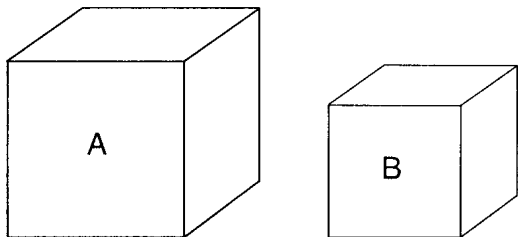


## Earth Science Midterm Review

- Which action can be performed most accurately using only the human senses?  
A) tearing a sheet of paper into squares whose sides measure 1 centimeter  
B) adding 10 grams of salt to a cup of water  
C) measuring the air pressure of a room  
D) counting 28 shells from a beach
- In order to make observations, an observer must always use  
A) experiments  
B) the senses  
C) proportions  
D) mathematical calculations
- Which statement about a major hurricane is an inference?  
A) The windspeed is measured at 200 km/hr.  
B) The central air pressure is recorded at 946.0 mb.  
C) A rain gauge records three inches of rain in less than one hour.  
D) Damage from the storm is expected to be extensive.
- The best example of an inference is a  
A) reading of atmospheric pressure  
B) measurement of air temperature  
C) weather forecast for 3 days  
D) determination of dewpoint temperature
- The primary purpose of a classification system is to enable people to  
A) make measurements that are very accurate  
B) eliminate inaccurate inferences  
C) organize observations in a meaningful way  
D) extend their powers of observation

Base your answers to questions 6 through 9 on the diagrams below, which represent two different solid, uniform materials cut into cubes *A* and *B*.

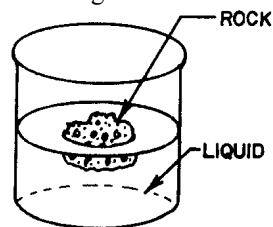


Mass of A = 320 g      Density of B = 3 g/cm<sup>3</sup>  
Volume of A = 64 cm<sup>3</sup>      Volume of B = 27 cm<sup>3</sup>

(Not drawn to scale)

- What is the mass of cube *B*?  
A) 9 g      B) 27 g      C) 3 g      D) 81 g

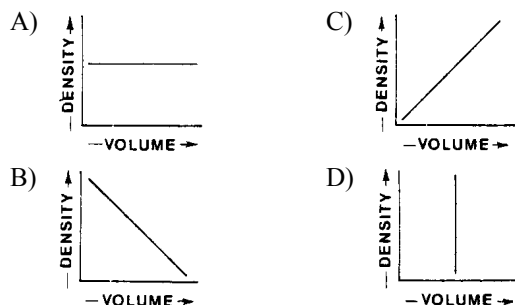
- A student calculates the density of a third material as 8.3 grams per cubic centimeter instead of the accepted value of 8.0 grams per cubic centimeter. What is the student's approximate percent deviation (percent of error)?  
A) 3.8%      B) 30.0%      C) 3.0%      D) 36.1%
- Assume cube *B* was broken into many irregularly shaped pieces. Compared to the density of the entire cube, the density of one of the pieces would be  
A) less      C) the same  
B) greater
- What is the density of cube *A*?  
A) 0.2 g/cm<sup>3</sup>      C) 12.8 g/cm<sup>3</sup>  
B) 5.0 g/cm<sup>3</sup>      D) 64.0 g/cm<sup>3</sup>
- The diameter through the equator of Jupiter is about 143,000 kilometers. What is this distance written in scientific notation (powers of 10)?  
A)  $143 \times 10^2$  km      C)  $1.43 \times 10^5$  km  
B)  $1.43 \times 10^3$  km      D)  $143 \times 10^5$  km
- A quantity of water is frozen solid and then heated from 0°C to 10°C. Which statement best describes the properties of the water during this time?  
A) Mass and volume change.  
B) Volume and density change.  
C) Mass changes but volume remains constant.  
D) Volume changes but density remains constant.
- The diagram below shows a glass jar containing a clear liquid and a floating rock.



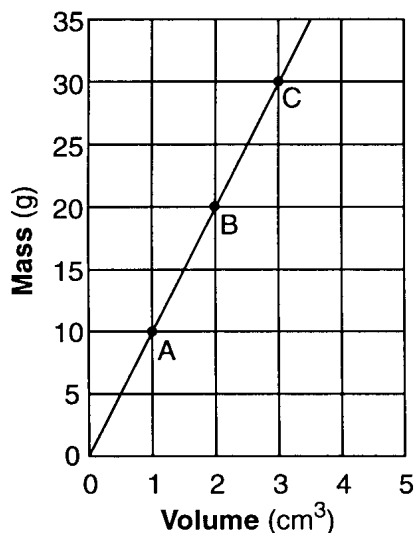
Which conclusion about the relative density of the rock and the liquid is true?

- The rock is less dense than the liquid.  
B) The rock is more dense than the liquid.  
C) The rock and the liquid have the same density.
- The Earth's actual shape is most correctly described as  
A) a circle      C) an oblate sphere  
B) a perfect sphere      D) an eccentric ellipse
- Measurements taken from space show the Earth to be  
A) greatest in diameter at the Equator  
B) greatest in diameter at the poles  
C) a perfect sphere  
D) pear shaped

15. A student calculates the densities of five different pieces of aluminum, each having a different volume. Which graph best represents this relationship?

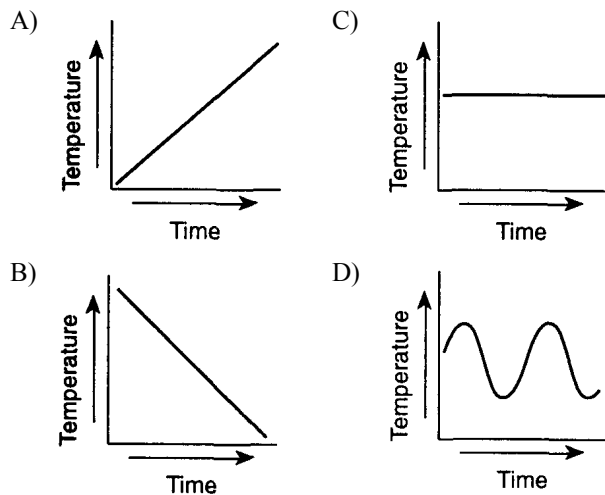


16. The graph below shows the relationship between mass and volume for three samples, A, B, and C, of a given material.



What is the density of this material?

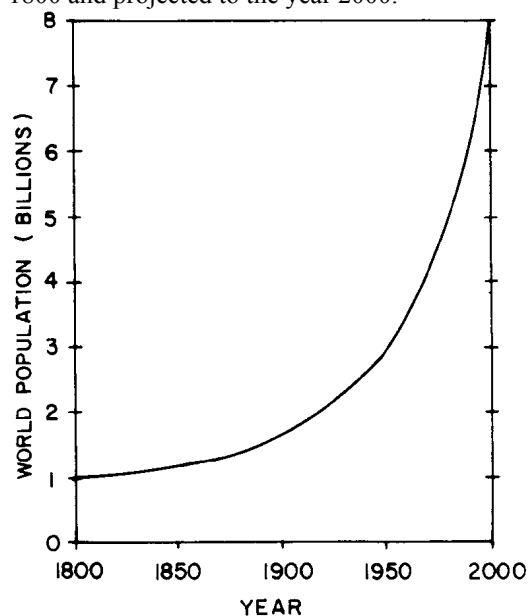
- A) 1.0 g/cm<sup>3</sup>                      C) 10.0 g/cm<sup>3</sup>  
 B) 5.0 g/cm<sup>3</sup>                      D) 20.0 g/cm<sup>3</sup>
17. Which graph most likely illustrates a cyclic change?



18. Most scientists believe Earth's Early Archean atmosphere was formed primarily by gases released from

- A) stream erosion                      C) volcanic eruptions  
 B) chemical weathering              D) plant transpiration

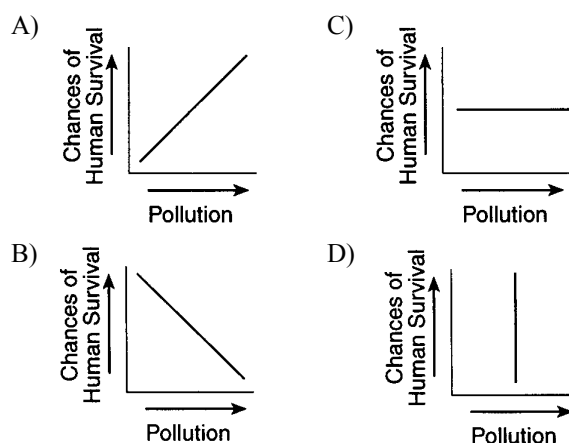
19. The graph below shows world population beginning in the year 1800 and projected to the year 2000.



The graph shows the greatest increase in population between

- A) 1825 and 1850                      C) 1925 and 1950  
 B) 1875 and 1900                      D) 1975 and 2000

20. Which graph shows the most probable effect of environmental pollution on the chances of human survival?



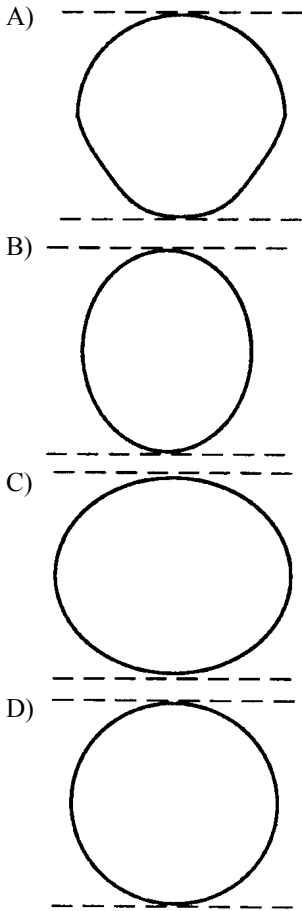
21. Which list contains three major greenhouse gases found in Earth's atmosphere?

- A) carbon dioxide, methane, and water vapor  
 B) carbon dioxide, oxygen, and nitrogen  
 C) hydrogen, oxygen, and methane  
 D) hydrogen, water vapor, and nitrogen

22. Most scientists infer that increasing levels of carbon dioxide in Earth's atmosphere are contributing to

- A) decreased thickness of the troposphere  
 B) depletion of ozone  
 C) increased absorption of ultraviolet radiation  
 D) increased global temperatures

23. Which diagram most accurately shows the cross-sectional shape of the Earth?



24. The ozone layer protects life on Earth by absorbing harmful ultraviolet radiation. The ozone layer is located between 17 kilometers and 35 kilometers above Earth's surface in which atmospheric temperature zone?

- A) troposphere
- B) stratosphere
- C) mesosphere
- D) thermosphere

25. Earth's early atmosphere formed during the Early Archean Era. Which gas was generally absent from the atmosphere at that time?

- A) water vapor
- B) carbon dioxide
- C) nitrogen
- D) oxygen

26. At an altitude of 95 miles above Earth's surface, nearly 100% of the incoming energy from the Sun can be detected. At 55 miles above Earth's surface, most incoming x-ray radiation and some incoming ultraviolet radiation can no longer be detected. This missing radiation was most likely

- A) absorbed in the thermosphere
- B) absorbed in the mesosphere
- C) reflected by the stratosphere
- D) reflected by the troposphere

27. As altitude increases from the tropopause to the mesopause, the atmospheric temperature will

- A) decrease, only
- B) increase, only
- C) decrease, then increase
- D) increase, then decrease

28. Why do most clouds form in the troposphere?

- A) Air pressure rises with increasing altitude.
- B) The dewpoint is too high in the other layers of the atmosphere.
- C) The other layers of the atmosphere are too cold to contain water.
- D) The lowest 11 km of the atmosphere contains almost all of the atmospheric water vapor.

29. Earth's hydrosphere is best described as the

- A) solid outer layer of Earth
- B) liquid outer layer of Earth
- C) magma layer located below Earth's stiffer mantle
- D) gaseous layer extending several hundred kilometers from Earth into space

30. What is the inferred pressure, in millions of atmospheres, in Earth's interior at a depth of 2900 kilometers?

- A) 1.4
- B) 9.9
- C) 3.0
- D) 4900

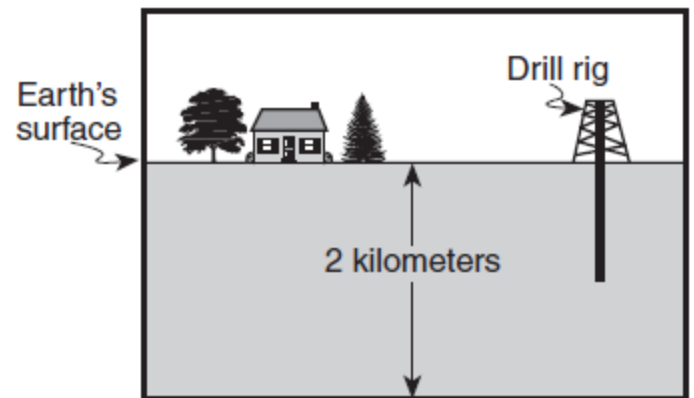
31. In which Earth layer does the pressure reach 3.5 million atmospheres?

- A) crust
- B) stiffer mantle
- C) outer core
- D) inner core

32. Which atmospheric temperature zone is located between 8 and 32 miles above Earth's surface and contains an abundance of ozone?

- A) troposphere
- B) stratosphere
- C) mesosphere
- D) thermosphere

33. The cross section below shows a drill rig used to collect rock samples from below Earth's surface.



(Not drawn to scale)

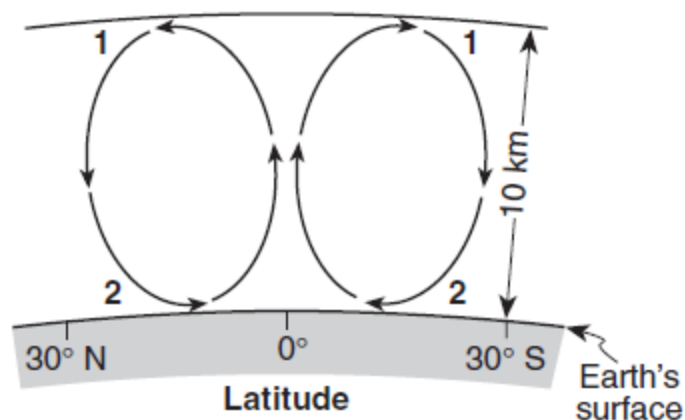
The rock samples collected from the bottom of the drill hole came from which Earth layer?

- A) lithosphere
- B) hydrosphere
- C) asthenosphere
- D) stiffer mantle

34. New York State's highest peak, Mt. Marcy, is located at approximately

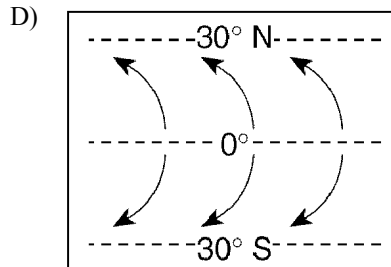
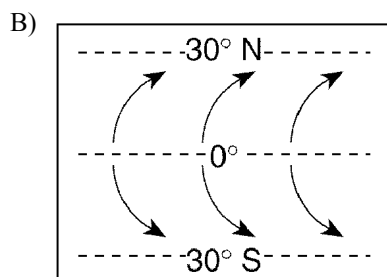
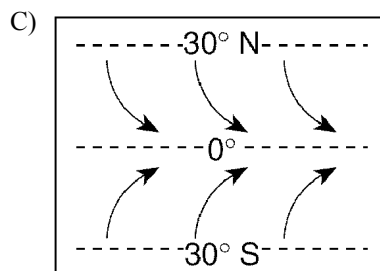
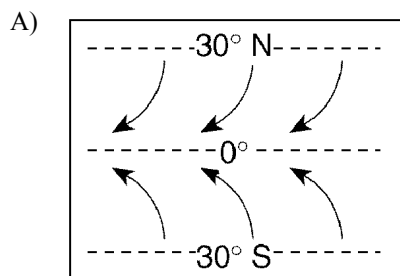
- A) 44°10' N 74°05' W
- B) 44°05' N 73°55' W
- C) 73°55' N 44°10' W
- D) 74°05' N 44°05' W

Base your answers to questions 35 through 38 on the cross section below and on your knowledge of Earth science. The cross section shows the general movement of air within a portion of Earth's atmosphere located between 30° N and 30° S latitude. Numbers 1 and 2 represent different locations in the atmosphere.



(Not drawn to scale)

35. What is the approximate percentage by volume of oxygen present in Earth's atmosphere at location 2?
- A) 10%      B) 21%      C) 33%      D) 46%
36. The air movement shown in the cross section is due to the process of
- A) condensation      B) conduction      C) evaporation      D) convection
37. Which temperature zone layer of Earth's atmosphere is shown in the cross section?
- A) troposphere      B) stratosphere      C) mesosphere      D) thermosphere
38. Which map best shows the surface movement of winds between 30° N and 30° S latitude?



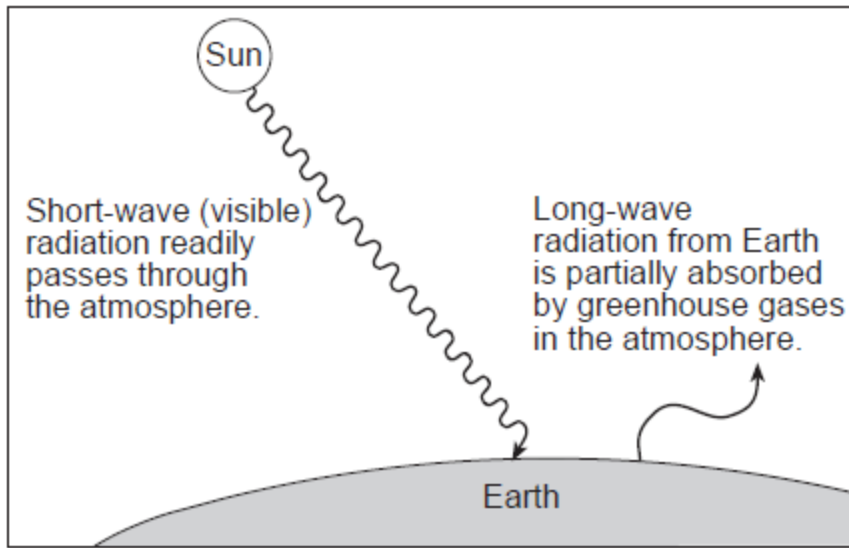
39. Which New York State city is located at 42°39' N 73°45' W?

A) Buffalo      C) Ithaca  
B) Albany      D) Plattsburgh

40. Which mantle hot spot is located directly below a mid-ocean ridge plate boundary?

A) Yellowstone      C) Canary Islands  
B) Iceland      D) Hawaii

41. Base your answer to the following question on the diagram below, which represents the greenhouse effect in which heat energy is trapped in Earth's atmosphere



(Not drawn to scale)

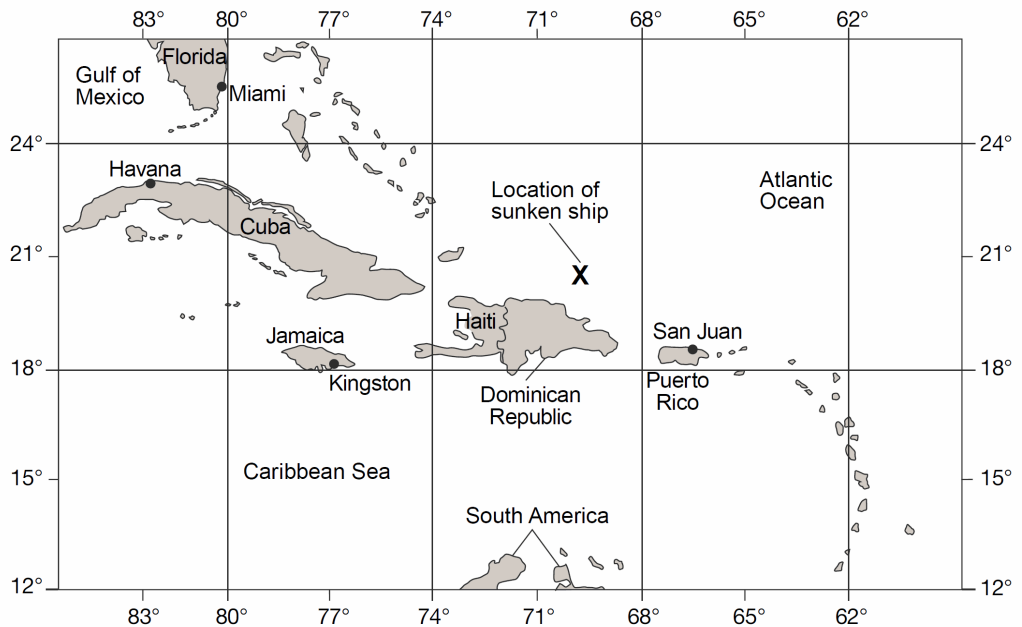
Which type of radiation from Earth is the long-wave radiation absorbed by greenhouse gases?

- A) ultraviolet      B) visible light      C) infrared      D) radio waves
42. What is the relative humidity when the dry-bulb temperature is  $16^{\circ}\text{C}$  and the wet-bulb temperature is  $14^{\circ}\text{C}$ ?
- A) 90%    B) 80%    C) 14%    D) 13%
43. The diagram below represents an observer measuring the altitude of *Polaris*.
- 
- Zenith     $37^{\circ}$     *Polaris*     $53^{\circ}$     Horizon
- At which latitude is this observer located?
- A)  $16^{\circ}\text{N}$     B)  $37^{\circ}\text{N}$     C)  $53^{\circ}\text{N}$     D)  $90^{\circ}\text{N}$
44. Which process is responsible for the greatest loss of energy from Earth's surface into space on a clear night?
- A) condensation      C) radiation  
B) conduction      D) convection
45. In which region of the electromagnetic spectrum is most of Earth's outgoing terrestrial radiation?
- A) infrared      C) ultraviolet  
B) visible      D) x-rays
46. Which type of land surface would probably reflect the most incoming solar radiation?
- A) light colored and smooth  
B) light colored and rough  
C) dark colored and smooth  
D) dark colored and rough
47. The energy radiated from the Sun consists of a
- A) narrow range of wavelengths, with ultraviolet radiation having the greatest intensity  
B) narrow range of wavelengths, with infrared radiation having the greatest intensity  
C) wide range of wavelengths, with visible radiation having the greatest intensity  
D) wide range of wavelengths, with x-ray radiation having the greatest intensity
48. An object that is a good radiator of electromagnetic waves is also a good
- A) insulator from heat  
B) reflector of heat  
C) absorber of electromagnetic energy  
D) refractor of electromagnetic energy

Base your answers to questions 49 through 51 on the passage and map below. The map shows sections of the Atlantic Ocean, the Caribbean Sea, and the Gulf of Mexico.

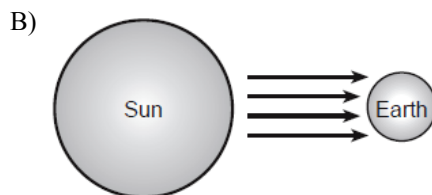
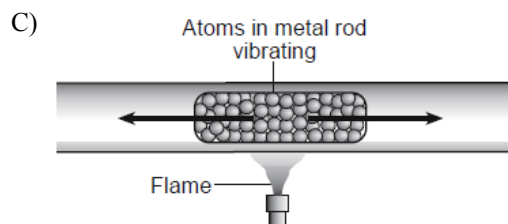
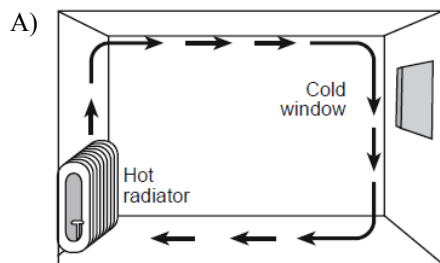
### Shipwreck

In 1641, the crew of the ship *Concepcion* used the Sun and stars for navigation. The crew thought that the ship was just north of Puerto Rico, but ocean currents had carried them off course. The ship hit a coral reef and sank off the coast of the Dominican Republic. The X on the map marks the location of the sunken ship.

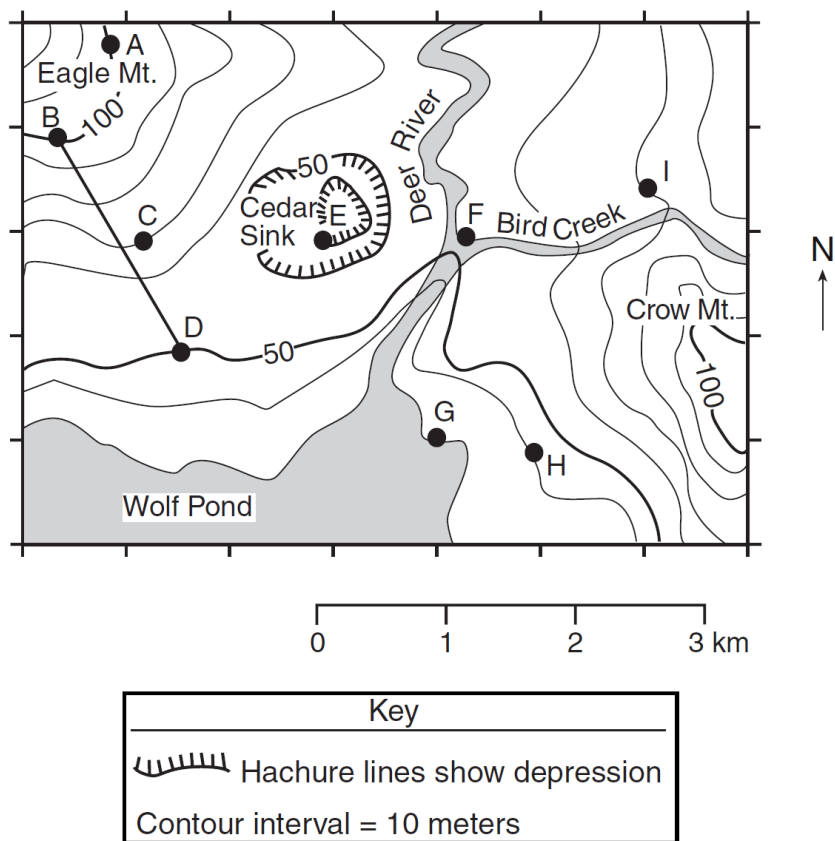


49. At which map location does *Polaris* appear the highest in the nighttime sky?
- A) Miami, Florida  
B) Kingston, Jamaica  
C) Havana, Cuba  
D) San Juan, Puerto Rico
50. What is the approximate latitude and longitude of the sunken ship?
- A) 20.5° N 70° E  
B) 20.5° N 70° W  
C) 20.5° S 70° E  
D) 20.5° S 70° W
51. On which tectonic plate is Puerto Rico located?
- A) North American Plate  
B) South American Plate  
C) Caribbean Plate  
D) Cocos Plate

52. Which diagram best represents heat transfer mainly by the process of conduction?



Base your answers to questions 53 through 56 on the topographic map below. Points *A* through *I* are locations on the map. Elevations are shown in meters.



53. Which locations have the same elevation?

- A) *A* and *C*      B) *B* and *E*      C) *C* and *I*      D) *F* and *G*

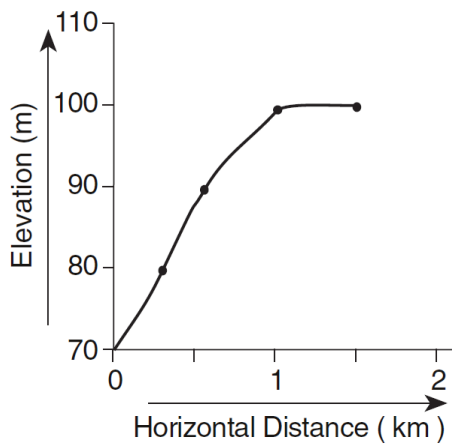
54. In which section of the map is the highest elevation located?

- A) northeast      B) northwest      C) southeast      D) southwest

55. The contour lines crossing Deer River show that the river flows

- A) northward out of Wolf Pond      C) southward out of Wolf Pond  
B) northward into Wolf Pond      D) southward into Wolf Pond

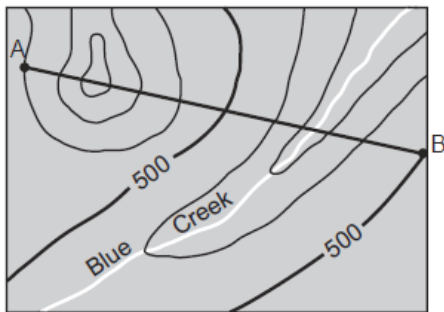
56. The profile below represents certain locations on the map.



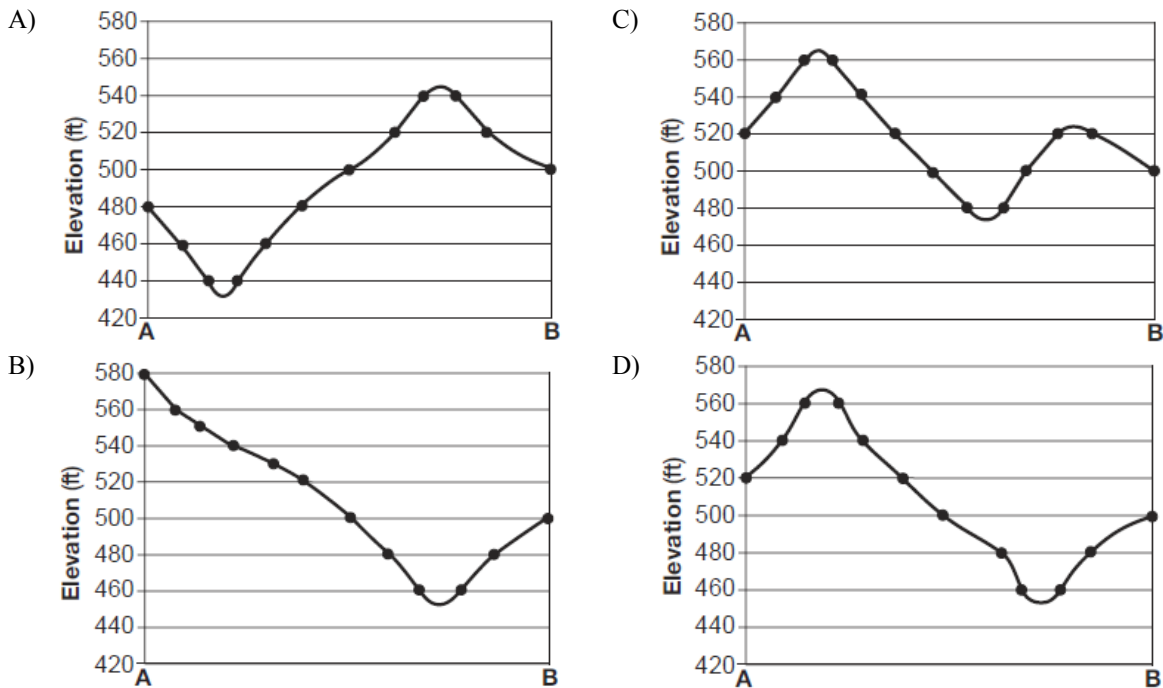
The profile represents a cross section of the landscape between points

- A) *A* and *D*                      B) *B* and *C*                      C) *C* and *A*                      D) *I* and *H*

57. The topographic map below has a contour interval of 20 feet. Points *A* and *B* represent locations on Earth's surface.



Which profile best represents the topographic cross section along the line from *A* to *B*?



58. Pollutants are most likely to be removed from the atmosphere by

- A) evaporation                      C) volcanic activity  
B) precipitation                      D) transpiration

59. Which type of air mass most likely has high humidity and high temperature?

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



60. The air above a burning candle is heated and rises. Which table correctly identifies the type of heat transfer within the rising air and the change in air density above the burning candle?

A)

Type of Heat Transfer	Change in Air Density
conduction	density increases

C)

Type of Heat Transfer	Change in Air Density
convection	density increases

B)

Type of Heat Transfer	Change in Air Density
conduction	density decreases

D)

Type of Heat Transfer	Change in Air Density
convection	density decreases

61. Conduction is the transfer of heat energy by

- A) density differences
- B) molecular contact
- C) electromagnetic waves
- D) movement through a vacuum

62. Heat energy from the lower latitudes is transferred to colder Earth regions by planetary wind circulation mainly through the process of

- A) conduction
- B) radiation
- C) convection
- D) reflection

63. Ozone is important to life on Earth because ozone

- A) cools refrigerators and air-conditioners
- B) absorbs energy that is reradiated by Earth
- C) absorbs harmful ultraviolet radiation
- D) destroys excess atmospheric carbon dioxide

64. Compared to a light-colored rock with a smooth surface, a dark-colored rock with a rough surface will

- A) both absorb and reflect less insolation
- B) both absorb and reflect more insolation
- C) absorb less insolation and reflect more insolation
- D) absorb more insolation and reflect less insolation

65. Which change would cause a *decrease* in the amount of insolation absorbed at Earth's surface?

- A) a decrease in cloud cover
- B) a decrease in atmospheric transparency
- C) an increase in the duration of daylight
- D) an increase in nitrogen gas

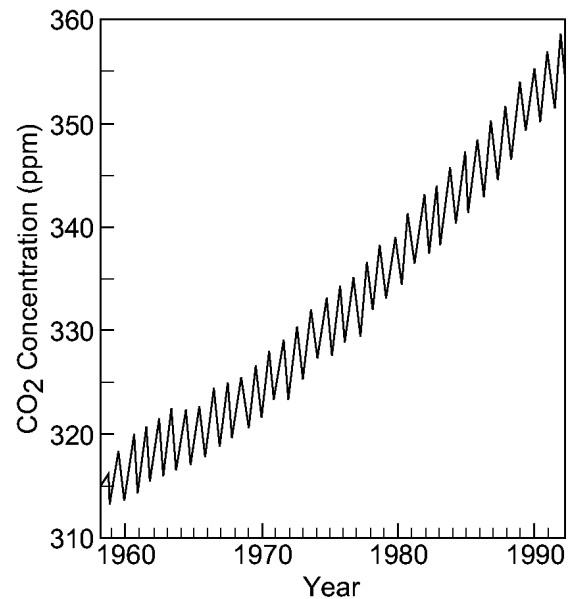
66. Earth's atmosphere is warmed when

- A) ultraviolet radiation emitted by Earth is absorbed by nitrogen and carbon dioxide in the atmosphere
- B) x-ray radiation emitted by Earth is absorbed by nitrogen and carbon dioxide in the atmosphere
- C) infrared radiation emitted by Earth is absorbed by carbon dioxide and water vapor in the atmosphere
- D) gamma radiation emitted by Earth is absorbed by carbon dioxide and water vapor in the atmosphere

67. What is the dewpoint when the dry-bulb temperature is 8°C and the wet-bulb temperature is 2°C?

- A) 28°C
- B) 6°C
- C) 3°C
- D) -9°C

68. The graph below shows the change in carbon dioxide concentration in parts per million (ppm) in Earth's atmosphere from 1960 to 1990.



The most likely cause of the overall change in the level of carbon dioxide from 1960 to 1990 is an increase in the

- A) number of violent storms
- B) number of volcanic eruptions
- C) use of nuclear power
- D) use of fossil fuels

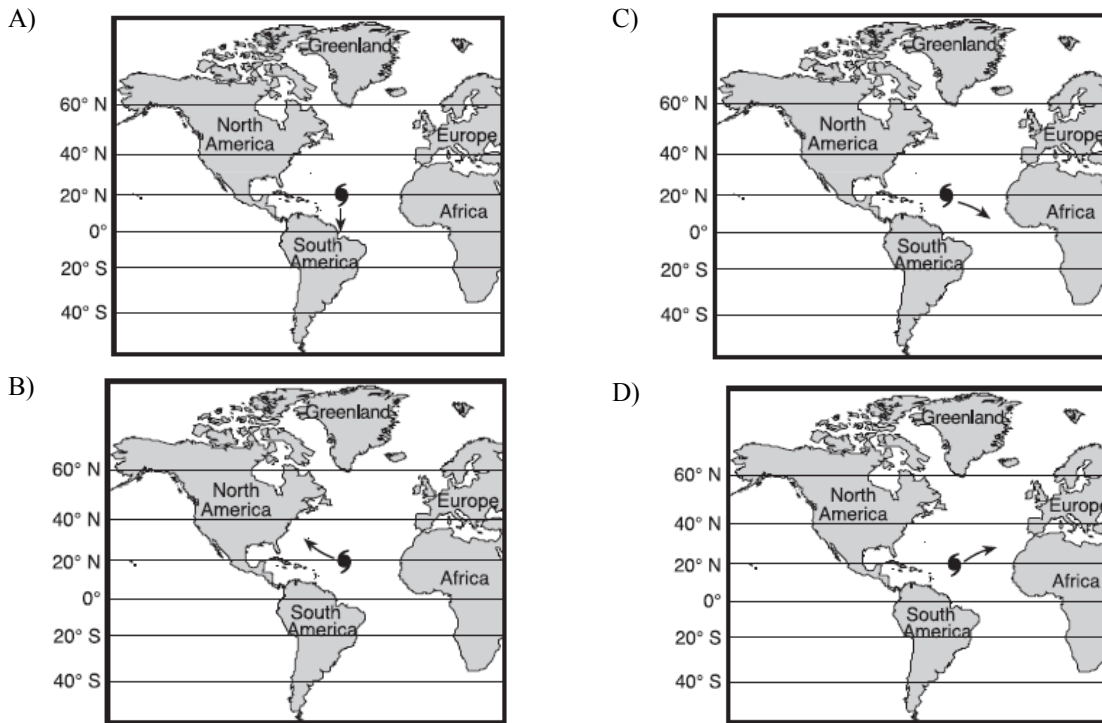
69. Which weather change is most likely indicated by rapidly falling air pressure?

- A) Humidity is decreasing.
- B) Temperature is decreasing.
- C) Skies are clearing.
- D) A storm is approaching.

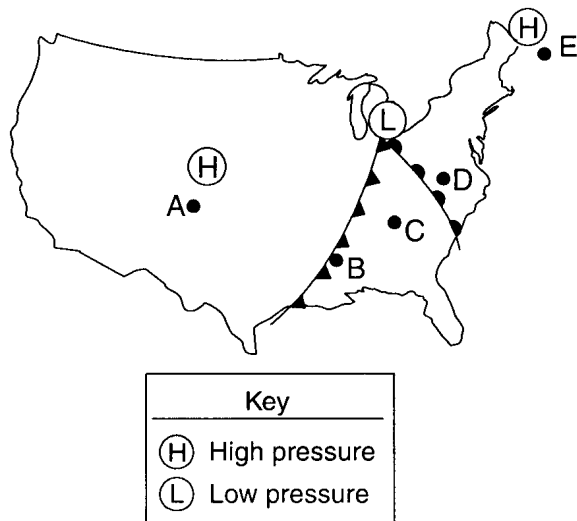
70. Weather-station measurements indicate that the dewpoint temperature and air temperature are getting farther apart and that air pressure is rising. Which type of weather is most likely arriving at the station?

- A) a snowstorm
- B) a warm front
- C) cool, dry air
- D) maritime tropical air

71. Which map below shows the most likely storm track for a hurricane in the Atlantic Ocean?



72. The map below shows high-pressure and low-pressure weather systems in the United States.



Which two lettered positions on the map are most likely receiving precipitation?

- A) A and B                      C) C and E  
B) B and D                      D) A and D

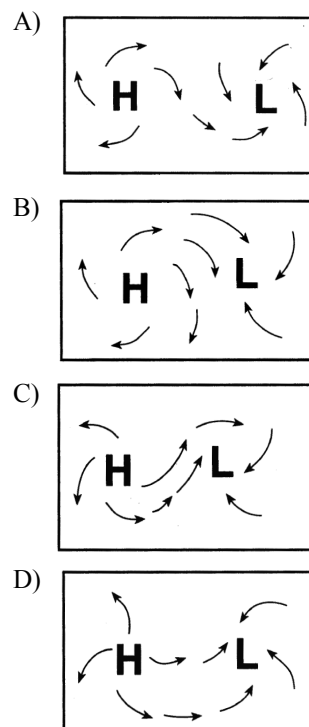
73. Monsoons develop as a result of

- A) large changes between the temperatures of a continent and neighboring oceans  
B) a continent and neighboring oceans having nearly the same temperatures  
C) air rising over Earth's equatorial region  
D) air sinking over Earth's polar regions

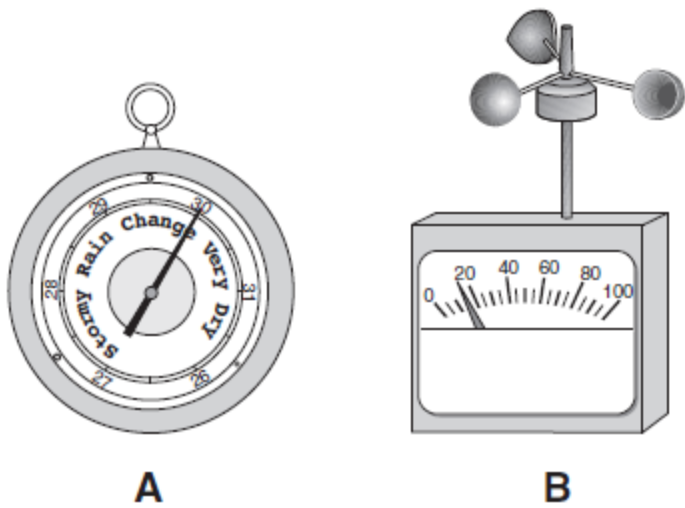
74. A psychrometer is used to determine which weather variables?

- A) wind speed and wind direction  
B) percentage of cloud cover and cloud height  
C) air pressure and air temperature  
D) relative humidity and dewpoint

75. Which map best represents the surface wind pattern around Northern Hemisphere high-pressure and low-pressure centers?



76. The diagram below shows weather instruments *A* and *B*.



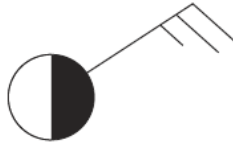
Which table correctly indicates the name of the weather instrument and the weather variable that it measures?

- A)
- | Instrument |             | Weather Variable Measured |
|------------|-------------|---------------------------|
| Letter     | Name        |                           |
| A          | thermometer | humidity                  |
| B          | wind vane   | wind direction            |
- B)
- | Instrument |             | Weather Variable Measured |
|------------|-------------|---------------------------|
| Letter     | Name        |                           |
| A          | thermometer | wind direction            |
| B          | wind vane   | humidity                  |
- C)
- | Instrument |            | Weather Variable Measured |
|------------|------------|---------------------------|
| Letter     | Name       |                           |
| A          | barometer  | wind speed                |
| B          | anemometer | air pressure              |
- D)
- | Instrument |            | Weather Variable Measured |
|------------|------------|---------------------------|
| Letter     | Name       |                           |
| A          | barometer  | air pressure              |
| B          | anemometer | wind speed                |

77. Large volcanic eruptions sometimes send dust and ash into the stratosphere. After these eruptions, global air temperatures are often

- A) cooler than normal because the atmosphere is less transparent
- B) cooler than normal because the atmosphere is more transparent
- C) warmer than normal because the atmosphere is less transparent
- D) warmer than normal because the atmosphere is more transparent

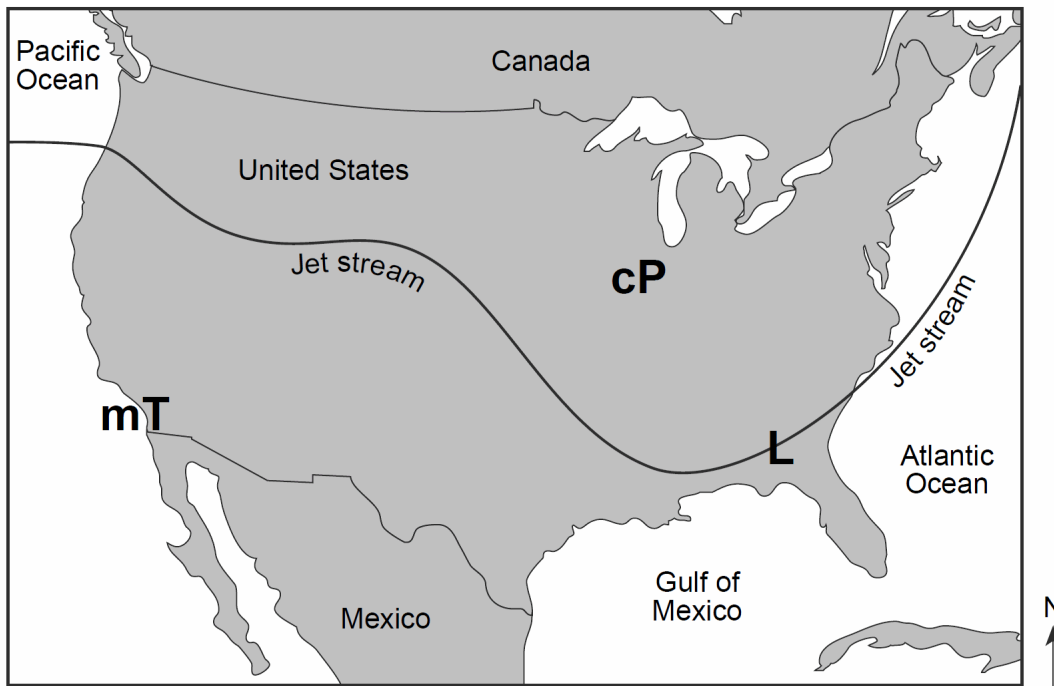
78. The weather station model below shows some of the weather data for a certain location.



What is the wind speed shown on the station model and which instrument is used to measure the wind speed?

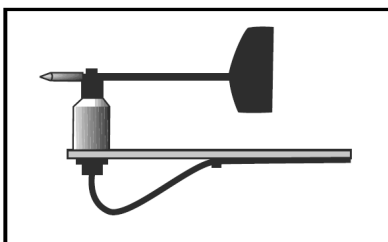
- A) 15 knots, measured by a wind vane
- B) 15 knots, measured by an anemometer
- C) 25 knots, measured by a wind vane
- D) 25 knots, measured by an anemometer

Base your answers to questions 79 through 82 on the map below, which shows the position of the jet stream relative to two air masses and a low-pressure center (L) over the United States.



79. Assuming the low-pressure center (L) follows a typical storm track, it will move
- A) into the mT air mass to the west
  - B) into the cP air mass to the northwest
  - C) along the path of the jet stream to the northeast
  - D) along the path of the jet stream to the southwest
80. In which layer of the atmosphere is this jet stream located?
- A) thermosphere
  - B) mesosphere
  - C) stratosphere
  - D) troposphere
81. What is the difference in the air temperature and humidity between the cP and mT air masses?
- A) The cP air mass is warmer and less humid.
  - B) The cP air mass is colder and more humid.
  - C) The mT air mass is warmer and more humid.
  - D) The mT air mass is colder and less humid.
82. What is the general movement of the surface winds around the center of this low-pressure area?
- A) counterclockwise and outward
  - B) counterclockwise and inward
  - C) clockwise and outward
  - D) clockwise and inward

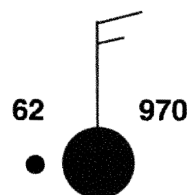
83. The diagram below shows a weather instrument found at most weather stations.



The main function of this instrument is to measure which weather variable?

- A) wind speed
- B) wind direction
- C) air pressure
- D) relative humidity

84. The station model below shows several weather variables recorded at a particular location.



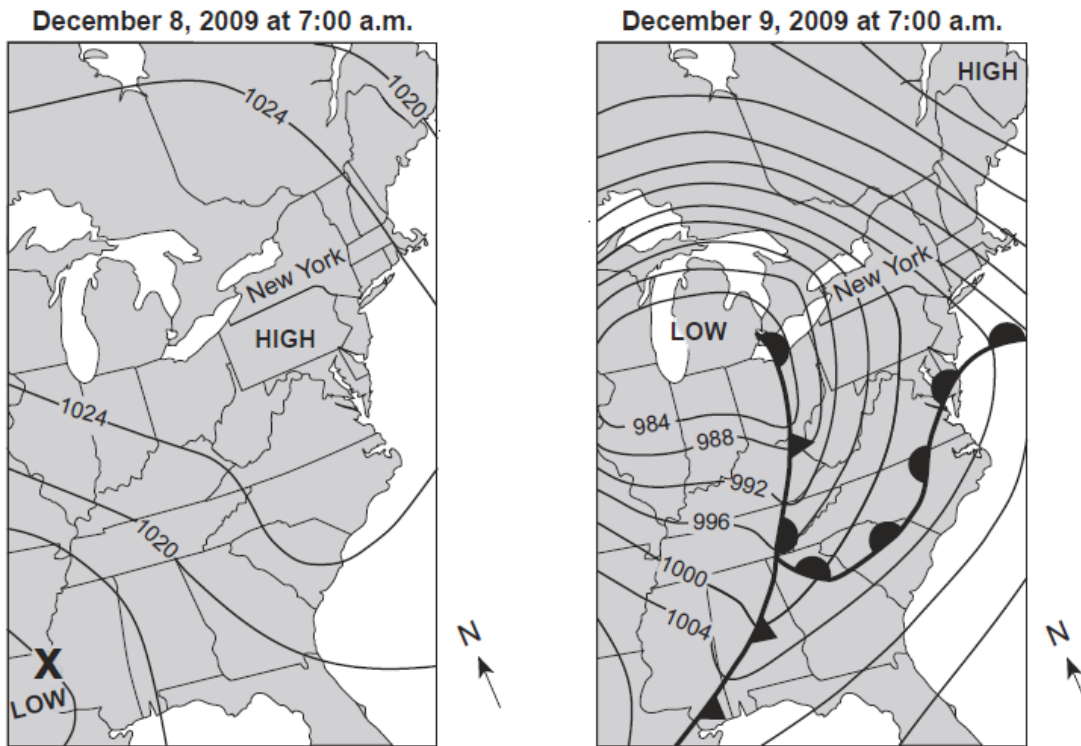
What was the most likely dewpoint at this location?

- A) 32°F
- B) 40°F
- C) 61°F
- D) 70°F

85. Which condition will most likely result in the formation of a cloud?

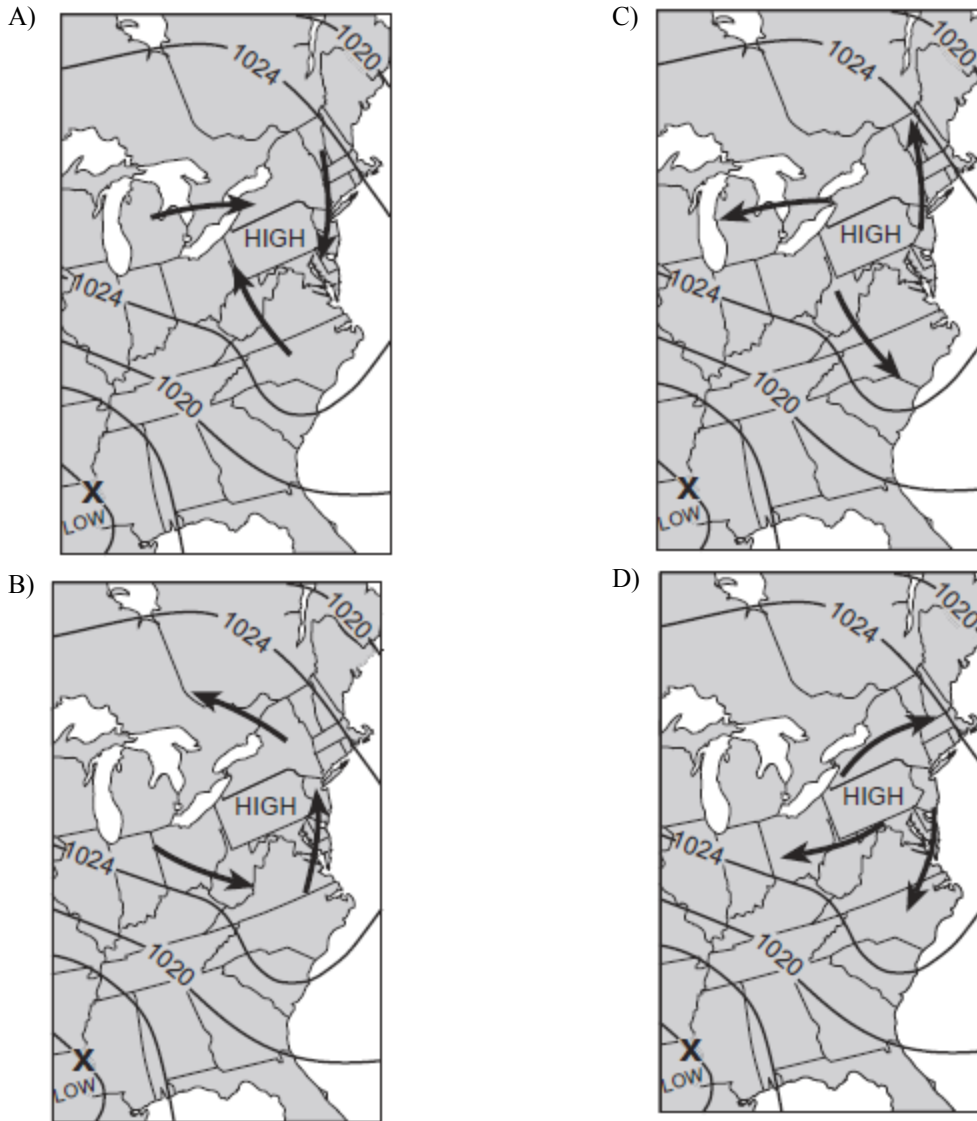
- A) wind speed decreasing
- B) air pressure increasing
- C) cool, moist air sinking
- D) warm, moist air rising

Base your answers to questions **86** through **90** on the weather maps below and on your knowledge of Earth science. The weather maps show the eastern United States on two consecutive days. Some isobars are labeled in millibars (mb). Letter *X* represents a location on Earth's surface on December 8, 2009.



86. Which information shown on the weather maps best indicates that wind speeds in New York State were greater on December 9 than on December 8?
- A) The isobars were closer together on December 9.
  - B) The fronts were closer together on December 9.
  - C) The air pressure over New York State was lower on December 9.
  - D) The air pressure over New York State was higher on December 9.
87. What was the barometric pressure for location *X* on December 8?
- A) 1016 mb
  - B) 1012 mb
  - C) 1008 mb
  - D) 1004 mb

88. Which map best shows the general surface wind pattern around the high-pressure system on December 8?



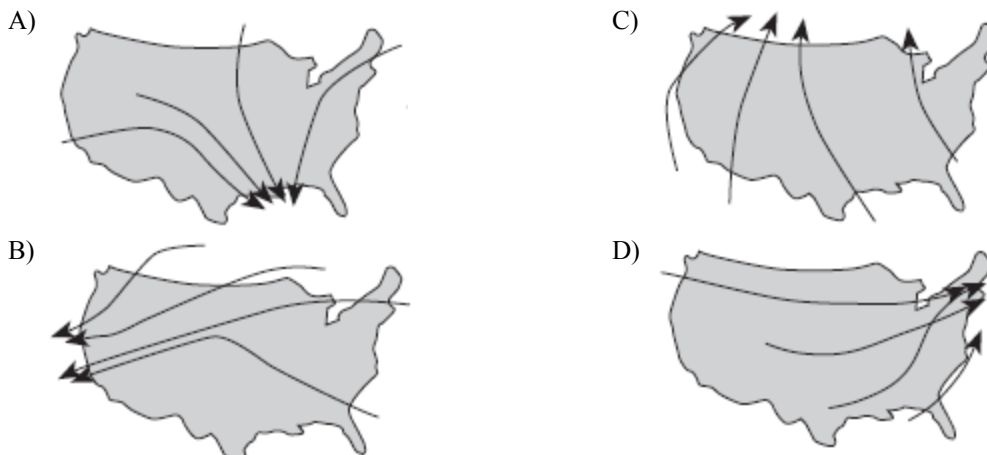
89. In which direction did the high-pressure center move from December 8, 2009, to December 9, 2009?

- A) southwest      B) southeast      C) northwest      D) northeast

90. Which type of front was located just south of New York City on December 9?





- A) cold      B) warm      C) stationary      D) occluded

91. Which map shows normal paths followed by low-pressure storm centers as they pass across the United States?

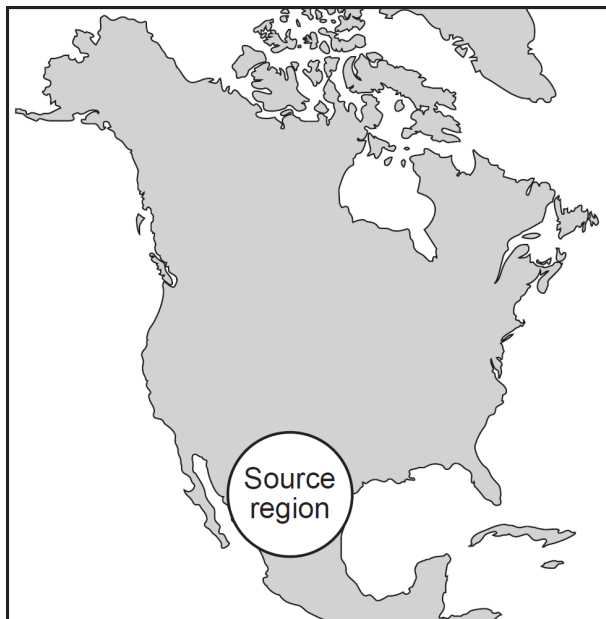




92. Which station model shows an air temperature of 75°F and a barometric pressure of 996.3 mb?

- A)  B)  C)  D) 

93. The map of North America below shows the source region of an air mass forming mostly over Mexico.



This air mass originating over Mexico is classified as

- A) continental polar C) maritime polar  
B) continental tropical D) maritime tropical

94. Which two processes lead to cloud formation in rising air?

- A) compressing and cooling  
B) compressing and warming  
C) expanding and cooling  
D) expanding and warming

95. The table below shows the air temperature and dewpoint at each of four locations, A, B, C, and D.

Location	A	B	C	D
Air temperature (°F)	80	60	45	35
Dewpoint (°F)	60	43	35	33

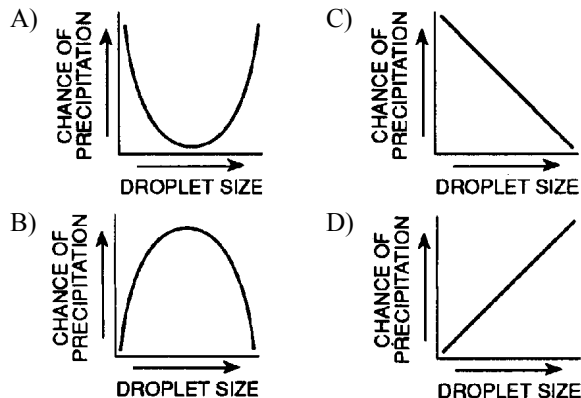
Based on these measurements, which location has the greatest chance of precipitation?

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

96. Which two Earth layers are separated by the Moho boundary?

- A) rigid mantle and plastic mantle  
B) outer core and stiffer mantle  
C) stiffer mantle and asthenosphere  
D) crust and rigid mantle

97. Which graph best represents the relationship between water droplet size and the chance of precipitation?



98. Earth's outer core is best inferred to be

- A) liquid, with an average density of approximately 4 g/cm<sup>3</sup>  
B) liquid, with an average density of approximately 11 g/cm<sup>3</sup>  
C) solid, with an average density of approximately 4 g/cm<sup>3</sup>  
D) solid, with an average density of approximately 11 g/cm<sup>3</sup>

99. What are the four most abundant elements, by volume, in the Earth's crust?

- A) oxygen, potassium, sodium, and calcium  
B) hydrogen, oxygen, nitrogen, and potassium  
C) aluminum, iron, silicon, and magnesium  
D) aluminum, calcium, hydrogen, and iron

100. Andrija Mohorovicic discovered the interface between the crust and the mantle that is now named for him. His discovery of the "Moho" was based on analysis of

- A) landscape boundaries C) erosional surfaces  
B) continental coastlines D) seismic waves

101. What is the approximate P-wave travel time from an earthquake if the P-wave arrives at the seismic station 8 minutes before the S-wave?

- A) 4 minutes 20 seconds C) 10 minutes 0 seconds  
B) 6 minutes 30 seconds D) 11 minutes 20 seconds

102. How long after receiving the first P-wave from an earthquake centered 4000 kilometers away does a seismic station receive its first S-wave from the same earthquake?

- A) 1 minute C) 7 minutes  
B) 5 minutes 35 seconds D) 12 minutes 40 seconds

103. The epicenter of an earthquake is located 6,500 kilometers away from a seismic station. If the first S-wave arrived at this seismic station at 1:30 p.m., at what time did the first P-wave arrive?

- A) 1:20 p.m. C) 1:38 p.m.  
B) 1:22 p.m. D) 1:40 p.m.

104. The map below shows a position of the polar jet stream over North America in January.



Which map best shows the air-mass movements associated with this jet stream position?

- A) Map A shows the polar jet stream curving from the southwest coast of Canada, across the northern United States, and then curving northeastward over the Atlantic Ocean. Arrows indicate air-mass movements: a thick arrow labeled "mT" (maritime tropical) points from the southwest coast of the United States towards the jet stream, and a thinner arrow labeled "cP" (continental polar) points from the interior of Canada towards the jet stream.
- C) Map C shows the polar jet stream curving from the southwest coast of Canada, across the northern United States, and then curving northeastward over the Atlantic Ocean. Arrows indicate air-mass movements: a thick arrow labeled "cT" (continental tropical) points from the southwest coast of the United States towards the jet stream, and a thinner arrow labeled "mP" (maritime polar) points from the interior of Canada towards the jet stream.
- B) Map B shows the polar jet stream curving from the southwest coast of Canada, across the northern United States, and then curving northeastward over the Atlantic Ocean. Arrows indicate air-mass movements: a thick arrow labeled "mP" (maritime polar) points from the southwest coast of the United States towards the jet stream, and a thinner arrow labeled "cT" (continental tropical) points from the interior of Canada towards the jet stream.
- D) Map D shows the polar jet stream curving from the southwest coast of Canada, across the northern United States, and then curving northeastward over the Atlantic Ocean. Arrows indicate air-mass movements: a thick arrow labeled "cP" (continental polar) points from the southwest coast of the United States towards the jet stream, and a thinner arrow labeled "mT" (maritime tropical) points from the interior of Canada towards the jet stream.



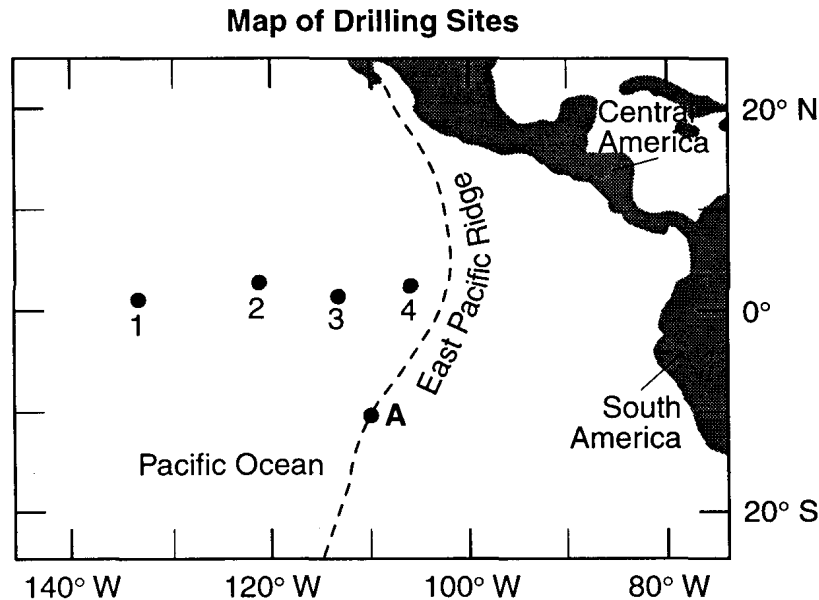
105. The striped areas on the map below show regions along the Great Lakes that often receive large amounts of snowfall due to lake-effect storms.



These storms generally develop when

- A) cold air moves to the east over warmer lake water
- B) cold air moves to the west over warmer land regions
- C) warm air moves to the east over colder lake water
- D) warm air moves to the west over colder land regions

Base your answers to questions **106** through **108** on the map below which shows the locations of deep-sea core drilling sites numbered 1 through 4. The approximate location of the diverging plate at the East Pacific Ridge is shown by a dashed line. Point *A* is located on the East Pacific Ridge.



106. At point *A*, the East Pacific Ridge is the boundary between the
- A) Cocos Plate and the North American Plate
  - B) South American Plate and the Nazca Plate
  - C) Pacific Plate and the South American Plate
  - D) Pacific Plate and the Nazca Plate
107. At which drilling site would the oldest igneous bedrock most likely be found?
- A) 1
  - B) 2
  - C) 3
  - D) 4
108. Compared to the thickness and density of the continental crust of South America, the oceanic crust of the Pacific floor is
- A) thinner and less dense
  - B) thinner and more dense
  - C) thicker and less dense
  - D) thicker and more dense

Base your answers to questions 109 through 111 on the data table below, which gives information collected at seismic stations *W*, *X*, *Y*, and *Z* for the same earthquake. Some of the data have been omitted.

**Data Table**

Seismic Station	P-Wave Arrival Time (h:min:s)	S-Wave Arrival Time (h:min:s)	Difference in Arrival Times (h:min:s)	Distance to Epicenter (km)
W	10:50:00	no S-waves arrived		
X	10:42:00	10:46:40		
Y	10:39:20		00:02:40	
Z	10:45:40			6200

109. Which seismic station was farthest from the earthquake epicenter?

- A) *W*                      B) *X*                      C) *Y*                      D) *Z*

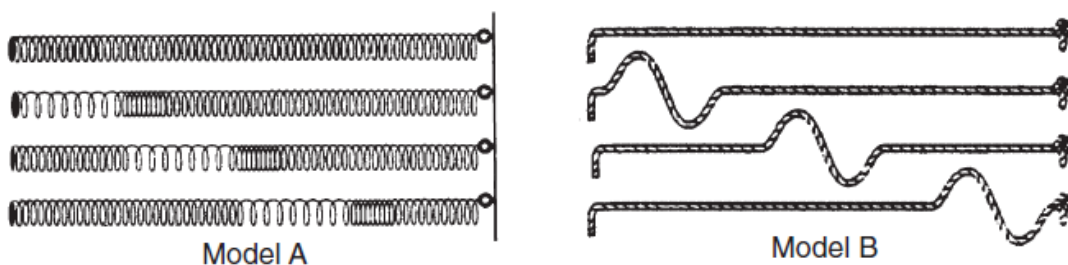
110. What is the most probable reason for the absence of *S*-waves at station *W*?

- A) *S*-waves were not generated at the epicenter.                      C) Station *W* was located on solid bedrock.  
B) *S*-waves cannot travel through liquids.                      D) Station *W* was located on an island.

111. At what time did the *S*-wave arrive at station *Y*?

- A) 10:36:40                      B) 10:39:20                      C) 10:42:00                      D) 10:45:20

112. Base your answer to the following question on the diagram below, which shows models of two types of earthquake waves.



Model *A* best represents the motion of earthquake waves called

- A) *P*-waves (compressional waves) that travel faster than *S*-waves (shear waves) shown in model *B*  
B) *P*-waves (compressional waves) that travel slower than *S*-waves (shear waves) shown in model *B*  
C) *S*-waves (shear waves) that travel faster than *P*-waves (compressional waves) shown in model *B*  
D) *S*-waves (shear waves) that travel slower than *P*-waves (compressional waves) shown in model *B*

113. Oceanic crust is sliding beneath the Aleutian Islands in the North Pacific Ocean, forming the Aleutian Trench at a

- A) convergent plate boundary between the Pacific Plate and the North American Plate  
B) convergent plate boundary between the Pacific Plate and the Juan de Fuca Plate  
C) divergent plate boundary between the Pacific Plate and the North American Plate  
D) divergent plate boundary between the Pacific Plate and the Juan de Fuca Plate

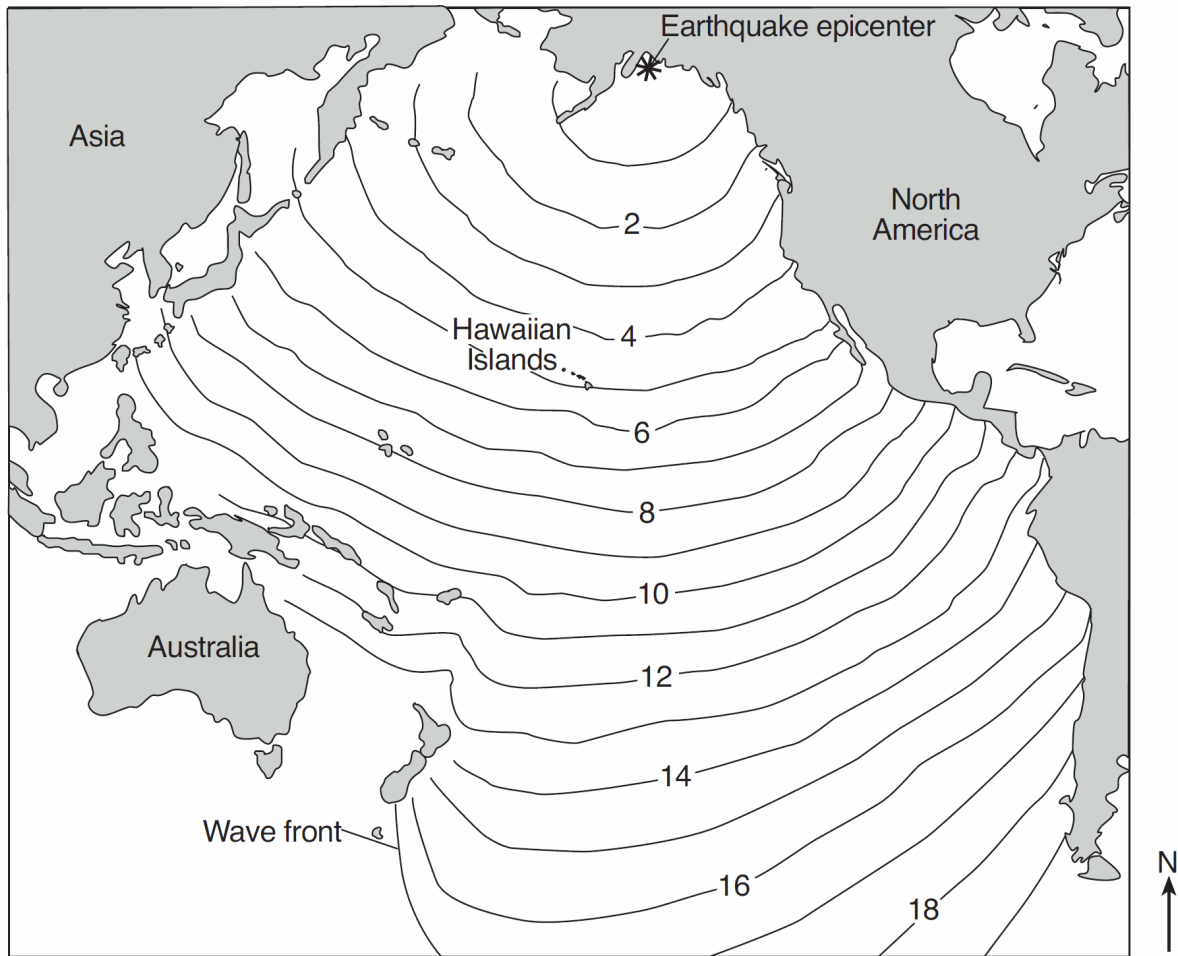
114. Crustal formation, which may cause the widening of an ocean, is most likely occurring at the boundary between the

- A) African Plate and the Eurasian Plate  
B) Pacific Plate and the Philippine Plate  
C) Indian-Australian Plate and the Antarctic Plate  
D) South American Plate and the North American Plate

115. The Indian-Australian tectonic plate is moving

- A) away from the Philippine Plate  
B) away from the Fiji Plate  
C) toward the Pacific Plate  
D) toward the Antarctic Plate

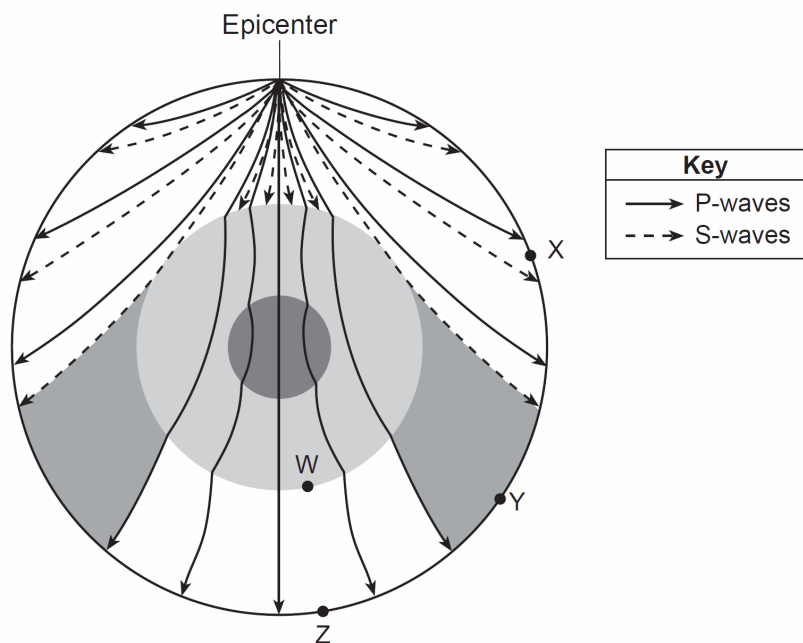
116. The map below shows changes in the position of the tsunami wave front produced by the 1964 Alaskan earthquake. The numbers indicate the time, in hours, for the wave front to reach the positions indicated by the isolines.



If the wave front reached the Hawaiian Islands at 10:30 p.m., at approximately what time did the earthquake occur?

- A) 1:30 p.m.      B) 5:30 p.m.      C) 3:30 p.m.      D) 4:30 p.m.

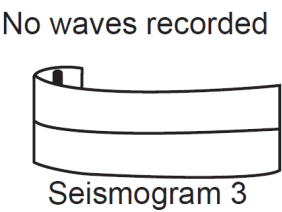
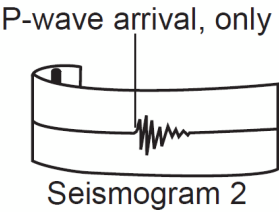
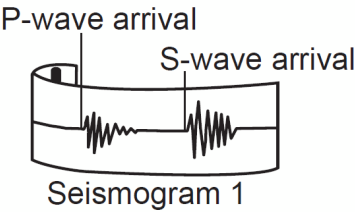
Base your answers to questions 117 through 119 on the cross section of Earth below and on your knowledge of Earth science. The cross section represents the pattern of seismic wave movement away from an earthquake. Point *W* represents a location at the boundary between two layers of Earth's interior. Points *X*, *Y*, and *Z* represent seismic stations on Earth's surface.



117. Which data best describe the depth below Earth's surface and the density of Earth's interior at location *W*?
- A) Depth: 600 km  
Density: changes from 3.4 g/cm<sup>3</sup> to 5.6 g/cm<sup>3</sup>
  - B) Depth: 1000 km  
Density: averages 4.5 g/cm<sup>3</sup>
  - C) Depth: 2900 km  
Density: changes from 5.6 g/cm<sup>3</sup> to 9.9 g/cm<sup>3</sup>
  - D) Depth: 5100 km  
Density: averages 11.1 g/cm<sup>3</sup>
118. Which statement best explains why *no* S-waves were received directly from this earthquake at some seismic stations?
- A) An interior Earth layer absorbs S-waves.
  - B) Earth's mantle reflects S-waves.
  - C) S-waves travel slower than P-waves.
  - D) S-waves travel only on Earth's surface.

119. The diagram below represents the seismograms of this earthquake recorded at seismic stations *X*, *Y*, and *Z*.

**Seismograms**



Which table best matches each seismic station with its likely seismogram?

- A) 

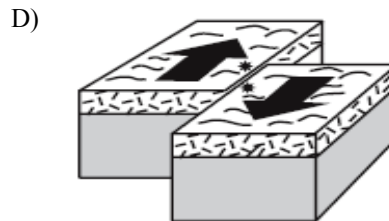
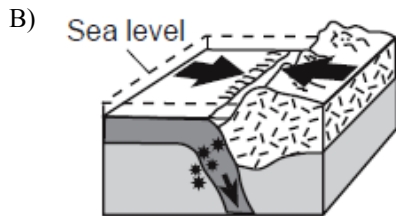
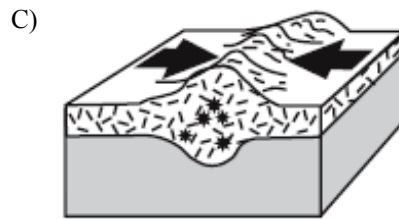
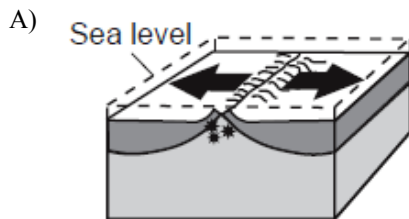
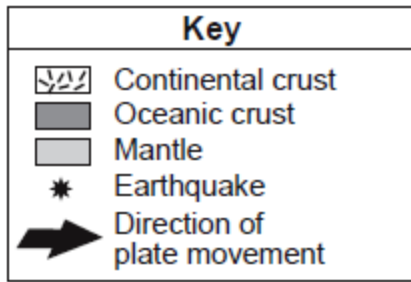
Seismic Station	Seismogram
X	1
Y	2
Z	3
- B) 

Seismic Station	Seismogram
X	3
Y	2
Z	1
- C) 

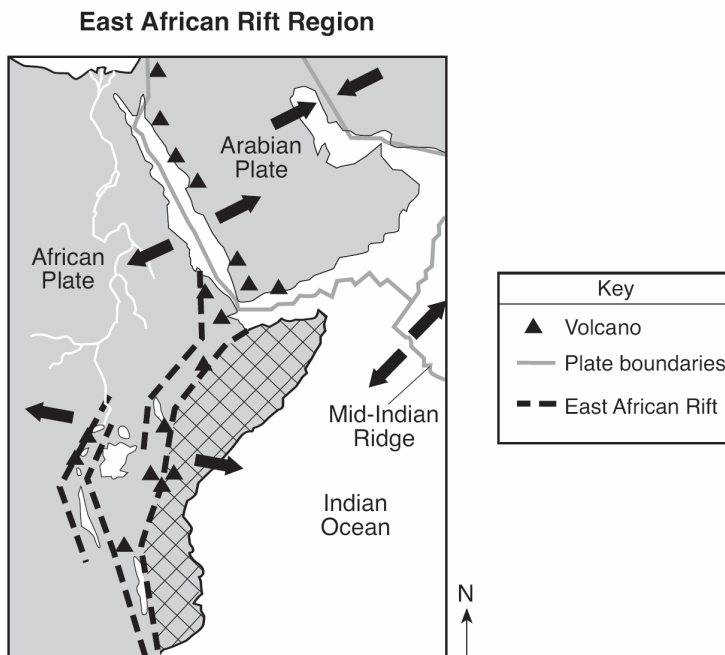
Seismic Station	Seismogram
X	2
Y	3
Z	1
- D) 

Seismic Station	Seismogram
X	1
Y	3
Z	2

120. Which block diagram represents the plate motion that causes the earthquakes that occur along the San Andreas Fault in California?



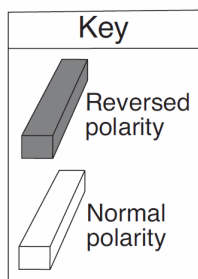
Base your answers to questions 121 and 122 on the map below, which shows the tectonic plate boundaries near the East African Rift. Arrows show relative tectonic plate movement. A region of Africa is crosshatched.



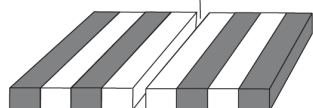
121. What appears to be happening to the crosshatched region of eastern Africa?

- A) A folded mountain range is forming as this region collides with the rest of Africa.
- B) Several volcanic mountains are forming as the rest of Africa subducts under this region.
- C) This region is moving eastward relative to the rest of Africa.
- D) This region is moving northward relative to the rest of Africa.

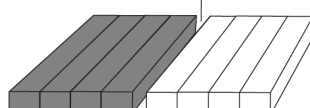
122. Which diagram best represents the polarity of the magnetic field preserved in the ocean-floor bedrock found on both sides of the Mid-Indian Ridge?



A) Mid-Indian Ridge



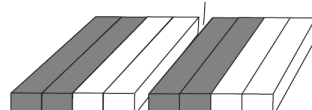
C) Mid-Indian Ridge



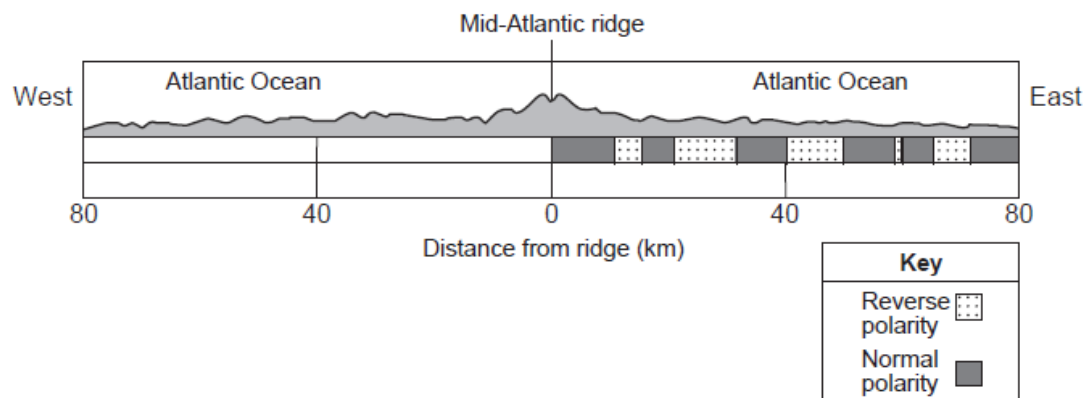
B) Mid-Indian Ridge



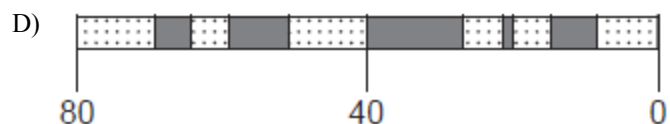
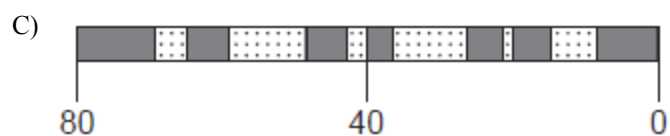
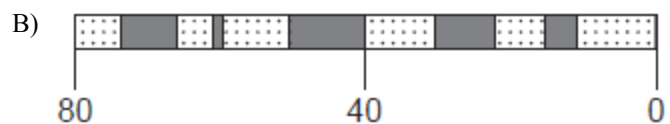
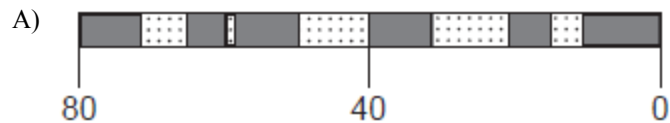
D) Mid-Indian Ridge



123. The cross section below represents a pattern of magnetic field reversals preserved in the igneous bedrock of the oceanic crust east of the Mid-Atlantic ridge.



Which cross section best represents the magnetic field pattern west of the Mid-Atlantic ridge?



**Answer Key**  
**Earth Midterm Review**

1.	<u>D</u>	42.	<u>B</u>	83.	<u>B</u>
2.	<u>B</u>	43.	<u>C</u>	84.	<u>C</u>
3.	<u>D</u>	44.	<u>C</u>	85.	<u>D</u>
4.	<u>C</u>	45.	<u>A</u>	86.	<u>A</u>
5.	<u>C</u>	46.	<u>A</u>	87.	<u>B</u>
6.	<u>D</u>	47.	<u>C</u>	88.	<u>D</u>
7.	<u>A</u>	48.	<u>C</u>	89.	<u>D</u>
8.	<u>C</u>	49.	<u>A</u>	90.	<u>B</u>
9.	<u>B</u>	50.	<u>B</u>	91.	<u>D</u>
10.	<u>C</u>	51.	<u>C</u>	92.	<u>D</u>
11.	<u>B</u>	52.	<u>C</u>	93.	<u>B</u>
12.	<u>A</u>	53.	<u>C</u>	94.	<u>C</u>
13.	<u>C</u>	54.	<u>B</u>	95.	<u>D</u>
14.	<u>A</u>	55.	<u>D</u>	96.	<u>D</u>
15.	<u>A</u>	56.	<u>C</u>	97.	<u>D</u>
16.	<u>C</u>	57.	<u>D</u>	98.	<u>B</u>
17.	<u>D</u>	58.	<u>B</u>	99.	<u>A</u>
18.	<u>C</u>	59.	<u>C</u>	100.	<u>D</u>
19.	<u>D</u>	60.	<u>D</u>	101.	<u>C</u>
20.	<u>B</u>	61.	<u>B</u>	102.	<u>B</u>
21.	<u>A</u>	62.	<u>C</u>	103.	<u>B</u>
22.	<u>D</u>	63.	<u>C</u>	104.	<u>A</u>
23.	<u>D</u>	64.	<u>D</u>	105.	<u>A</u>
24.	<u>B</u>	65.	<u>B</u>	106.	<u>D</u>
25.	<u>D</u>	66.	<u>C</u>	107.	<u>A</u>
26.	<u>A</u>	67.	<u>D</u>	108.	<u>B</u>
27.	<u>D</u>	68.	<u>D</u>	109.	<u>A</u>
28.	<u>D</u>	69.	<u>D</u>	110.	<u>B</u>
29.	<u>B</u>	70.	<u>C</u>	111.	<u>C</u>
30.	<u>A</u>	71.	<u>B</u>	112.	<u>A</u>
31.	<u>D</u>	72.	<u>B</u>	113.	<u>A</u>
32.	<u>B</u>	73.	<u>A</u>	114.	<u>C</u>
33.	<u>A</u>	74.	<u>D</u>	115.	<u>C</u>
34.	<u>B</u>	75.	<u>A</u>	116.	<u>B</u>
35.	<u>B</u>	76.	<u>D</u>	117.	<u>C</u>
36.	<u>D</u>	77.	<u>A</u>	118.	<u>A</u>
37.	<u>A</u>	78.	<u>D</u>	119.	<u>D</u>
38.	<u>A</u>	79.	<u>C</u>	120.	<u>D</u>
39.	<u>B</u>	80.	<u>D</u>	121.	<u>C</u>
40.	<u>B</u>	81.	<u>C</u>	122.	<u>A</u>
41.	<u>C</u>	82.	<u>B</u>	123.	<u>A</u>

---