Lesson 7 Test Bank – Weather

Multiple Choice Questions

1. What does weather refer to?
   1. Long-term average climate
   2. Daily atmospheric conditions
   3. Seasonal wind patterns
   4. Past climate records

Correct Answer: B

1. Which four components interact to produce weather systems?
   1. Clouds, ozone, ice, dust
   2. Temperature, moisture, air pressure, circulation
   3. Wind, water, land, sunlight
   4. Clouds, fog, precipitation, temperature

Correct Answer: B

1. What causes the humid tropics to have uniformly high temperatures?
   1. Global wind belts
   2. Polar air masses
   3. Constant solar energy input
   4. Seasonal shifts

Correct Answer: C

1. What is a major driver of weather variability in the midlatitudes?
   1. Sea surface temperatures
   2. Jet streams only
   3. Interaction of large air masses
   4. Daily humidity changes

Correct Answer: C

1. What is an air mass?
   1. A small weather cell
   2. A storm front
   3. A large body of air with uniform temperature and humidity
   4. An isolated storm

Correct Answer: C

1. How long does it take an air mass to equilibrate with a source region?
   1. 1 day
   2. 3–5 days
   3. 10–12 hours
   4. 7–10 days

Correct Answer: B

1. Maritime tropical (mT) air is classified as:
   1. Cold and dry
   2. Cold and moist
   3. Warm and dry
   4. Warm and moist

Correct Answer: D

1. What direction does cold air flow in global circulation?
   1. Toward the poles
   2. Toward the equator
   3. Westward only
   4. Eastward only

Correct Answer: B

1. Which air mass type can lead to lake-effect snow in North America?
   1. Continental tropical
   2. Maritime polar
   3. Maritime tropical
   4. Continental Arctic

Correct Answer: B

1. What enhances lake-effect snow along the Great Lakes?
   1. Cold ground and calm winds
   2. Temperature inversion over land
   3. Heat and moisture gain from the lake surface
   4. Clear skies and high pressure

Correct Answer: C

1. What term indicates an air mass is colder than the surface?
   1. mTu
   2. cPs
   3. cPk
   4. mTs

Correct Answer: C

1. What modifies air masses as they move?
   1. Upper air divergence
   2. Coriolis force
   3. Surface temperature and moisture
   4. Jet stream position

Correct Answer: C

1. What happens to mT air off the southwest U.S. coast?
   1. Becomes unstable due to heating
   2. Becomes stable crossing cold ocean currents
   3. Causes hurricanes
   4. Stays warm and moist

Correct Answer: B

1. What does mTs indicate?
   1. Stable maritime tropical air
   2. Unstable continental tropical air
   3. Storm-forming polar air
   4. Snow-producing warm front

Correct Answer: A

1. What type of front forms when a cold front overtakes a warm front?
   1. Warm front
   2. Stationary front
   3. Occluded front
   4. Cold occlusion

Correct Answer: C

1. Which front produces thunderstorms, showers, and squall lines?
   1. Stationary front
   2. Cold front
   3. Occluded front
   4. Warm front

Correct Answer: B

1. What weather follows a cold front?
   1. Fog and drizzle
   2. Steady rain
   3. Clear, cooler, drier air
   4. Continued warm air

Correct Answer: C

1. Which of the following is considered a cold, dry airmass?
   * 1. mT
     2. mP
     3. cP
     4. cT

Correct Answer: C

1. \_\_\_\_ uplift occurs when two unlike air masses collide.
   * 1. Orographic
     2. Convective
     3. Convergent
     4. Frontal

Correct Answer: D

1. At a warm front
   * 1. warm air replaces cold air
     2. a trough of lower pressure is found
     3. stratus - type clouds are found
     4. all the above

Correct Answer: D

1. Which of the following air masses are colder than the surface over which it is traveling?
   * 1. mTw
     2. mTu
     3. cPk
     4. none of the above

Correct Answer: C

1. The cold sector of a midlatitude cyclone
   * 1. experiences southerly winds
     2. generates nimbostratus clouds
     3. experiences light precipitation of long duration
     4. none of the above

Correct Answer: D

1. The mature stage of thunderstorm formation
   * 1. experiences mostly updrafts of air
     2. experiences updrafts and downdrafts
     3. experiences mostly downdrafts
     4. none of the above

Correct Answer: B

1. Which of the following is not a characteristic of a source region
   * 1. a region of little to no windiness
     2. areas dominated by high pressure
     3. areas dominated by low pressure
     4. regions of low relief

Correct Answer: C

1. A front
   * 1. is a boundary between contrasting masses of air
     2. is a zone of lower pressure
     3. is a boundary between opposing centers of high pressure
     4. can have all the above characteristics

Correct Answer: D

1. \_\_\_\_\_\_ is fundamentally responsible for the creation of midlatitude cyclones.
   * 1. large pressure gradients
     2. cyclonic shear
     3. large temperature gradients
     4. none of the above

Correct Answer: B

1. Which of the following is not associated with a cold front
   * 1. cumulonimbus clouds
     2. warm air replacing cold air
     3. possibility of intense rain of short duration
     4. all the above are associated with a cold front.

Correct Answer: B

1. The wind direction ahead of a warm front is generally
   * 1. from the east
     2. from the south
     3. from the north
     4. from the west

Correct Answer: A

1. Which of the following is not true about cP air?
   * 1. cP air is generally unstable air
     2. cP air is generally found behind a cold front
     3. cP air that affects North America has its source in central Canada
     4. cP air is found in the cold sector of a midlatitude cyclone

Correct Answer: A

1. Climate change may lead to what kind of weather effect?
   1. Decreased storms globally
   2. Intensified storm systems in some regions
   3. Reduced storm surges
   4. Uniform warming across all regions

Correct Answer: B

1. What cloud progression is typical of an approaching warm front?
   1. Stratus → cumulus
   2. Cirrus → cirrostratus → altostratus → nimbostratus
   3. Cumulonimbus → cirrus
   4. Altostratus → cumulus

Correct Answer: B

1. What weather is associated with a stationary front?
   1. Short bursts of rain
   2. Persistent rain or fog for several days
   3. Clear skies and warming
   4. Snowstorms only

Correct Answer: B

1. What marks a midlatitude cyclone's initial stage?
   1. Storm occlusion
   2. Rapid temperature rise
   3. Surface convergence and rotation
   4. A dry slot in the storm

Correct Answer: C

1. What defines the open stage of a midlatitude cyclone?
   1. A vertical cloud wall
   2. Clear skies
   3. Well-defined cold and warm fronts with wave shape
   4. Rising pressure

Correct Answer: C

1. What happens in the occluded stage of a cyclone?
   1. Warm front lifts and intensifies
   2. Cold front slows and dissipates
   3. Cold front catches the warm front, lifting warm air
   4. Surface high develops

Correct Answer: C

1. What stage occurs when convergence and uplift end?
   1. Cyclogenesis
   2. Mature stage
   3. Open stage
   4. Dissolving stage

Correct Answer: D

1. Where do midlatitude cyclones most commonly form?
   1. Equator
   2. Subtropical high
   3. Polar front
   4. Desert regions

Correct Answer: C

1. What is the typical lifespan of a midlatitude cyclone?
   1. Less than a day
   2. 2–5 days
   3. 10–14 days
   4. One month

Correct Answer: B

1. What does "nor’easter" refer to?
   1. A storm on the West Coast
   2. A hurricane in the Gulf
   3. An intense winter storm in the Northeastern U.S.
   4. A polar easterly wind pattern

Correct Answer: C

1. What is the most common storm type globally?
   1. Tornado
   2. Hurricane
   3. Thunderstorm
   4. Nor’easter

Correct Answer: C

1. What stage of a thunderstorm involves strong updrafts and growing cumulus clouds?
   1. Dissipating stage
   2. Open stage
   3. Mature stage
   4. Cumulus stage

Correct Answer: D

1. What stage of a thunderstorm includes heavy rain, hail, and lightning?
   1. Cumulus stage
   2. Open stage
   3. Dissipating stage
   4. Mature stage

Correct Answer: D

1. What happens during the dissipating stage of a thunderstorm?
   1. Updrafts dominate
   2. Downdrafts cut off updrafts
   3. Storm strengthens
   4. Rainfall increases

Correct Answer: B

1. What triggers severe thunderstorms?
   1. Weak downdrafts
   2. Stable air layers
   3. Strong downdrafts forcing more warm air upward
   4. Rising cold air

Correct Answer: C

1. What type of cloud produces lightning?
   1. Altostratus
   2. Cumulonimbus
   3. Cirrus
   4. Nimbostratus

Correct Answer: B

1. Tornadoes typically form when:
   1. Cold air rises over warm
   2. Warm moist air collides with cold dry air
   3. Ocean currents shift
   4. Fog settles

Correct Answer: B

1. What is the average wind speed of a tornado?
   1. 50 mph
   2. 80 mph
   3. 110 mph
   4. 200 mph

Correct Answer: C

1. What causes most tornado deaths?
   1. Lightning
   2. Drowning
   3. Heatstroke
   4. Flying debris

Correct Answer: D

1. Which scale is used to rank tornado strength?
   1. Richter scale
   2. Hurricane Index
   3. Fujita scale
   4. Saffir-Simpson scale

Correct Answer: C

1. Tornado outbreaks in the U.S. are most common during:
   1. Summer
   2. Spring
   3. Winter
   4. Autumn

Correct Answer: B

1. What kind of storm has a calm eye and spiral rainbands?
   1. Tornado
   2. Thunderstorm
   3. Hurricane
   4. Midlatitude cyclone

Correct Answer: C

1. What ocean condition favors hurricane formation?
   1. Cold water below 20°C
   2. Sea surface temperature ≥ 28°C
   3. High pressure above ocean
   4. Cold air over warm sea

Correct Answer: B

1. Which layer contains a hurricane’s strongest winds and lowest pressure?
   1. Eye
   2. Eyewall
   3. Rainbands
   4. Spiral zone

Correct Answer: B

1. Which U.S. hurricane caused over $125 billion in damages in 2005?
   1. Hurricane Sandy
   2. Hurricane Andrew
   3. Hurricane Harvey
   4. Hurricane Katrina

Correct Answer: D

1. What is the main hazard associated with hurricane storm surge?
   1. Wind damage
   2. Tornado formation
   3. Sea level rise plus wind-driven water
   4. Thunderstorms

Correct Answer: C

1. What determines hurricane classification?
   1. Temperature and pressure
   2. Rainfall intensity
   3. Sustained wind speed
   4. Latitude

Correct Answer: C

1. Where do tropical cyclones form most often?
   1. Equator
   2. Between 10° and 25° latitude
   3. Polar regions
   4. Above 40°N

Correct Answer: B

1. Which factor weakens a hurricane?
   1. Warm ocean water
   2. Low wind shear
   3. Landfall or cooler water
   4. Strong convection

Correct Answer: C

1. What is the paradox of a hurricane?
   1. Warm rain and cold wind
   2. Calm center and violent outer bands
   3. Rising pressure and sinking winds
   4. Fast movement and no rainfall

Correct Answer: B

1. What trend has been observed since 1980 in extreme weather?
   1. No significant changes
   2. Decrease in storm frequency
   3. Increase in frequency and vulnerability
   4. Decline in global storm intensity

Correct Answer: C

Written Response Questions

1. Describe the characteristics of an air mass source region.

Correct Answer: An air mass source region is one that has flat terrain and dominated by high pressure.

1. Describe two ways in which air masses can be modified.

Correct Answer: Air masses are modified by the surface over which they travel. For example, an mT air mass that passes over a cold ocean current is chilled at the surface enhancing stability. Cold air masses traveling over warm surface are heated enhancing their instability.

1. Describe the characteristics of a front.

Correct Answer: A front is boundary between contrasting masses of air. They are a zone of converging air and lower pressure.

1. Compare and contrast mP, cP, mT, cT air masses.

Correct Answer:

mP air masses are cool and moist forming over oceans at about 60 N and S.

cP air masses are cold and dry forming over continents at about 60 N.

mT air masses are warm and moist air masses forming over oceans at about 30 N and S.

cT air are warm and dry air masses forming over continents at about 30 N and S.

1. Describe the process of cyclogenesis.

Correct Answer: Cyclones form along frontal boundaries like the polar front where air is converging from opposite directions. A twisting motion is created as cyclonic shear takes place between the converging air streams. The surface convergence is supported by upper level divergence in the jet stream. The spiraling storm creates a cold front as cold air pushes into regions once occupied by warm air. A warm front is spawned where warm air intrudes into regions once dominated by cold air. Through time the cold front and warm front merge to form an occlusion. Finally, the storm dissipates.

1. Describe the weather changes (e.g. temperature change, pressure tendency, clouds, wind direction) associated with the passage of a warm front.

Correct Answer: A change in cloud cover from cirrus, to cirrostratus, altostratus, and stratus is typical of the approach of a warm front. Air pressure decreases as the front approach, then increases after passage. Nimbostratus clouds are present along the warm front if it is precipitating. Low intensity/long duration precipitation is typical of nimbostratus clouds. Wind are likely to shift from an easterly direction to a southerly direction as the warm from passes. Air temperatures rise upon the passage of the front.

1. Describe the weather changes (e.g. temperature change, pressure tendency, clouds, wind direction) associated with the passage of a cold front.

Correct Answer: The air ahead of a cold front is generally from the south in the warm sector. Pressure drops as the front approaches. Cumulus clouds grow into cumulonimbus clouds and intense, but short-lasting precipitation occurs. As the front passes, wind shifts from a southerly/southwesterly direction toward the west and possibly northwest. Temperatures decrease as the front passes. After passage, cloud cover dissipates.

1. Compare and Contrast the kind of precipitation associated with cold and warm fronts.

Correct Answer: Precipitation along warm fronts tends to be low intensity and long in duration. Precipitation along cold fronts tends to be high intensity and short in duration.

1. What forms an occluded front?

Correct Answer: A cold front overtaking a warm front, lifting warm air off the ground.

1. What defines a stationary front?

Correct Answer: Two air masses meet but neither advances, leading to prolonged cloudy, wet conditions.

1. Describe the three stages of thunderstorm development.

Correct Answer:

Cumulus stage: Creation of a cumulus cloud by updrafts of warm, moist air

Mature stage: Updrafts of warm moist air fuels the developing storm. Downdrafts of cold dry air is created by precipitation entrainment.

Decay stage: Downdrafts predominate as uplift of warm moist air ceases.

1. Describe the conditions under which tornadoes form.

Correct Answer: There is much we do not know about tornadoes. Tornadoes are most common during the Spring when greatly contrasting air masses collide to produce severe storm systems. Wind shear within the severe thunderstorm causes rotation of air about a horizontal axis. The rotating circulation is tilted into the vertical by the updrafts in the thunderstorm. As the rotating air increases in height and shrinks in size a mesocyclone is formed. For whatever reason, a tornado funnel is spawned within the mesocyclone.

1. How does lightning form?

Correct Answer: Charge separation in cumulonimbus clouds leads to electrical discharge.

1. Under what conditions are hurricanes most likely to form?

Correct Answer: A hurricane develops from a tropical disturbance once it reaches sustained winds in excess of 75 mph (65 knots). Most hurricanes form poleward of 10 latitude as the Coriolis effect is too weak closer to the equator. Hurricanes form in a uniform mass of warm air over tropical oceans with temperatures of 80 F (26.5 C) through a depth of 200 feet (60 meters).

1. Describe the Enhanced Fujita scale.

Correct Answer: Ranks tornadoes by wind speed and damage (EF0 to EF5).

1. Why is tornado prediction difficult?

Correct Answer: Exact formation and touchdown points are highly variable and unpredictable.

1. What creates the most damage from a hurricane?

Correct Answer: The high water level that precedes the hurricane called the "storm surge" creates the most damage due to flooding.

1. What is the role of warm sea surface in hurricane formation?

Correct Answer: Fuels rising humid air and low-pressure development.

1. What is the eye of a hurricane?

Correct Answer: Calm, low-pressure center surrounded by violent eyewall winds.

1. What causes a hurricane to weaken?

Correct Answer: Moving over land or cooler waters, reducing moisture supply.

1. Why is understanding weather important for geographers?

Correct Answer: Helps predict impacts on people, ecosystems, and infrastructure for adaptation planning.

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