing air masses by a mountain barrier is termed orographic uplift, and it produces moist windward slopes and drier leeward slopes.
Answer: True False
- 146) Chinook winds form on the windward side of mountains.
Answer: True False
- 147) Orographic precipitation is limited in areal extent, yet it produces the world's highest precipitation amounts and averages.
Answer: True False
- 148) A line on a weather map that is marked with small triangular spikes designates a warm front.
Answer: True False
- 149) The direction of travel of midlatitude wave cyclones is controlled largely by the polar jet stream.
Answer: True False
- 150) In the Southern Hemisphere, a migrating center of low pressure, with converging, ascending air that spirals clockwise, is a cyclone.
Answer: True False
- 151) Weather prediction may always remain difficult because slight changes of the input data into computer models can result in big differences in the predicted outcome of a weather situation.
Answer: True False

- 152) Thunderstorms and hail are associated with cumulonimbus cloud development.
Answer: True False
- 153) Tornadoes, typhoons and hurricanes are identical in physical structure and properties, although they occur in different parts of the world.
Answer: True False
- 154) Hurricanes and tornadoes are fueled by the latent heat of condensation.
Answer: True False
- 155) Hurricanes are more likely to develop when sea surface temperatures are slightly below normal.
Answer: True False
- 156) Fog can be used as a source of water.
Answer: True False
- 157) The year 2002 saw relatively little weather-related damage.
Answer: True False
- 158) The formation of sleet requires a sub-freezing layer of air near the ground.
Answer: True False
- 159) Most lightning strikes occur over water.
Answer: True False
- 160) The frequency of tornadoes in the United States has been decreasing over the last ten or so years.
Answer: True False
- 161) The lowest sea-level pressure on Earth was measured inside a hurricane.
Answer: True False
- 162) A strong El Niño usually means a large number of strong Atlantic hurricanes.
Answer: True False

