Clicker Questions and Clicker Quizzes

Clicker Questions

**Chapter 7**

- Of the four forces that affect the motion of air in our atmosphere, which is to thank for opposing the vertical pressure gradient force so that we have air in our atmosphere?
    A. Horizontal pressure gradient force
    B. Gravitational force
    C. Frictional force
    D. Coriolis force

- Which force is most important near the surface than in the upper atmosphere?
    A. Horizontal pressure gradient force
    B. Gravitational force
    C. Frictional force
    D. Coriolis force

- The Coriolis force _____.
    A. always causes moving objects to turn to the right of their direction of motion
    B. can only affect the direction of a moving object, not its speed
    C. is zero for non-moving objects
    D. All of the above
    E. Only b and c

- True or false: The Coriolis force is zero at the poles and strongest at the equator.
    A. True
    B. False

- True or false: Geostrophic balance is a balance between the vertical pressure gradient force and the gravitational force.
    A. True
    B. False

- True or false: The atmosphere is always in hydrostatic balance.
    A. True
    B. False

- Which of the following forces affect horizontal motion within the boundary layer?
    A. Horizontal pressure gradient force
    B. Coriolis
    C. Friction
    D. All of the above
    E. Only a and b

- The Coriolis force causes moving objects to turn _____.
    A. Right in both the northern and southern hemispheres
    B. Left in both the northern and southern hemispheres
    C. Right in the northern hemisphere, left in the southern hemisphere
    D. Left in the northern hemisphere, right in the southern hemisphere

- A surface low pressure system is typically associated with _____ weather because of the generally _____ air motion associated with it.
    A. Clear and sunny, sinking
    B. Cloudy and rainy, sinking
    C. Clear and sunny, rising
    D. Cloud and rainy, rising

- _____ aloft yields higher pressure in the air column (and thus at the surface), and then yields _____ at the surface due to the sinking motion within the column.
    A. Divergence, convergence
    B. Convergence, divergence
    C. Divergence, divergence
    D. Convergence, convergence

- The wind speed around a low pressure center (or a trough) will be _____ the geostrophic wind speed.
    A. Less than
    B. Greater than
    C. Equal to

- The surface pressure will typically _____ ahead of an approaching upper level trough.
    A. Increase
    B. Decrease
    C. Not change

- The surface pressure will typically increase below the _____ quadrant of a jetstreak.
    A. Right entrance, right exit
    B. Left entrance, left exit
    C. Right entrance, left exit
    D. Left entrance, right exit

**Chapter 8**

- True or false: Sinking motion in the atmosphere is typically associated with clear skies.
  A. True
  B. False

- For anticyclonic flow above the boundary layer the true flow will be _____ the geostrophic value.
  A. Greater than
  B. Less than
  C. Equal to

- In the friction layer you would expect the winds to _____ a low pressure center leading to _____.
  A. spiral in towards, convergence
  B. spiral in towards, divergence
  C. spiral out from, convergence
  D. spiral out from, divergence

- Heating a column of air will lead to _____ in the surface pressure.
  A. an increase
  B. a decrease
  C. no change

**Chapter 9**

- An airmass that is moist and cool would be called a _____ airmass.
  A. Continental polar
  B. Continental tropical
  C. Maritime polar
  D. Maritime tropical

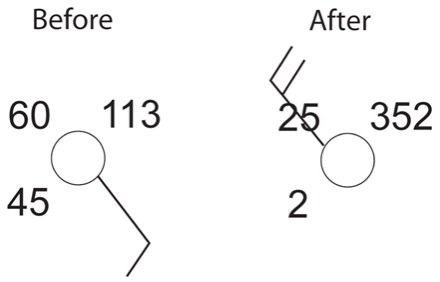
- You would expect a continental tropical airmass to form over the _____.
  A. Gulf of Mexico
  B. Northern Pacific Ocean
  C. Desert southwest of the US
  D. Northern great plains of Canada

- The following symbol is used to indicate _____.
  A. Cold front
  B. Warm front
  C. Stationary front
  D. Occluded front
  E. Dry line

- _____ clouds often form _____ warm fronts with warm, moist and stable air behind the warm front.
    A. Cumulonimbus, on the leading edge of
    B. Cumulonimbus, along and ahead of
    C. Nimbostratus, on the leading edge of
    D. Nimbostratus, along and ahead of

- A _____ separates warm and cold airmasses when cold air is retreating and warm air is advancing.
    A. Cold front
    B. Warm front
    C. Stationary front
    D. Occluded front
    E. Dry line

- Based on the following two surface station model reports from before and after a front has passed what type of front has passed this weather station?
    A. Cold front
    B. Warm front
    C. Occluded front
    D. Dry line

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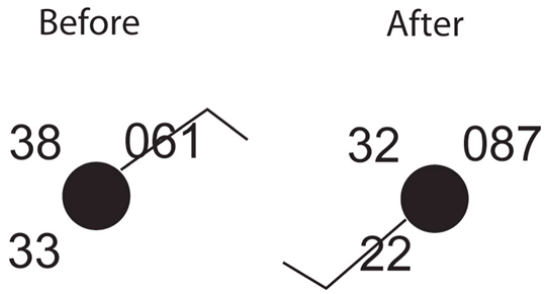


**Chapter 10**

- On an infrared satellite image an extratropical cyclone often appears like _____.
  A. A question mark
  B. An exclamation point
  C. A comma
  D. A semi-colon

- Extratropical cyclones are important in the atmosphere because they transport warm air towards the _____ and cold air towards the _____ in the Northern hemisphere.
  A. North, north
  B. North, south
  C. South, south
  D. South, north

- Extratropical cyclones do not typically form _____.
  A. Just east of the Colorado Rocky Mountains
  B. Along the Texas-Louisiana Gulf coast
  C. Over southern California
  D. Over the Gulf of Alaska

- You would expect to find divergence in the upper troposphere _____ and in the _____ region of a jetstreak.
  A. ahead of a trough, right-exit
  B. ahead of a trough, left-exit
  C. behind a trough, right-exit
  D. behind a trough, left-exit

- You would most likely find a warm, dry airmass moving _____ on the _____ side of an extratropical cyclone in the central United States.
  A. Towards the west, north
  B. Towards the east, north
  C. Towards the west, south
  D. Towards the east, south

- For an extratropical cyclone that has just developed east of the Rocky Mountains in the United States you would expect to find a warm front _____ of the low pressure center and a cold front _____ of the low pressure center.
  A. East, west
  B. North, south
  C. West, east
  D. South, north

- Where is a broad area of clouds and precipitation most likely to form in an extratropical cyclone?
    A. Ahead of the cold front
    B. Ahead of the warm front
    C. Behind the warm front
    D. Behind the dry line

- True or false: You would expect a low pressure center to form or intensify at the surface when divergence is greater than convergence in a column of the atmosphere.
    A. True
    B. False

- As cold air moves south on the west side of a surface low pressure center the height of the 300 mb pressure surface aloft would _____.
    A. Increase
    B. Decrease
    C. Not change

- Once an occluded front forms in an extratropical cyclone the surface low pressure center is surrounded by _____.
    A. Cold air on all sides
    B. Warm air on all sides
    C. Cold air to the north and warm air to the south
    D. Warm air to the north and cold air to the south

- What type of weather would you expect to observe with a dissipating extratropical cyclone?
    A. Clear skies and no precipitation
    B. Broad area of clouds and snow
    C. Broad area of clouds and rain
    D. Narrow band of clouds and rain
    E. Either b or c

**Chapter 15**

- Where are blizzards most common in the United States?
    A. North Dakota
    B. Texas
    C. New York
    D. Kansas

- True or false: A blizzard can only occur when new snow is falling.
    A. True
    B. False

- A decrease in the body's core temperature to a level at which normal muscular and cerebral functions become impaired is _____.
    A. Frost bite
    B. Wind chill temperature
    C. Hypothermia
    D. Snow blindness

- Which of the following factors favors the formation of very cold air?
    A. Long winter nights
    B. Snow covered ground
    C. Clear skies
    D. All of the above
    E. None of the above

- On which side of a surface low pressure center do the most severe blizzard conditions generally occur?
    A. Northeast
    B. Southeast
    C. Southwest
    D. Northwest

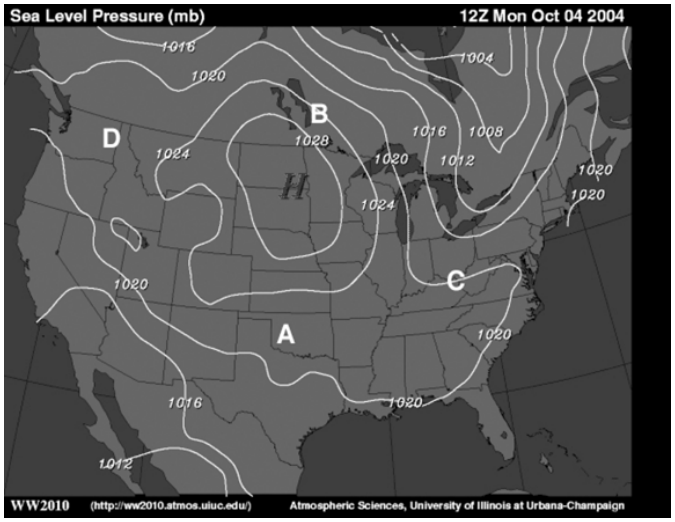
**Clicker Quizzes**

**Quiz #4**

- The pressure gradient force is always _____ to isobars of sea level pressure on a surface weather map, and points from _____.
    A. perpendicular, low to high pressure
    B. perpendicular, high to low pressure
    C. parallel, low to high pressure
    D. parallel, high to low pressure

- On a surface weather map a region where isobars are widely spaced would have a _____ pressure gradient and you would expect to find _____ winds at this location.
    A. small, strong
    B. small, weak
    C. large, strong
    D. large, weak

- What direction is the pressure gradient force pointing towards at point B on this sea level pressure map?
  A. Northwest
  B. Northeast
  C. Southwest
  D. Southeast




- The vertical pressure gradient is usually _____ the horizontal pressure gradient in the eyewall of a hurricane.
  A. Greater than
  B. Less than
  C. Equal to

- The Coriolis force _____ of an object in motion in the middle latitudes of the Earth.
  A. can only change the speed
  B. can only change the direction
  C. can change both the speed and direction
  D. does not affect either the speed or direction

- The Coriolis force will be largest for an air parcel moving at a speed of _____ in the middle latitudes of the Earth.
  A. 0 mph
  B. 10 mph
  C. 20 mph
  D. 100 mph

- Which of the following forces are important for determining the horizontal motion of air above the boundary layer?
  A. Horizontal pressure gradient force
  B. Coriolis force
  C. Frictional force
  D. All of the above
  E. Only a and b

- The geostrophic wind blows _____ to straight height contours on a constant pressure map such that higher heights are located to the _____ of the geostrophic wind direction in the Northern hemisphere.
    A. parallel, right
    B. perpendicular, right
    C. parallel, left
    D. perpendicular, left

- In general the 300 mb constant pressure surface slopes down from _____, and this results in _____ geostrophic wind in mid-latitudes.
    A. the equator to the North Pole, easterly
    B. the equator to the North Pole, westerly
    C. the North Pole to the equator, easterly
    D. the North Pole to the equator, westerly

**Quiz #5**

- Convergence is a net _____ of air molecules into a region of the atmosphere, and is associated with _____ of surface pressure over a given location when it occurs in the column of atmosphere above that location.
    A. Inflow, an increase
    B. Inflow, a decrease
    C. Outflow, an increase
    D. Outflow, a decrease
- Convergence of air at the surface will result in _____ in a column of air, which is typically associated with _____.
    A. Sinking motion, clouds and precipitation
    B. Sinking motion, clear skies
    C. Rising motion, clouds and precipitation
    D. Rising motion, clear skies

- Convergence of air just below the tropopause will result in _____ in a column of air, which is typically associated with _____.
    A. Sinking motion, clouds and precipitation
    B. Sinking motion, clear skies
    C. Rising motion, clouds and precipitation
    D. Rising motion, clear skies

- For cyclonic flow above the boundary layer the true flow will be _____ the geostrophic value.
    A. Greater than
    B. Less than
    C. Equal to

- Assuming that the spacing between height contours remains constant an air parcel will _____ as it moves from a ridge to a trough at 300 mb leading to _____ between the ridge and trough.
    A. Speed up, convergence
    B. Speed up, divergence
    C. Slow down, convergence
    D. Slow down, divergence

- For a straight jetstreak at 300 mb you would expect divergence to occur in the _____ regions.
    A. Left entrance and left exit
    B. Right entrance and right exit
    C. Left entrance and right exit
    D. Right entrance and left exit

- The following symbol is used to indicate _____.
    A. Cold front
    B. Warm front
    C. Stationary front
    D. Occluded front
    E. Dry line

- _____ is a front that is characterized by sharp moisture differences rather than sharp temperature differences.
    A. Cold front
    B. Warm front
    C. Stationary front
    D. Occluded front
    E. Dry line

- Based on the following two surface station model reports from before and after a front has passed what type of front has passed this weather station?
    A. Cold front
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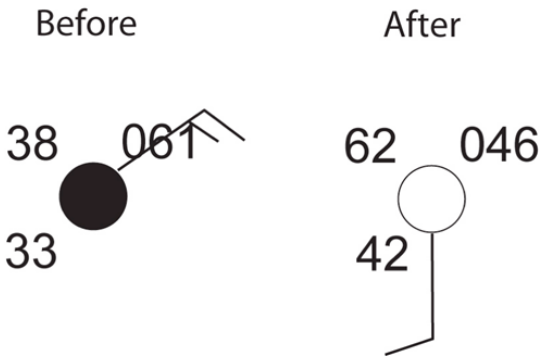

**Quiz #6**

- Extratropical cyclones form _____.
  A. Near the equator
  B. Between about 30 and 70 deg latitude
  C. Near the poles

- On a surface weather map of the United States an extratropical cyclone would be associated with winds flowing in a _____ direction around an area of _____ pressure.
  A. counterclockwise, high
  B. Clockwise, high
  C. Counterclockwise, low
  D. Clockwise, low

- On average you would expect an extratropical cyclone to affect an area that covers approximately _____.
  A. 1 or 2 states
  B. About one third of the lower 48 states
  C. All of North America
  D. All of the northern hemisphere

- True or false: You would expect a low pressure center to form or intensify at the surface when convergence is greater than divergence in a column of the atmosphere.
  A. True
  B. False

- You would most likely find a cold, dry airmass moving _____ on the _____ side of an extratropical cyclone in the central United States.
  A. Towards the south, east
  B. Towards the north, east
  C. Towards the south, west
  D. Towards the north, west

- You would expect to find light, steady precipitation falling _____ a warm front if the airmass that is rising over the front is _____.
  A. Ahead of, stable
  B. Ahead of, unstable
  C. Behind, stable
  D. Behind, unstable

- What conditions are most likely to cause a cold front to be the leading front south of an extratropical cyclone that has formed in eastern Colorado?
    A. Cool air behind the front
    B. Warm air behind the front
    C. Very cold air behind the front
    D. None of the above

- As air rises due to upslope flow its temperature _____ and its relative humidity _____.
    A. Increases, increases
    B. Increases, decreases
    C. Decreases, decreases
    D. Decreases, increases

- You would expect to find the most hazardous wintry weather in the _____ portion of a wintertime extratropical cyclone in the central United States.
    A. Northwest
    B. Northeast
    C. Southwest
    D. southeast