Dewpoint Humidty Cloud Formation
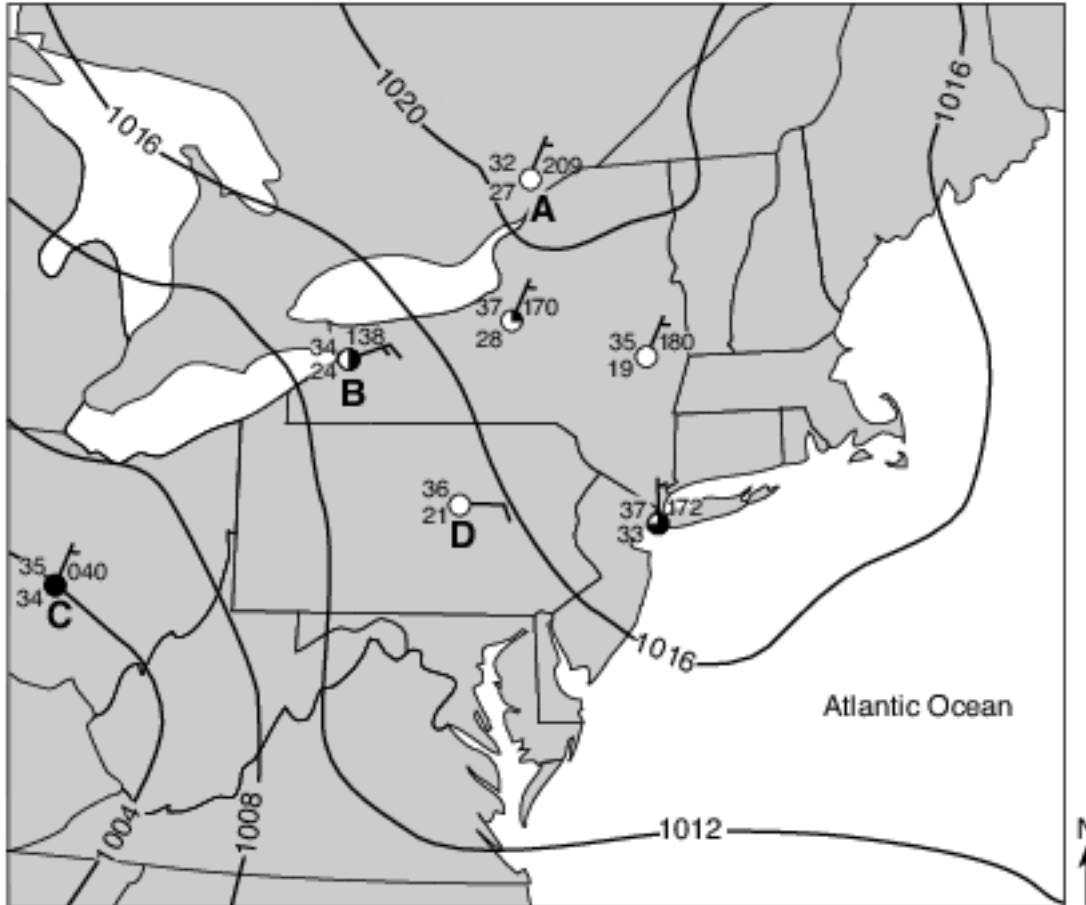
Base your answers to questions 1 on the weather map below. The map shows isobars and seven weather station models. Four of the weather stations are identified by letters A, B, C, and D.

1 Which weather station had the highest relative humidity?

(1) A   (3) C

(2) B   (4) D

Base your answers to questions 2 on the weather map below, which shows the locations of a high-pressure center (H) and a low-pressure center (L) over a portion of North America. The isolines indicate surface air pressures.
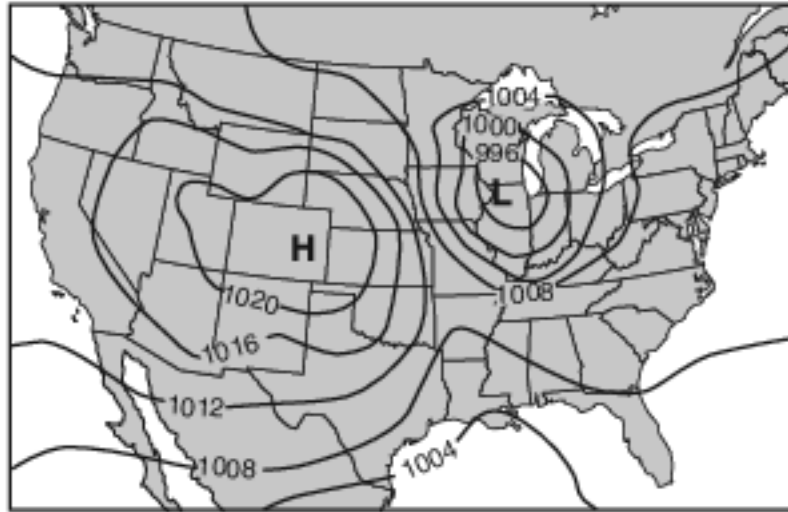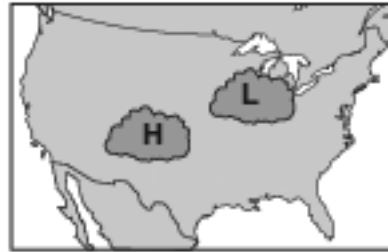

2 Which map shows the most likely location of clouds associated with these pressure centers?

(1)

(3)

(2)

(4)

3 A dry-bulb temperature of 30°C and a wet-bulb temperature of 29°C were recorded at a weather station. What are the relative humidity and the most likely weather conditions?
   (1) Relative humidity is 29% with clear skies.
   (2) Relative humidity is 29% with a good chance of snow.
   (3) Relative humidity is 93% with clear skies.
   (4) Relative humidity is 93% with a good chance of rain.

4 Which sequence of events affecting moist air within Earth's atmosphere causes cloud formation?
   (1) rising → expanding → cooling → condensation   (3) sinking → expanding → warming → condensation
   (2) rising → contracting → warming → evaporation   (4) sinking → contracting → cooling → evaporation

5 What is the dewpoint when the dry-bulb temperature is 12°C and the wet-bulb temperature is 7°C?

(1) 1°C   (3) 28°C

(2) −5°C   (4) 48°C

6 Which weather instrument is most useful in measuring relative humidity?

(1) barometer   (3) psychrometer

(2) anemometer   (4) wind vane

7 If the air temperature is 20°C and the relative humidity is 58%, what is the dewpoint?

(1) 5°C   (3) 15°C

(2) 12°C   (4) 38°C

8 Clouds most likely form as a result of
(1) moist air rising, compressing, and warming
(2) moist air rising, expanding, and cooling
(3) dry air rising, compressing, and warming
(4) dry air rising, expanding, and cooling

9 The dewpoint is 15°C. What is the wet-bulb temperature on a sling psychrometer if the dry-bulb temperature is 18°C?

(1) 16°C   (3) 3°C

(2) 2°C   (4) 20°C

Base your answers to questions 10 on the graphs below and on your knowledge of Earth science. The graphs show air temperatures and dewpoints in °F, and wind speeds in knots (kt) from 2:00 a.m. to 11:00 p.m. at a certain New York State location.


Time of Day
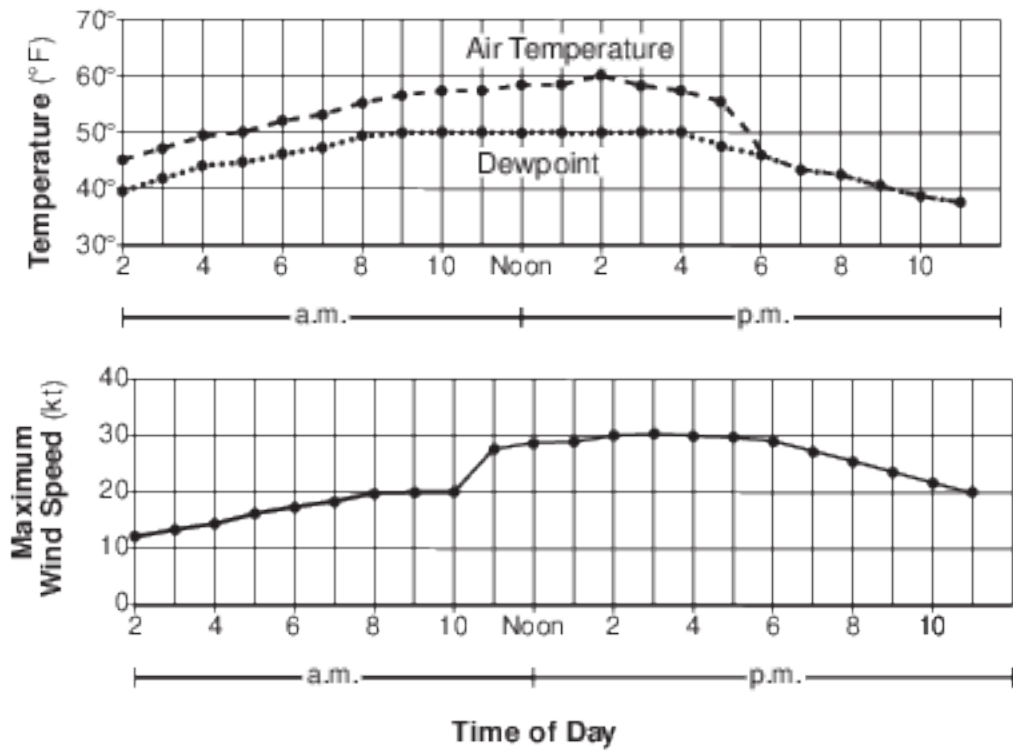
10 What was the relative humidity at 8:00 p.m.?

(1) 30%   (3) 75%

(2) 45%   (4) 100%

11 What is the relative humidity of the air when the dry-bulb temperature is 4°C and the dewpoint is −4°C?

(1) 42%   (3) 51%

(2) 46%   (4) 56%

Base your answers to questions 12 on the diagram below, which shows the windward and leeward sides of a mountain range. Arrows show the movement of air over a mountain. Points A and B represent locations at sea level on Earth's surface.
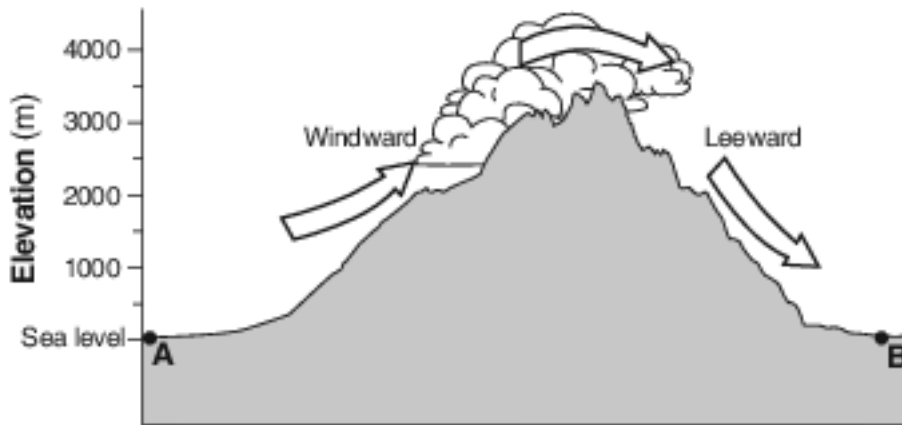

12 Identify one weather instrument that could be used to determine the dewpoint of the air at point A. [1]

Base your answers to questions 13 on the block diagram in image provided, which represents a house in New York State with a well that supplies water for people. A truck is spreading salt near a gasoline station to melt the snow on the road. Two soil zones are labeled on the diagram.

13 Identify one process that occurred in rising, moist air that caused the clouds to form at this location. [1]

Base your answers to questions 14 on the weather map below and on your knowledge of Earth science. On the weather map, the location of the center of a high-pressure system (H) and a front are shown. Isobar values are labeled in millibars (mb). Weather station models represent the weather conditions at Atlanta, Georgia, and Tampa, Florida.
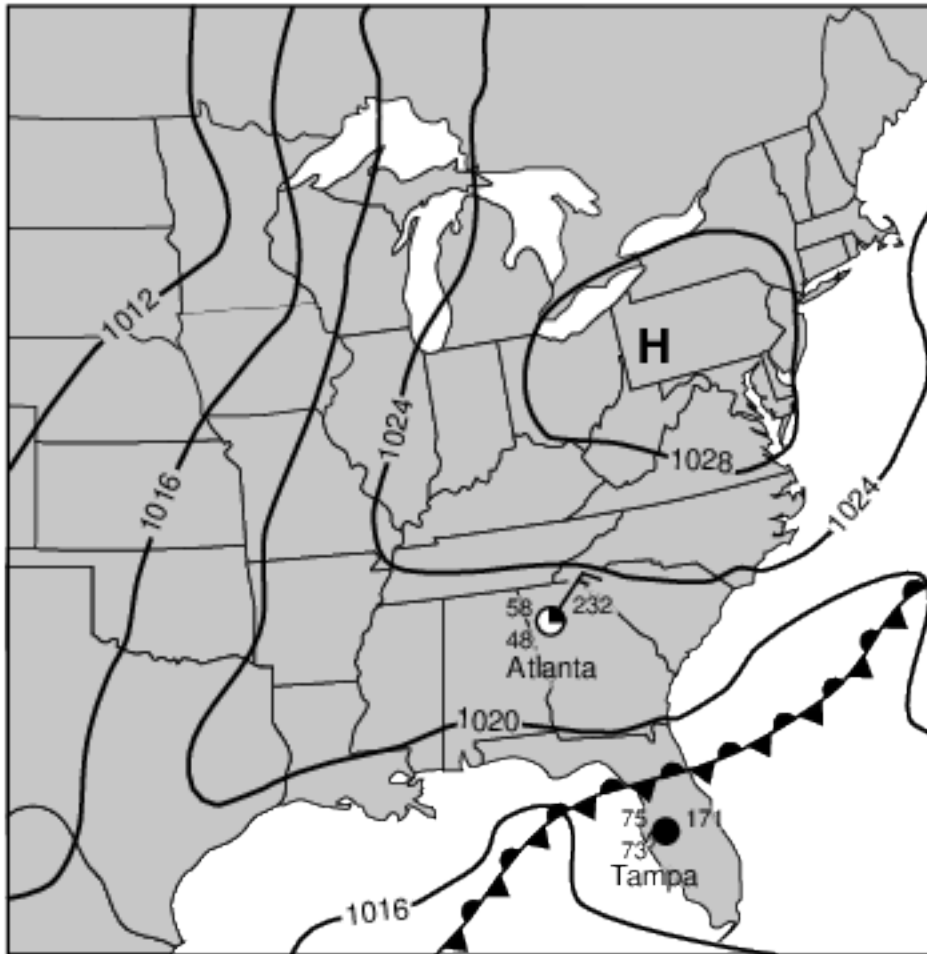
14 Describe one piece of evidence shown on the map that indicates that Tampa, Florida, has a high probability of precipitation. [1]

Base your responses to questions 15 on the station models below and on your knowledge of Earth science. The changing weather conditions at a location in New York State during a winter storm are recorded on the station models.
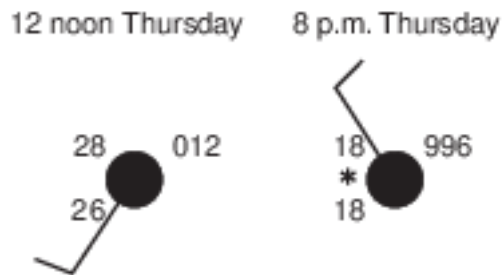
15 State the relative humidity at this location at 8 p.m. Thursday. [1]
    in/h

Answer Keys

1 3

2 2

3 4

4 1

5 1

6 3

7 2

8 2

9 1

10 4

11 4

12 Allow 1 credit. Acceptable responses include, but are not limited to:
- — psychrometer
- — wet- and dry-bulb thermometer
- — hygrometer

13 Allow 1 credit. Acceptable responses include, but are not limited to:
- — expansion
- — condensation
- — cooling

14 Allow 1 credit. Acceptable responses include, but are not limited to:
- — The dewpoint and air temperature are close together./high relative humidity
- — 100% cloud cover/overcast
- — Tampa is close to a front.
- — The air pressure is low.

15 Allow 1 credit for 100%.