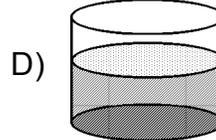
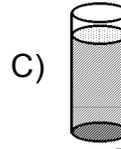
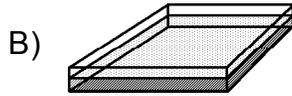
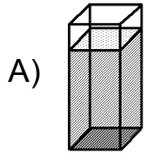


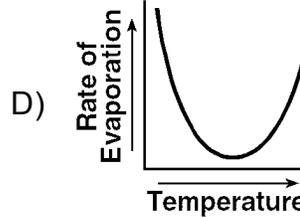
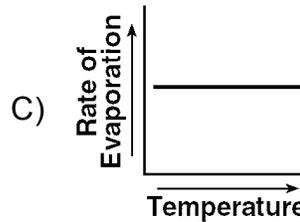
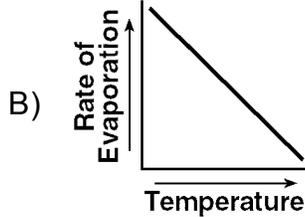
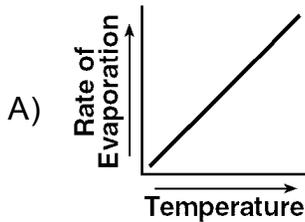
## Weather Unit Exam Pre-Test Questions

Name: \_\_\_\_\_

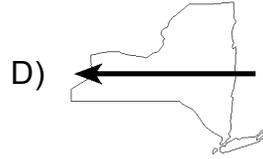
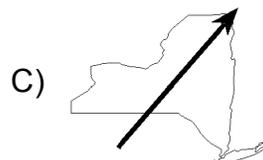
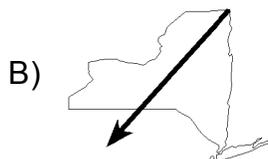
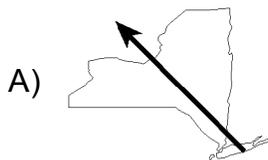
- 1) Equal quantities of water are placed in four uncovered containers with different shapes and left on a table at room temperature. From which container will the water evaporate most rapidly?



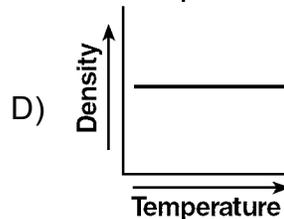
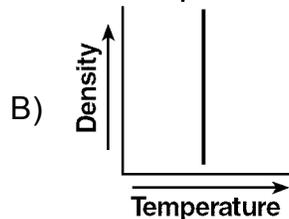
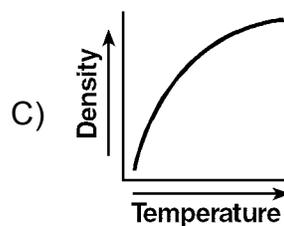
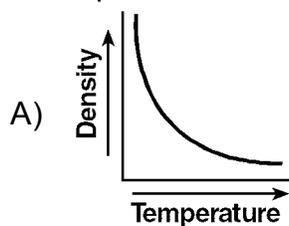
- 2) Which graph *best* illustrates the relationship between rate of evaporation and air temperature?



- 3) By which process does most water vapor enter the atmosphere?
- A) evaporation from lakes and rivers                      C) evaporation from ocean surfaces  
 B) sublimation from polar ice and snow                  D) evapotranspiration from land areas
- 4) In which map does the arrow show the general direction that *most* low-pressure storm systems move across New York State?



- 5) Which graph best represents the relationship between air temperature and air density in the atmosphere? (assuming that elevation held is constant)



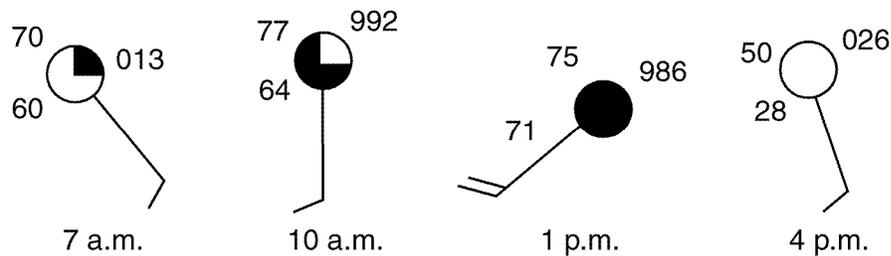
- 6) The table below shows dry-bulb and wet-bulb temperature readings taken at four different locations, A, B, C, and D.

Location	Dry-Bulb Temperature ( $^{\circ}\text{C}$ )	Wet-Bulb Temperature ( $^{\circ}\text{C}$ )
A	13	9
B	18	15
C	23	21
D	28	27

Which location has the *lowest* relative humidity? [Refer to the *Earth Science Reference Tables*.]

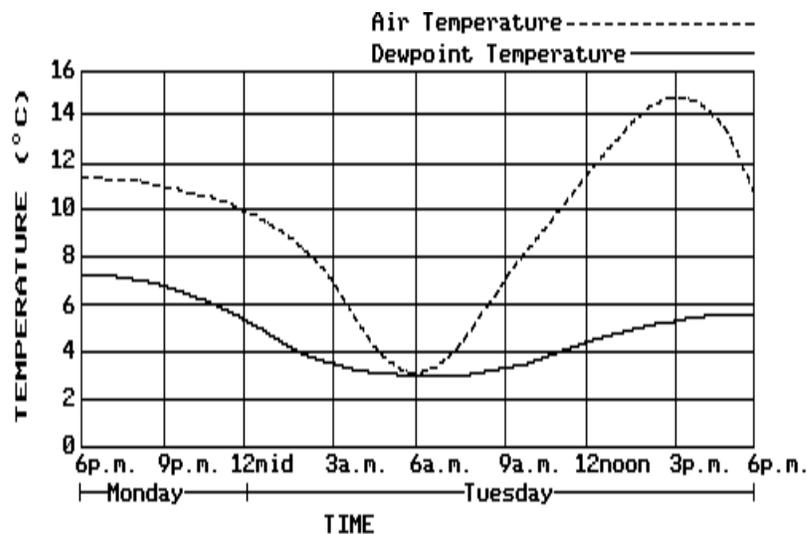
- A) A                      B) B                      C) C                      D) D
- 7) When the dry-bulb temperature is  $22^{\circ}\text{C}$  and the wet-bulb temperature is  $13^{\circ}\text{C}$ , the relative humidity is
- A) 10%                      B) 59%                      C) 33%                      D) 41%
- 8) Students wish to study the effect of elevation above sea level on air temperature and air pressure. They plan to hike in the Adirondack Mountains from Heart Lake, elevation 2,179 feet, to the peak of Mt. Marcy, elevation 5,344 feet. Which instruments should they use to collect their data?
- A) anemometer and psychrometer                      C) thermometer and barometer  
B) anemometer and barometer                      D) thermometer and psychrometer
- 9) A student used a sling psychrometer to measure the humidity of the air. If the relative humidity was 65% and the dry-bulb temperature was  $10^{\circ}\text{C}$ , what was the wet-bulb temperature?
- A)  $5^{\circ}\text{C}$                       B)  $7^{\circ}\text{C}$                       C)  $10^{\circ}\text{C}$                       D)  $3^{\circ}\text{C}$
- 10) The air temperature is  $10^{\circ}\text{C}$ . Which dewpoint temperature would result in the highest probability of precipitation?
- A)  $6^{\circ}\text{C}$                       B)  $0^{\circ}\text{C}$                       C)  $-4^{\circ}\text{C}$                       D)  $8^{\circ}\text{C}$

- 11) The diagrams below represent station models showing weather data collected at four different times during 1 day at a location in New York State.



What was the barometric pressure at 4 p.m.?

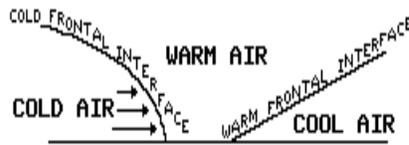
- A) 260 mb                      B) 1,026 mb                      C) 1,002.6 mb                      D) 26.0 mb
- 12) A temperature of 104° Fahrenheit is equal to a temperature of  
 A) 72°C                      B) 104°C                      C) 40°C                      D) 136°C
- 13) The graph below shows the air temperature and dewpoint temperature over a 24-hour period for a location in New York State.



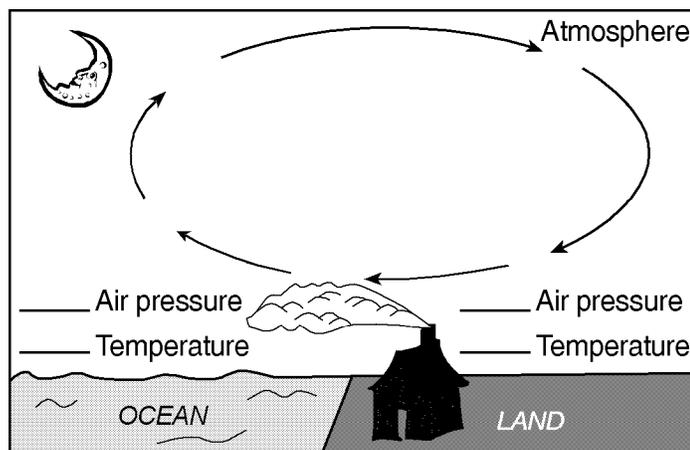
When was the air at ground level saturated with water vapor?

- A) 12 noon Tuesday                      C) 6 a.m. Tuesday  
 B) 6 p.m. Monday                      D) 3 p.m. Tuesday
- 14) The air temperature and the wet-bulb temperature were measured and both were found to be 18°C. Two hours later, measurements were taken again and the air temperature was 20°C, while the wet-bulb temperature remained 18°C. The relative humidity of the air during those two hours  
 A) remained the same                      B) increased                      C) decreased
- 15) As the difference between the dewpoint temperature and the air temperature decreases, the probability of precipitation  
 A) remains the same                      B) increases                      C) decreases

- 16) The diagram below represents a cross-sectional view of airmasses associated with a low-pressure system. The cold frontal interface is moving faster than the warm frontal interface. What usually happens to the warm air that is between the two frontal surfaces?

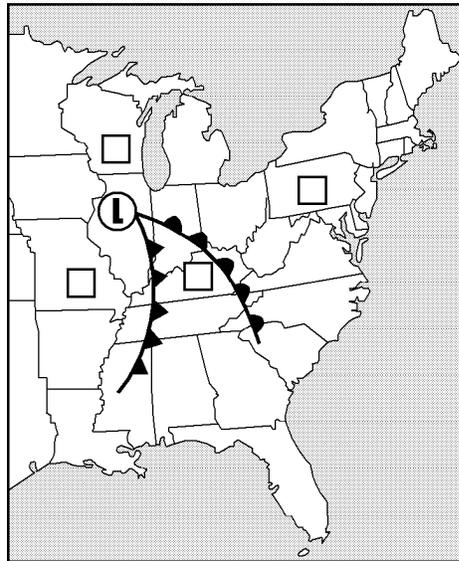


- A) The warm air is forced under the cold frontal interface but over the warm frontal interface.  
 B) The warm air is forced under both frontal interfaces.  
 C) The warm air is forced over both frontal interfaces.  
 D) The warm air is forced under the cold frontal interface but under the warm frontal interface.
- 17) The cross section below represents a house at an ocean shoreline at night. Smoke from the chimney is blowing out to sea.

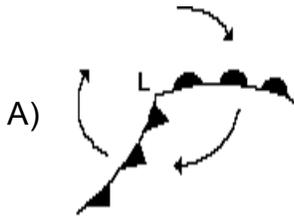


- (a) Label the *two* lines provided on the cross section above to show where air pressure is relatively "high" and where it is relatively "low."
- (b) Assume that the wind blowing out to sea on this night is caused by local air-temperature conditions. Label the *two* lines provided on the cross section above to show where Earth's surface air temperature is relatively "warm" and where it is relatively "cool."

- 18) The weather map below shows a typical midlatitude low-pressure system centered in Illinois.

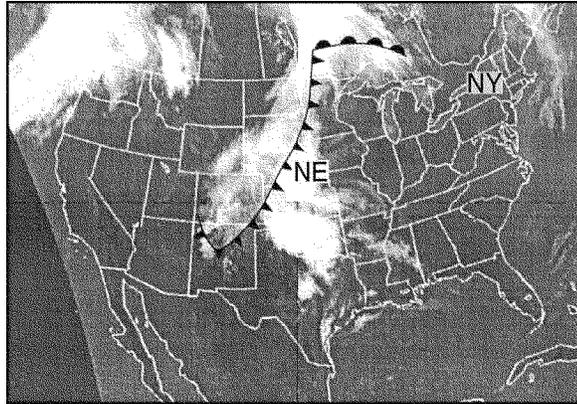


- (a) On this weather map, indicate which boxed area has the *highest* surface air temperatures by marking an **X** in one of the four boxes on the map.
- (b) On the weather map above, draw an arrow to predict the normal storm track that this low-pressure center would be expected to follow.
- 19) Which diagram below best represents the air circulation around a Northern Hemisphere low-pressure center?



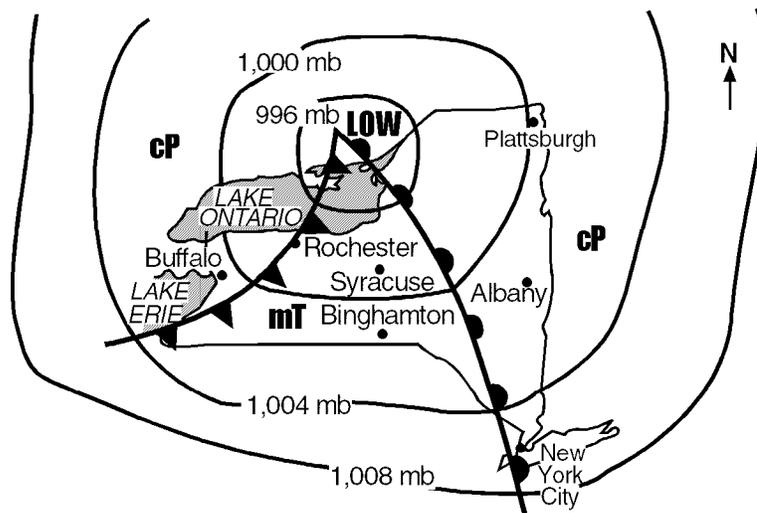
- 20) As warm, moist air moves into a region, barometric pressure readings in the region will generally
- A) decrease                      B) increase                      C) remain the same
- 21) A balloon carrying weather instruments is released at the Earth's surface and rises through the troposphere. As the balloon rises, what will the instruments generally indicate?
- A) an increase in both air temperature and air pressure  
 B) a decrease in both air temperature and air pressure  
 C) a decrease in air temperature and a increase in air pressure  
 D) an increase in air temperature and a decrease in air pressure

- 22) The satellite image below shows cloud patterns associated with weather fronts over the United States on a certain day. The states of Nebraska (NE) and New York (NY) have been labeled.

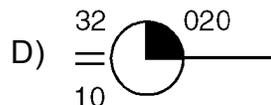
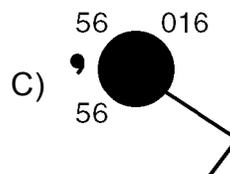
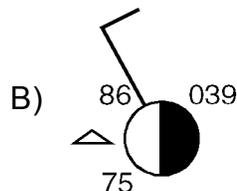
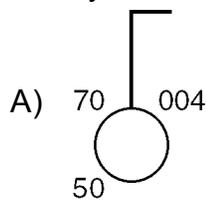


At the time this satellite image was taken, what were the weather conditions in New York State?

- A) cloudy with heavy precipitation  
 B) mostly cloudy in the northern part of the State and clear in the southern part  
 C) clear skies with no precipitation  
 D) very cloudy with no precipitation
- 23) The weather map below shows a low-pressure storm system located over New York State in midsummer.

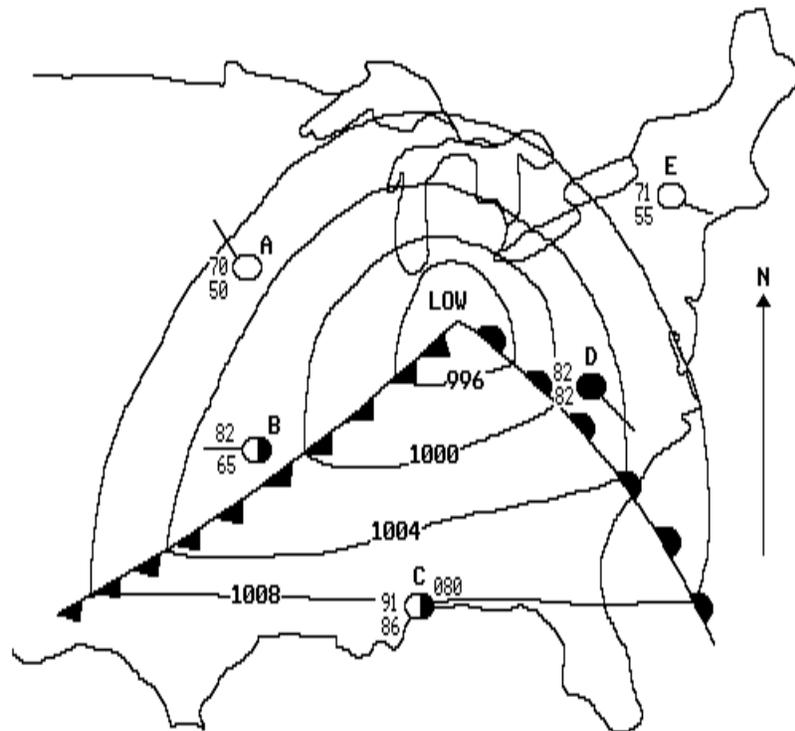


Which weather station model *best* represents the weather conditions in Albany, where a slow, steady drizzle is occurring?



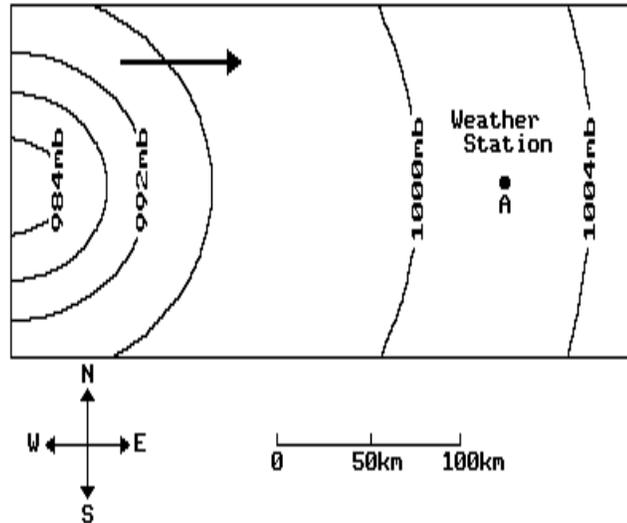
Questions 24 and 25 refer to the following:

The diagram below represents a surface weather map of a portion of the United States. The map shows a low-pressure system with frontal lines and five weather stations A through E. Note that part of the weather data is missing from each station. [All temperatures are in DF.] [Refer to the *Earth Science Reference Tables*.]

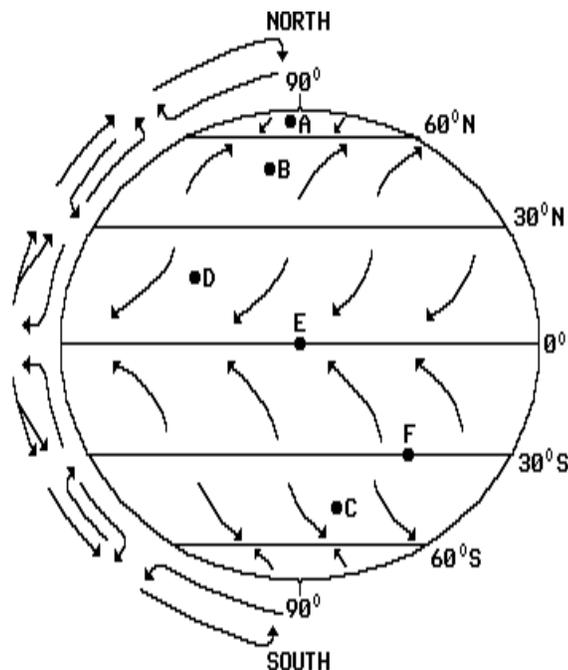


- 24) Which weather station has a relative humidity of 100%?
- A) A                      B) B                      C) D                      D) C
- 25) Assuming that the low-pressure system follows a normal storm track, which weather station is probably located in the path of the approaching center of the low?
- A) A                      B) C                      C) E                      D) B
- 26) The primary cause of winds is the
- A) uniform density of the atmosphere  
 B) friction between the atmosphere and the lithosphere  
 C) unequal heating of the Earth's atmosphere  
 D) rotation of the Earth
- 27) Which factor is most directly related to wind velocity?
- A) cloud type                      C) relative humidity  
 B) pressure gradient                      D) dewpoint

- 28) The diagram below represents weather station A in the path of an airmass approaching from the west. Which change will most likely be recorded first by weather station A?



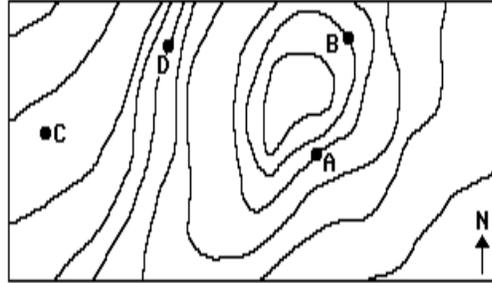
- A) an increase in air pressure  
 B) a decrease in cloud cover  
 C) a decrease in temperature  
 D) an increase in wind speed
- 29) The diagram below represents the general circulation of the Earth's atmosphere and the Earth's planetary wind and pressure belts. Points A through F represent locations on the Earth's surface.



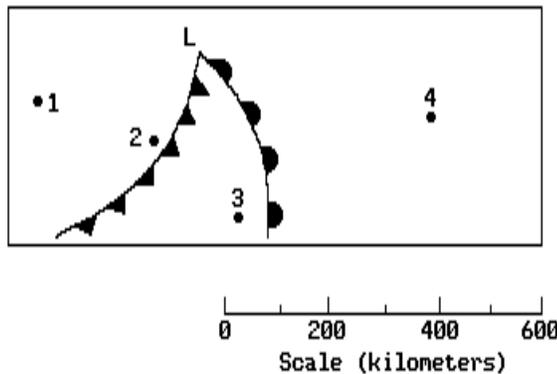
Which location is experiencing a southwest planetary wind?

- A) F                      B) B                      C) C                      D) A

- 30) The map below represents a portion of an air-pressure field at the Earth's surface. At which position is wind speed *lowest*?

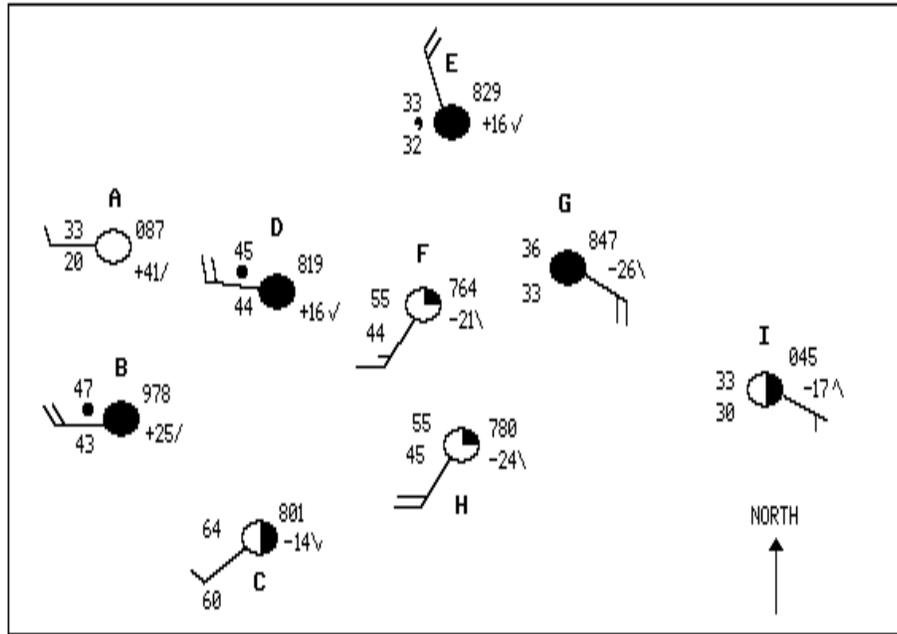


- A) A                      B) C                      C) D                      D) B
- 31) Which symbol would be used to identify an air mass originating in central Canada?  
 A) **cT**                      B) **cP**                      C) **mT**                      D) **mP**
- 32) At which location will a low-pressure storm center most likely form?  
 A) near the middle of a cold air mass  
 B) on the leeward side of mountains  
 C) over a very dry, large, flat land area  
 D) along a frontal surface between different airmasses
- 33) The diagram below shows four points on a map with their relative positions to a low-pressure weather system. Which point is most likely having heavy precipitation?

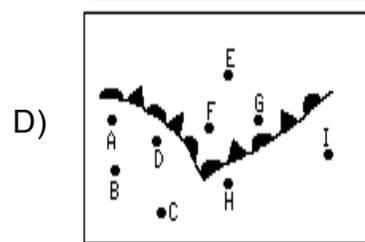
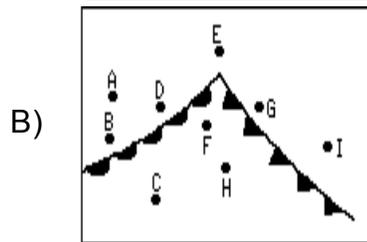
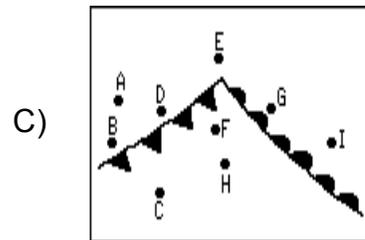
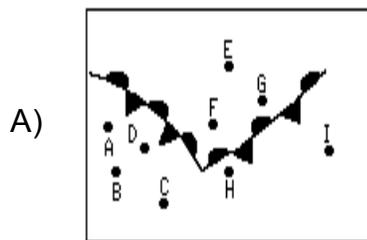


- A) 4                      B) 2                      C) 3                      D) 1

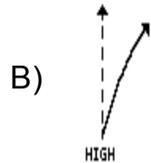
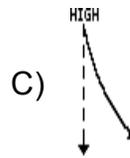
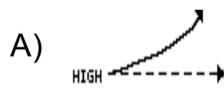
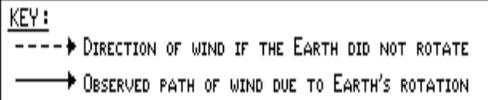
34) The diagram below represents a section of a weather map for locations in the central United States. The letters A through I identify reporting weather stations.



Which diagram best shows the fronts and their locations on the weather map?



- 35) Which drawing best illustrates the general result that the Earth's rotation would have on the direction of the wind as it moves away from the center of a high-pressure system in the Northern Hemisphere?



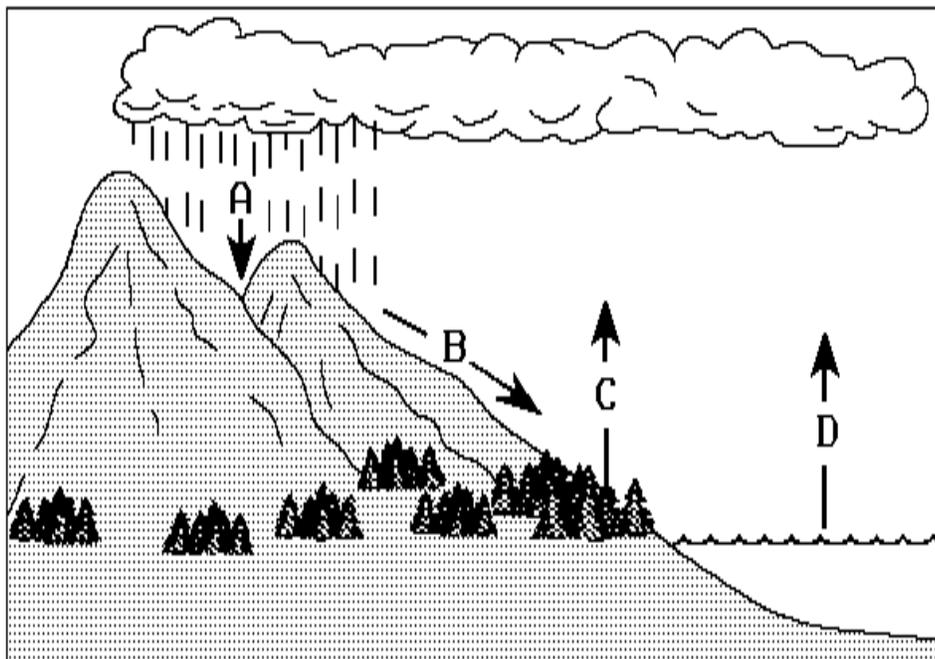
- 36) Why do clouds usually form at the leading edge of a cold airmass?

- A) Cold air flows over warm air, causing the warm air to descend and cool.  
 B) Cold air contains more water vapor than warm air does.  
 C) Cold air flows under warm air, causing the warm air to rise and cool.  
 D) Cold air contains more dust than warm air does.

- 37) Present-day weather predictions are based primarily upon

- A) airmass movements  
 B) land and sea breezes  
 C) cloud height  
 D) ocean currents

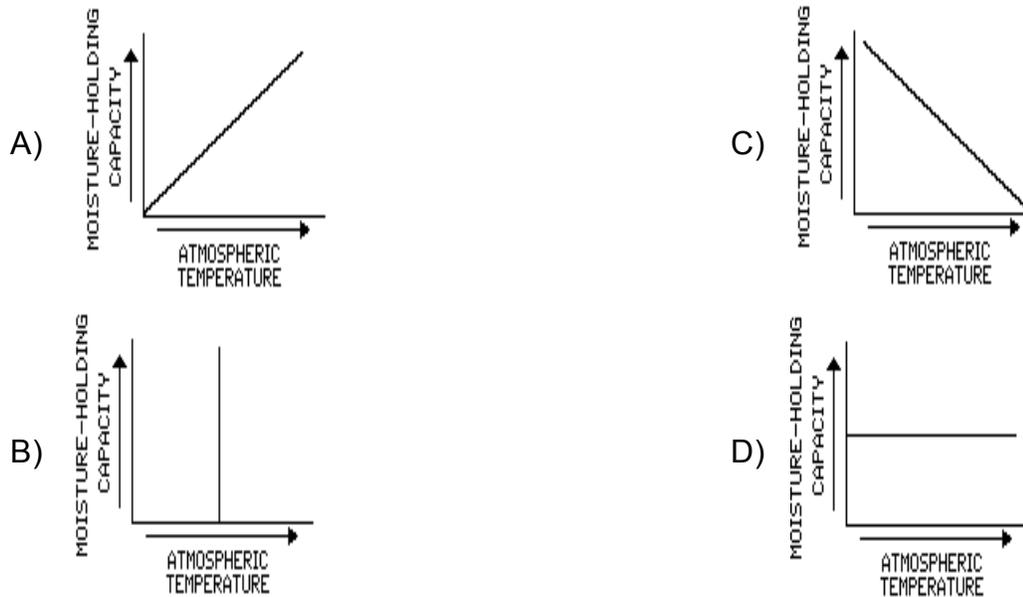
- 38) A diagram of the water cycle is shown below. Letters A through D represent the processes taking place.



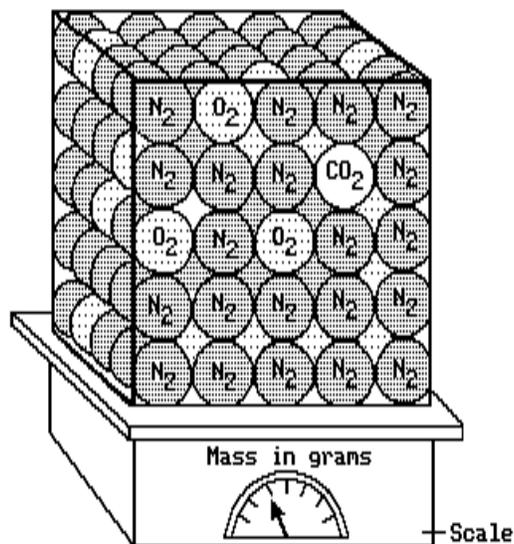
Which arrow represents the process of transpiration?

- A) D  
 B) B  
 C) C  
 D) A

- 39) Which graph best represents the relationship between the moisture-holding capacity (ability to hold moisture) of the atmosphere and atmospheric temperature?



- 40) The diagram below represents a model that shows how air density is affected by the addition of water vapor to the air. Marbles with different masses, representing nitrogen, oxygen, and carbon dioxide, were used to fill a container to show a certain volume of dry air. The container was placed on a scale to find the mass of this volume of dry air.



MOLECULE SYMBOL	GAS	MASS
	Nitrogen	28 g
	Oxygen	32 g
	Carbon Dioxide	44 g
	Water Vapor	18 g

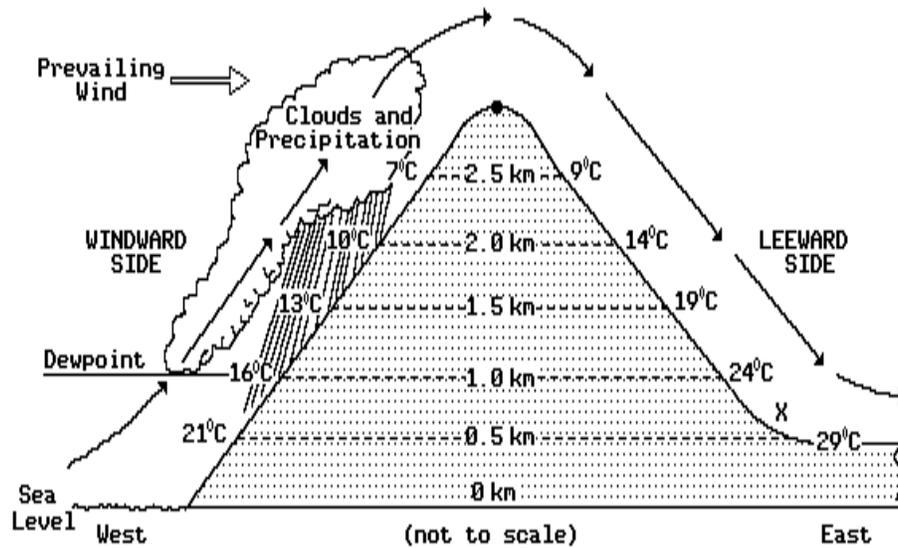
A few marbles representing nitrogen ( $N_2$ ) and oxygen ( $O_2$ ) were removed and replaced with marbles representing water vapor ( $H_2O$ ) to show the same volume of air with water vapor present. The relative mass of each gas, as represented by the marbles, is shown in the data table.

When a few of the marbles representing nitrogen and oxygen are replaced with marbles representing water vapor, the air model will become

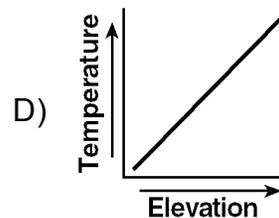
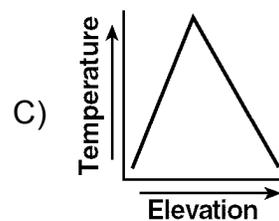
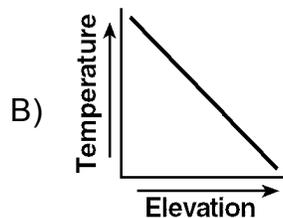
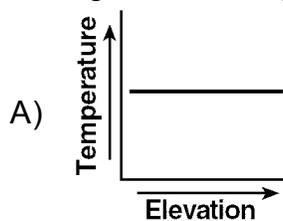
- A) heavier and less dense                      C) lighter and less dense  
 B) heavier and more dense                    D) lighter and more dense

Questions 41 and 42 refer to the following:

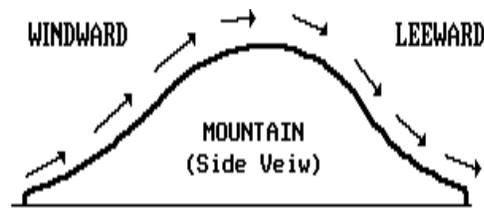
The diagram below shows a mountain. The prevailing wind direction and air temperatures at different elevations on both sides of the mountain are indicated.



- 41) On which side of the mountain and at which elevation is the relative humidity probably 100%?
- A) on the leeward side at 1.0 km  
 B) on the windward side at 0.5 km  
 C) on the windward side at 1.5 km  
 D) on the leeward side at 2.5 km
- 42) The air temperature on the leeward side of the mountain at the 1.5-kilometer level is higher than the temperature at the same elevation on the windward side. What is the probable cause for this?
- A) The insolation received at sea level is greater on the leeward side of the mountain.  
 B) The air on the windward side of the mountain has a lower adiabatic lapse rate than the air on the leeward side of the mountain.  
 C) Heat stored in the ocean keeps the windward side of the mountain warmer.  
 D) Potential energy is lost as rain runs off the windward side of the mountain.
- 43) Which graph *best* shows the general effect that differences in elevation above sea level have on the average annual temperature?

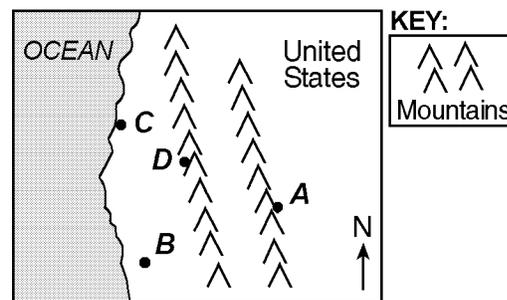


- 44) The diagram below shows the direction of movement of air over a mountain.



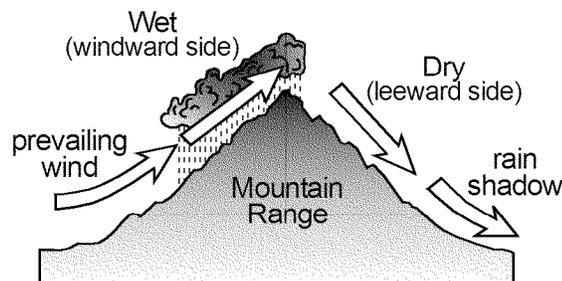
As the air moves down the leeward side of the mountain, the air will

- A) warm due to compression  
 B) cool due to compression  
 C) warm due to expansion  
 D) cool due to expansion
- 45) The map below shows the location of four cities, A, B, C, and D, in the western United States where prevailing winds are from the southwest.



Which city most likely receives the *least* amount of average yearly precipitation?

- A) A  
 B) B  
 C) C  
 D) D
- 46) The cross section below shows how prevailing winds have caused different climates on the windward and leeward sides of a mountain range.

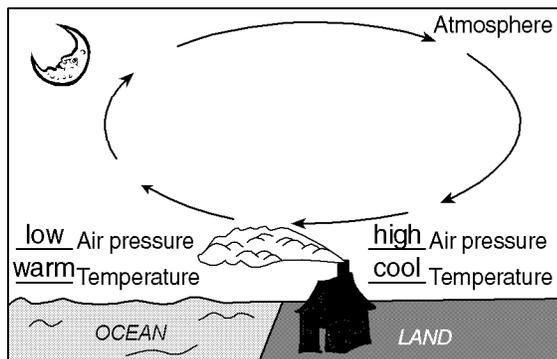


Why does the windward side of this mountain have a wet climate?

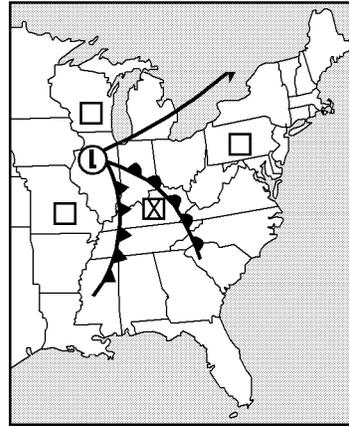
- A) Rising air expands and warms, causing the water droplets to evaporate.  
 B) Rising air compresses and cools, causing the water droplets to evaporate.  
 C) Rising air expands and cools, causing the water vapor to condense.  
 D) Rising air compresses and warms, causing the water vapor to condense.
- 47) Which process most directly results in cloud formation?
- A) radiation  
 B) transpiration  
 C) precipitation  
 D) condensation

- 1) B
- 2) A
- 3) C
- 4) C
- 5) OE
- 6) A
- 7) Ô
- 8) C
- 9) Ó
- 10) D
- 11) C
- 12) C
- 13) C
- 14) C
- 15) B
- 16) C

17)



18)



- 19) C
- 20) A
- 21) B
- 22) C
- 23) C
- 24) C
- 25) C
- 26) C
- 27) B
- 28) D
- 29) B
- 30) B
- 31) B
- 32) D
- 33) B
- 34) C
- 35) B
- 36) C
- 37) A
- 38) C

- 39) A
- 40) C
- 41) C
- 42) B
- 43) B
- 44) A
- 45) A
- 46) C
- 47) D