1. Daily weather forecasts are based primarily on
   (1) phases of the Moon
   (2) air-mass movements
   (3) ocean currents
   (4) seismic data

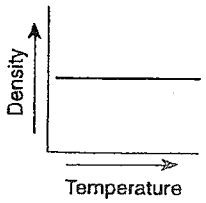
2. Which weather conditions are most probable when the moisture content of the air increases, resulting in a lower atmospheric pressure?
   (1) partly cloudy, with skies becoming clear
   (2) cold and windy
   (3) sunny and fair
   (4) cloudy, with a chance of precipitation

3. 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?
   (1) anemometer and psychrometer
   (2) anemometer and barometer
   (3) thermometer and barometer
   (4) thermometer and psychrometer

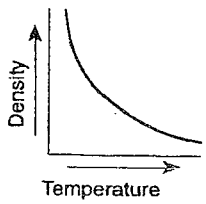
4. An air temperature of 30°C is equal to
   (1) –22°F
   (2) –2°F
   (3) 86°F
   (4) 74°F

5. A temperature of 73° Fahrenheit is approximately equal to a temperature of
   (1) 162° Celsius
   (2) 17° Celsius
   (3) 23° Celsius
   (4) 26° Celsius

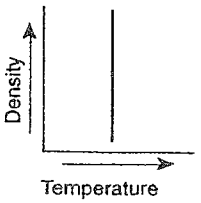
6. Which graph best represents the relationship between air temperature and air density in the atmosphere?



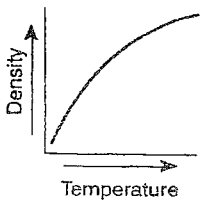
(1)



(3)



(2)

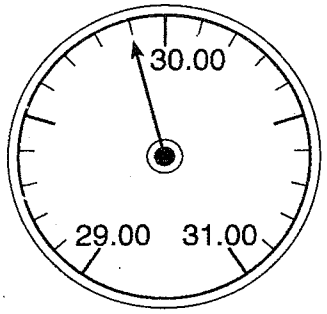


(4)

7. Earth's surface winds generally blow from regions of higher
   (1) air pressure toward regions of lower air pressure
   (2) air temperature toward regions of lower air temperature
   (3) elevations toward regions of lower elevations
   (4) latitudes toward regions of lower latitudes

8. Which weather condition most directly determines wind speeds at Earth's surface?
   (1) visibility changes
   (2) air-pressure gradient
   (3) amount of cloud cover
   (4) dewpoint differences

9. The diagram below represents an aneroid barometer that shows the air pressure, in inches of mercury.

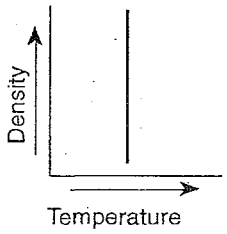



When converted to millibars, this air pressure is equal to
   (1) 1015.5 mb
   (2) 1012.5 mb
   (3) 1009.0 mb
   (4) 1029.9 mb

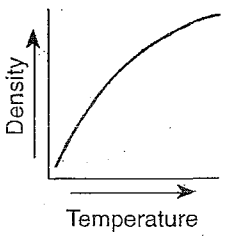
10. As warm, moist air moves into a region, barometric pressure readings in the region will generally
   (1) decrease
   (2) increase
   (3) remain the same

11. Air pressure is usually highest when the air is
   (1) cold and dry
   (2) warm and humid
   (3) cold and humid
   (4) warm and dry

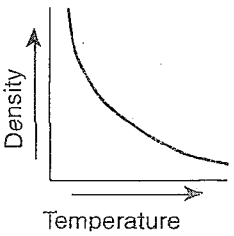
12. Which graph best represents the relationship between air temperature and air density in the atmosphere?



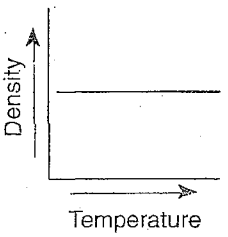
(1)



(3)



(2)



(4)

13. A high-pressure center is generally characterized by
   (1) cool, dry weather
   (2) warm, dry weather
   (3) cool, wet weather
   (4) warm, wet weather

14. A weather map of New York State shows isobars that are close together, indicating a steep pressure gradient. Which weather condition is most likely present?
(1) dry air
(2) low temperatures
(3) low visibility
(4) strong winds

15. As the temperature of the atmosphere at a given location increases, the air pressure will most likely
(1) decrease
(2) increase
(3) remain the same

16. An observer measured the air temperature and the dewpoint and found the difference between them to be 12°C. One hour later, the difference between the air temperature and the dewpoint was found to be 4°C. Which statement best describes the changes that were occurring?
(1) The relative humidity was decreasing and the chance of precipitation was increasing.
(2) The relative humidity was increasing and the chance of precipitation was increasing.
(3) The relative humidity was increasing and the chance of precipitation was decreasing.
(4) The relative humidity was decreasing and the chance of precipitation was decreasing.

17. As wind velocity decreases, the distance between isobars on a weather map will
(1) decrease
(2) increase
(3) remain the same

18. What is the relative humidity when the dry-bulb temperature is 16°C and the wet-bulb temperature is 14°C?
(1) 80%
(2) 90%
(3) 14%
(4) 13%

19. Which weather variable can be determined by using a psychrometer?
(1) wind speed
(2) barometric pressure
(3) relative humidity
(4) cloud cover

20. At which of these latitudes would average annual precipitation be greatest?
(1) 0°
(2) 90° N
(3) 90° S
(4) 30° N

21. The surface winds in a typical Northern Hemisphere high-pressure system are generally moving
(1) counterclockwise away from the high-pressure center
(2) clockwise away from the high-pressure center
(3) clockwise toward the high-pressure center
(4) counterclockwise toward the high-pressure center

22. In which direction do surface winds around lowpressure centers in the Northern Hemisphere generally move?
(1) counterclockwise, toward the center of the low
(2) clockwise, toward the center of the low
(3) clockwise, away from the center of the low
(4) counterclockwise, away from the center of the low

23. The air over the Equator generally rises because the air is
(1) dry and hot with high density
(2) moist and hot with low density
(3) dry and cool with low density
(4) moist and cool with high density

24. As a weather balloon released from the surface of Earth rises through the troposphere, the instruments it carries will usually indicate that
(1) temperature decreases, but atmospheric pressure and concentration of water vapor increase
(2) temperature, atmospheric pressure, and concentration of water vapor increase
(3) temperature increases, but atmospheric pressure and concentration of water vapor decrease
(4) temperature, atmospheric pressure, and concentration of water vapor decrease

25. Which natural event directly results in the periodic cleaning of the atmosphere?
(1) radiation
(2) volcanic eruptions
(3) precipitation
(4) transpiration

26. Air masses are identified on the basis of temperature and
(1) wind velocity
(2) atmospheric transparency
(3) type of precipitation
(4) moisture content

27. Which type of air mass usually contains the most moisture?
(1) mT
(2) mP
(3) cT
(4) cP

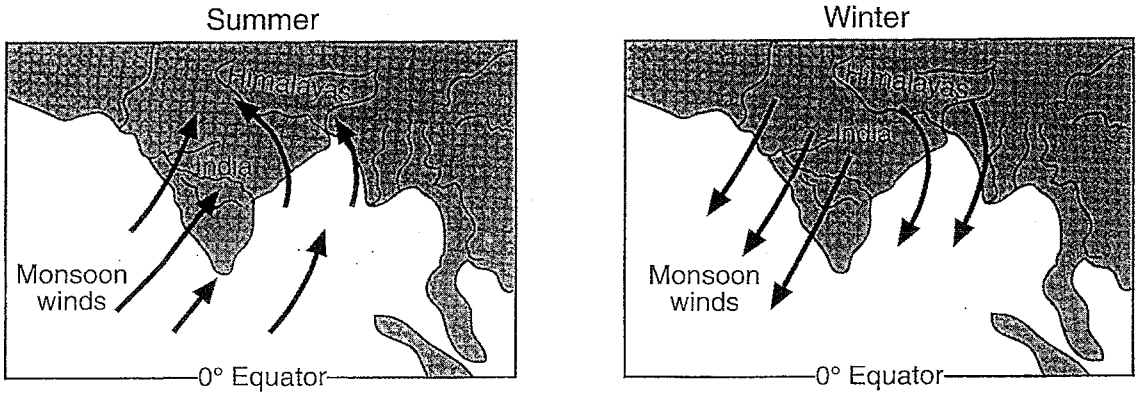
28. Which type of air mass is associated with warm, dry atmospheric conditions?
(1) cT
(2) mP
(3) cP
(4) mT

29. Which weather map symbol represents air masses that normally form just south of the United States over the Caribbean Sea?
(1) cP
(2) mT
(3) mP
(4) cT

30. Compared to a maritime tropical air mass, a maritime polar air mass has a
(1) lower temperature and more water vapor
(2) higher temperature and less water vapor
(3) higher temperature and more water vapor
(4) lower temperature and less water vapor

31. Weather along most fronts is usually cloudy with precipitation because the warm air along most fronts is usually
(1) rising and cooling, causing water vapor to condense
(2) rising and warming, causing water vapor to condense
(3) sinking and cooling, causing water to evaporate
(4) sinking and warming, causing water to evaporate

32. The arrows on the two maps below show how the monsoon winds over India change direction with the seasons.




How do these winds affect India's weather in summer and winter?

(1) Winter is cooler and more humid than summer.
(2) Summer is warmer and more humid than winter.
(3) Winter is warmer and less humid than summer.
(4) Summer is cooler and less humid than winter.

33. The weather characteristics of air mass result primarily from its

(1) geographic origin
(2) size and shape
(3) direction of movement
(4) rate of movement

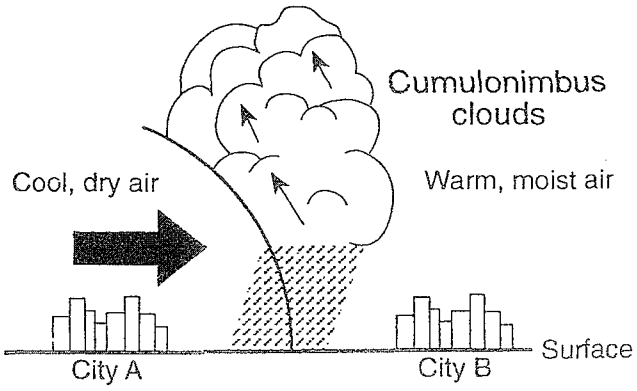
34. As a cold front passes a New York weather station, which changes will usually be observed in barometric pressure and air temperature?

(1) Pressure falls and temperature rises.
(2) Both pressure and temperature fall.
(3) Pressure rises and temperature falls.
(4) Both pressure and temperature rise.

35. Which statement best explains why precipitation occurs at frontal boundaries?

(1) Warm, moist air rises when it meets cold, dry air.
(2) Cold fronts move slower than warm fronts.
(3) Cold fronts move faster than warm fronts.
(4) Warm, moist air sinks when it meets cold, dry air.

36. The cross section below shows a weather front. The large arrow shows the direction of the movement of the cool air mass.



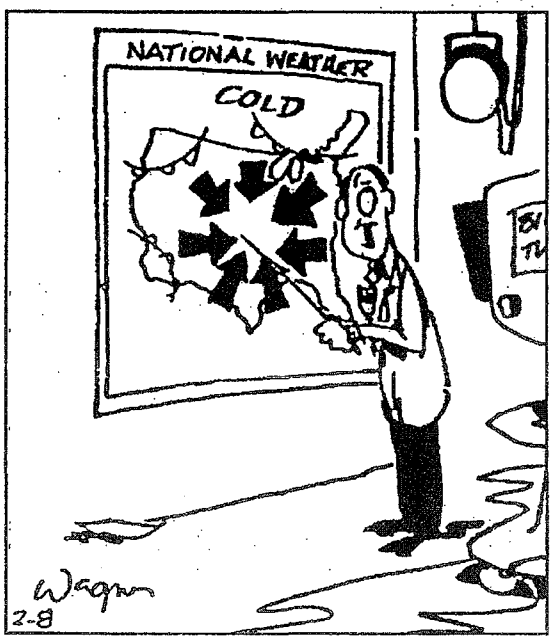

Which type of weather front is shown?

(1) stationery front
(2) warm front
(3) cold front
(4) occluded front

37. Tornadoes occur when a very cold, dry air mass meets a very warm, wet air mass. Which two air masses would most likely form a tornado when they meet?

(1) mP and mT
(2) cP and cA
(3) cT and mP
(4) cP and mT

38. In the cartoon below, the large arrows represent surface winds.




"Residents of this tiny community are being urged to evacuate."

What feature is found at the location to which the meteorologist is pointing?

(1) an area of divergence
(2) a high-pressure center
(3) an anticyclone
(4) a low-pressure center

39. As a stationary airmass is heated, its density will generally

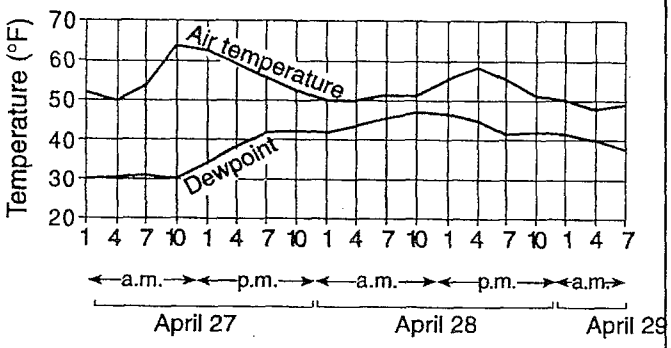
(1) decrease
(2) increase
(3) remain the same

40. An air mass classified as mP usually forms over which type of Earth surface?
(1) warm ocean (3) cool ocean
(2) warm land (4) cool land

41. Under which atmospheric conditions will water most likely evaporate at the fastest rate?
(1) cold, humid, and windy (3) cold, dry, and calm
(2) hot, dry, and windy (4) hot, humid, and calm

42. A student uses a sling psychrometer outdoors on a clear day. The dry-bulb (air) temperature is 10°C. The water on the wet bulb will most likely
(1) condense, causing the wet-bulb temperature to be equal to the air temperature
(2) condense, causing the wet-bulb temperature to be higher than the air temperature
(3) evaporate, causing the wet-bulb temperature to be lower than the air temperature
(4) evaporate, causing the wet-bulb temperature to be equal to the air temperature

43. The graph below is a computer-generated forecast of air temperature and dewpoint for a city during a period of $2\frac{1}{4}$ days.



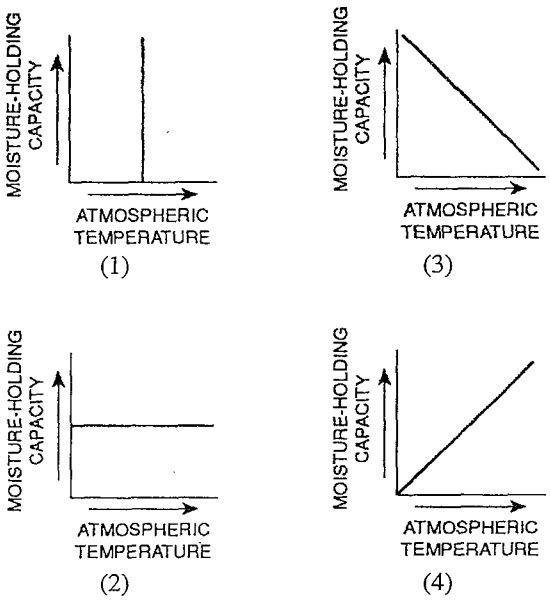

At which time during this period is the rate of evaporation expected to be highest?
(1) April 27 at 10 a.m. (3) April 29 at 4 a.m.
(2) April 28 at 4 p.m. (4) April 28 at 10 a.m.

44. A container of water is placed in an open outdoor area so that the evaporation rate can be observed. The water will most likely evaporate fastest when the weather is
(1) cool, dry, and calm (3) cool, humid, and windy
(2) warm, dry, and windy (4) warm, humid, and calm

45. What is the most effective method for increasing the rate of evaporation of a given amount of water?
(1) decreasing the air movement over the water's surface
(2) increasing the air pressure over the water's surface
(3) increasing the water's surface area
(4) decreasing the water's temperature

46. Which process most directly results in cloud formation?
(1) precipitation (3) condensation
(2) transpiration (4) radiation

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




48. Liquid water will continue to evaporate from the Earth's surface, increasing the amount of atmospheric water vapor, until
(1) the relative humidity falls below 50%
(2) transpiration occurs
(3) the temperature of the atmosphere becomes greater than the dewpoint temperature
(4) the atmosphere becomes saturated

49. When a person leaves the ocean after swimming on a windy day, the person usually feels cold because
(1) water condenses on the skin
(2) radiation is absorbed through the skin
(3) salt is absorbed through the skin
(4) water evaporates from the skin

50. Which event is a direct result of transpiration and evaporation?
(1) The atmosphere warms.
(2) Moisture enters the atmosphere.
(3) Cloud cover decreases.
(4) Moisture leaves the atmosphere.

51. What is the relative humidity if the dry-bulb temperature is 22°C and the wet-bulb temperature is 17°C?
(1) 60% (3) 5%
(2) 14% (4) 68%

52. What is the relative humidity when the air temperature is 29°C and the wet-bulb temperature is 23°C?
(1) 20% (3) 54%
(2) 60% (4) 6%

53. 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°C, what was the wet-bulb temperature?

(1) 10°C (3) 7°C

(2) 5°C (4) 3°C

54. Which weather change usually occurs when the difference between the air temperature and the dewpoint temperature is *decreasing*?

(1) The barometric pressure increases.

(2) The amount of cloud cover decreases.

(3) The probability of precipitation decreases.

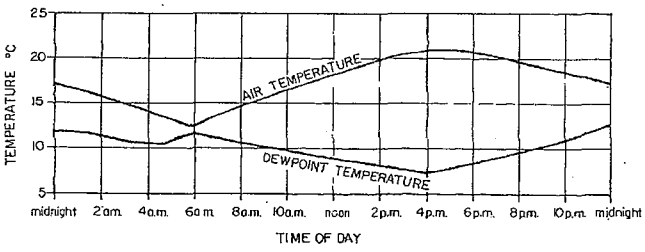
(4) The relative humidity increases.

55. What is the dewpoint when the dry-bulb temperature is 24°C and the wet-bulb temperature is 15°C?

(1) 8°C (3) 36°C

(2) –18°C (4) 4°C

56. The graph below shows the changes in air temperature and dewpoint temperature over a 24-hour period at a particular location. At what time was the relative humidity *lowest*?




(1) midnight (3) 10 a.m.

(2) 6 a.m. (4) 4 p.m.

57. What is the dewpoint temperature when the dry-bulb temperature is 22°C and the wet-bulb temperature is 15°C?

(1) 10°C (3) 12°C

(2) 7°C (4) 14°C

58. When molecules of water evaporate into the air and replace the heavier molecules of oxygen and nitrogen, the density of the air generally

(1) decreases (3) remains the same

(2) increases

59. As a parcel of air rises, its temperature will

(1) decrease due to expansion

(2) decrease due to compression

(3) increase due to expansion

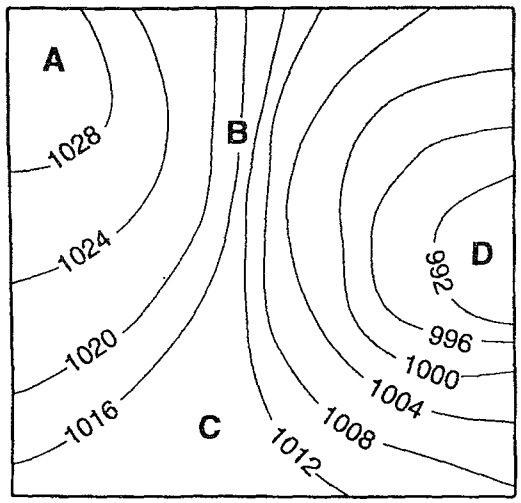
(4) increase due to compression

60. As a sample of very moist air rises from sea level to a higher altitude, the probability of condensation occurring in that air sample will

(1) decrease (3) remain the same

(2) increase

61. The weather map below shows a portion of an air-pressure field at Earth's surface. Isobars show air pressure in millibars.

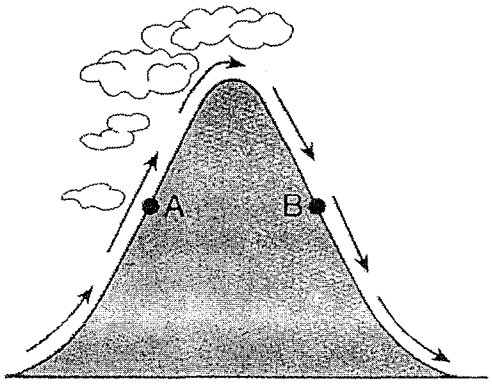



At which location is windspeed greatest?

(1) *A* (3) *C*

(2) *B* (4) *D*

62. The cross section below shows the direction of air flowing over a mountain. Points *A* and *B* are at the same elevation on opposite sides of the mountain.




Compared to the air temperature and humidity at point *A*, the air temperature and humidity at point *B* are usually

(1) cooler and wetter (3) cooler and drier

(2) warmer and wetter (4) warmer and drier

63. Precipitation often occurs along a frontal surface because the air along a frontal surface

(1) is low in humidity

(2) contains condensation nuclei

(3) has a high density

(4) is rising

64. Snowfall is rare at the South Pole because the air over the South Pole is usually

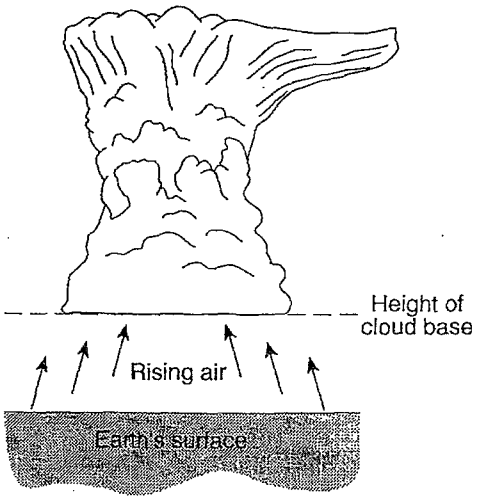
(1) rising and moist (3) rising and dry

(2) sinking and moist (4) sinking and dry

65. Which atmospheric conditions are necessary for condensation?
    (1) saturated air and equal dewpoint and air temperatures
    (2) unsaturated air and dewpoint temperature much higher than air temperature
    (3) saturated air and dewpoint temperature much lower than air temperature
    (4) unsaturated air and equal dewpoint and air temperatures

66. Condensation will most likely occur in a given volume of air when the air is
    (1) unsaturated and contains no condensation nuclei
    (2) saturated and contains condensation nuclei
    (3) unsaturated and contains condensation nuclei
    (4) saturated and contains no condensation nuclei

67. The diagram below shows air rising from the Earth's surface to form a thunderstorm cloud.




According to the Lapse Rate chart, what is the height of the base of the thunderstorm cloud when the air at the Earth's surface has a temperature of 20°C and a dewpoint of 12°C?
    (1) 1.0 km
    (2) 1.5 km
    (3) 3.0 km
    (4) 0.7 km

68. The base of a cumulus cloud was determined to be 500 meters above the Earth's surface. This is the altitude at which
    (1) no dust is present in the air
    (2) the air temperature drops below 0°C
    (3) the air temperature equals the dewpoint temperature
    (4) cumulus clouds always form

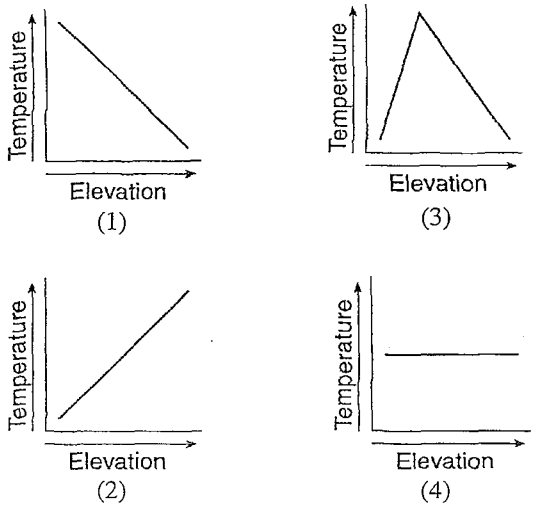
69. Which event will most likely occur in rising air?
    (1) increasing temperature
    (2) cloud formation
    (3) decreasing relative humidity
    (4) clearing skies

70. According to the *Earth Science Reference* Tables, the prevailing winds at 45° S latitude are from the
    (1) northwest
    (2) northeast
    (3) southeast
    (4) southwest

71. On sunny summer days, a breeze often develops that blows from large bodies of water toward nearby landmasses because the
    (1) temperatures of the bodies of water are greater
    (2) air over the bodies of water becomes heavier with additional water vapor
    (3) temperature of the air above the landmasses is greater
    (4) specific heat of the landmasses is greater

72. Why are most beaches often considerably cooler than nearby inland locations on hot summer afternoons?
    (1) A land breeze develops due to the lower specific heat of water and the higher specific heat of land.
    (2) A sea breeze develops due to the higher specific heat of water and the lower specific heat of land.
    (3) The beaches are closer to the Equator than the inland locations are.
    (4) The beaches are farther from the Equator than the inland locations are.

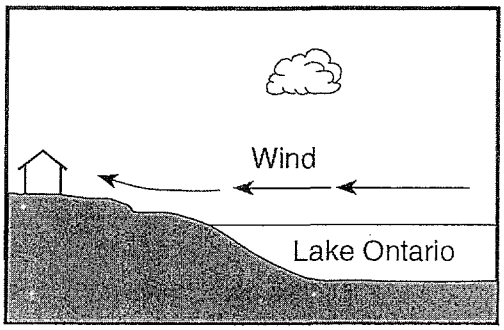
73. Which graph best shows the general effect that differences in elevation above sea level have on the average annual temperature?




74. What is the general pattern of air movement on March 21 at Earth's Equator (0°)?
    (1) upward, due to low temperature and high pressure
    (2) downward, due to low temperature and high pressure
    (3) upward, due to high temperature and low pressure
    (4) downward, due to high temperature and low pressure

75. Which planetary wind pattern is present in many areas of little rainfall?
    (1) Winds converge and air sinks.
    (2) Winds converge and air rises.
    (3) Winds diverge and air rises.
    (4) Winds diverge and air sinks.

76. The cross section below shows a house on the shore of Lake Ontario in August.

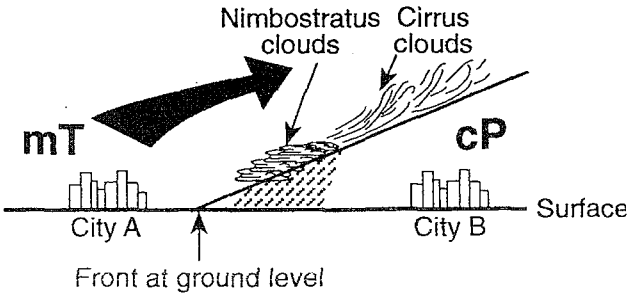



(Not drawn to scale)

Under which conditions would the wind shown in the cross section most likely occur?

(1) at 2 p.m., when the air over land is 80°F and the air over the lake is 70°F
(2) at 2 a.m., when the air over land is 70°F and the air over the lake is 80°F
(3) at 6 a.m., when the air over land is 70°F and the air over the lake is 70°F
(4) at 10 p.m., when the air over land is 70°F and the air over the lake is 72°F

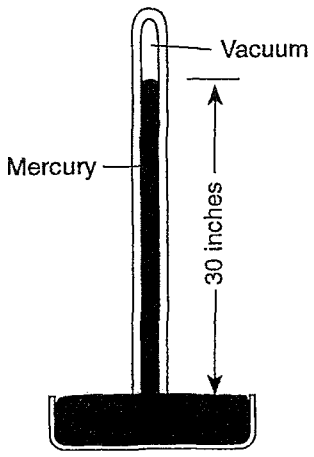
77. Base your answer to the following question on the diagram below, which shows the frontal boundary between mT and cP air masses.




If the front at ground level is moving toward city *B*. which type of weather front is shown?

(1) warm front
(2) stationary front
(3) cold front
(4) occluded front

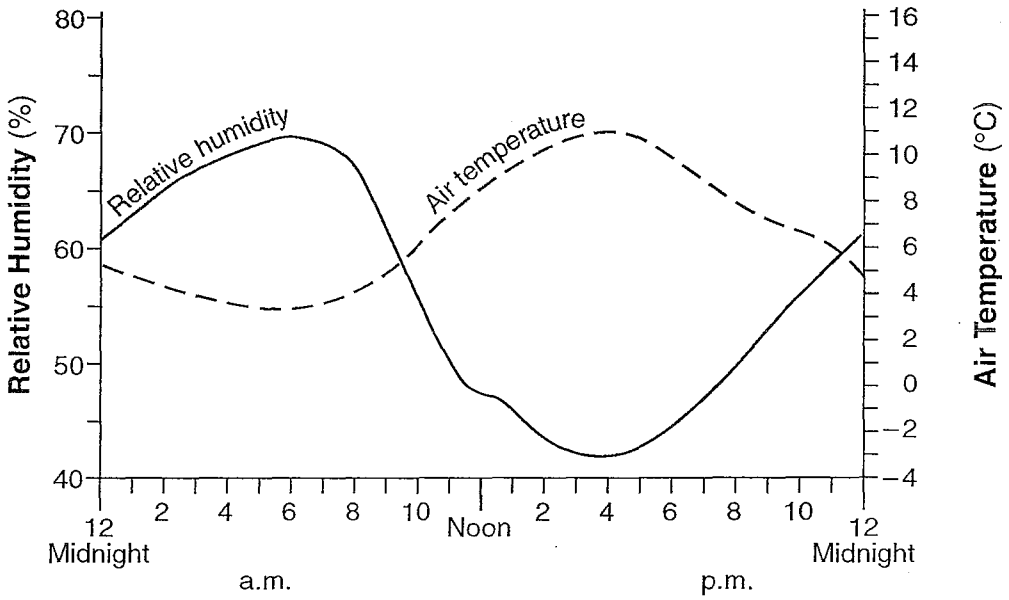
78. Base your answer to the following question on the diagram below of a weather instrument.




In Connecticut, which weather conditions are most likely to exist when the height of the mercury in the tube is much greater than 30 inches?

(1) warm, moist air with overcast skies
(2) a violent storm associated with the autumn season
(3) strong southerly winds with hail warnings
(4) cold, dry air with clear skies

Base your answers to questions **79** and **80** on the graph below, which shows the changes in relative humidity and air temperature during a spring day in Washington, D.C.




79. Which statement best describes the relationship between relative humidity and air temperature as shown by the graph?
    (1) Relative humidity decreases as air temperature decreases.
    (2) Relative humidity increases as air temperature increases.
    (3) Relative humidity remains the same as air temperature decreases.
    (4) Relative humidity decreases as air temperature increases.

80. What were the relative humidity and air temperature at noon on this day?
    (1) 47% and 48°F (2) 47% and 32°F (3) 65% and 32°F (4) 65% and 48°F