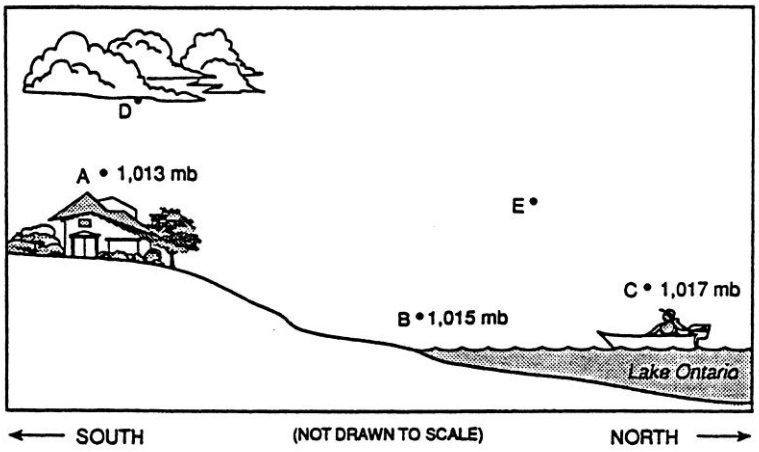
Name _____ Date _____

Atmospheric Variables Exam Review

Base your answers to **questions 1-5** on the *Earth Science Reference Tables* your knowledge of Earth Science, and the diagram below. The diagram shows a section of the shore of Lake Ontario. Surface air pressure readings are shown for these locations.



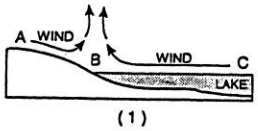
1. When converted to inches of mercury, the air pressure reading of 1,013 mb at A is approximately equal to
   (1) 30.00 in
   (2) 29.92 in
   (3) 29.22 in
   (4) 29.89 in

2. The evaporation of water from Lake Ontario would best occur on a day that is
   (1) cold and humid
   (2) hot and humid
   (3) hot and dry
   (4) cold and dry

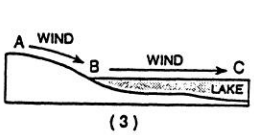
3. Why do the clouds begin to form at the elevation of D?
   (1) The air has cooled to the dewpoint temperature at this elevation.
   (2) The temperature is 0°C at this elevation.
   (3) The air below this elevation does not have enough condensation nuclei for clouds to form.
   (4) The water droplets are too small to be seen below this elevation.

4. What is the dewpoint temperature at location E when the dry-bulb temperature reading is 18°C and the wet-bulb reading is 11°C?
   (1) 1°C
   (2) 7°C
   (3) -11°C
   (4) 4°C

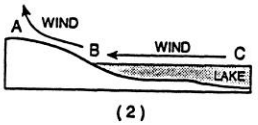
5. Which diagram best shows the probable wind direction for the conditions above?



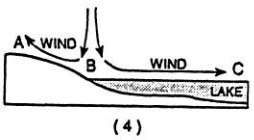
(1)



(3)



(2)



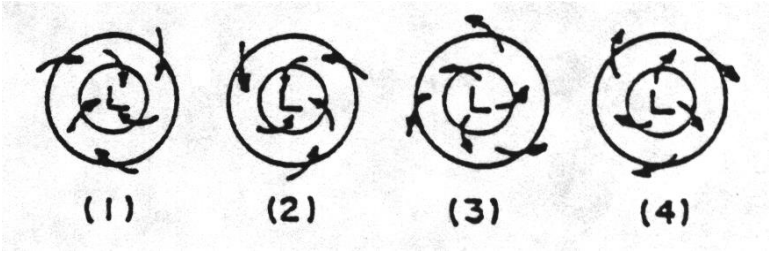
(4)

6. What is the relative humidity of a city whose dry bulb (air temperature) is measured to be 18°C and dewpoint is measured to be 13°C?
   (1) 81%
   (2) 72%
   (3) 3%
   (4) 13%

7. A strong surface wind is blowing from city A toward city B. City B has a barometric pressure of 1013 millibars. The barometric pressure of city A would most likely be
   (1) 988 millibars
   (2) 1002 millibars
   (3) 1026 millibars
   (4) 1013 millibars

8. Which conditions are most likely to develop over a land area adjacent to the ocean on a hot, sunny afternoon?
   (1) lower temperatures, with winds blowing in from the ocean
   (2) lower temperatures, with winds blowing out toward the ocean
   (3) higher temperatures, with winds blowing out toward the ocean
   (4) higher temperatures, with winds blowing in from the ocean

9. Which diagram best represents the air circulation as seen from above in a low pressure center (cyclone) in the Northern Hemisphere?



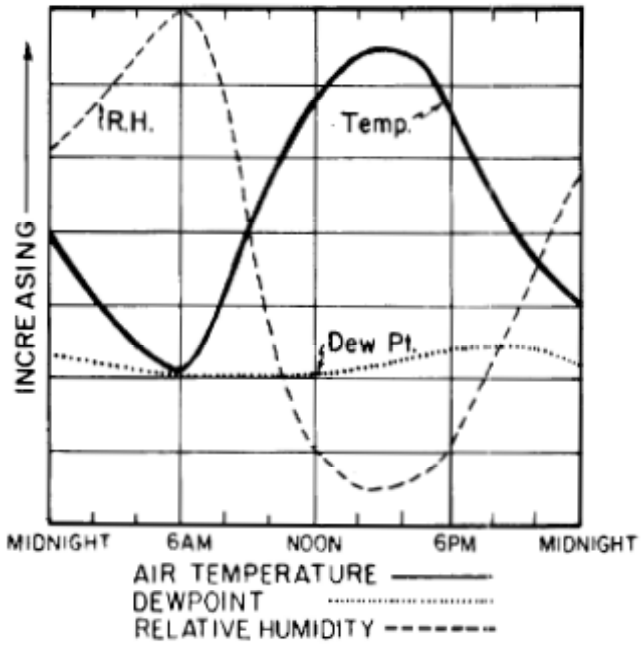
10. Rapidly falling barometric pressure readings usually indicate
    (1) clearing conditions
    (2) decreasing temperatures
    (3) decreasing humidity
    (4) approaching storm conditions

11. 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
    (1) increased
    (2) decreased
    (3) remained the same

12. The dry-bulb temperature of a sample of air is 26°C and the relative humidity is 57%. What is the approximate dewpoint temperature?
    1 26°C
    2 17°C
    3 6°C
    4 14°C

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

Base your answers to **questions 14-16** on the graph below which shows the hourly air temperature, dewpoint, and relative humidity for a 24 hour period.



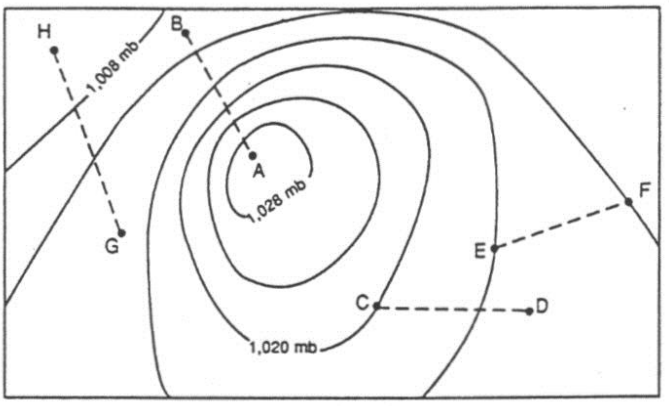
14. The graph indicates that as air temperature increases, the relative humidity
    1 decreases
    2 increases
    3 sometimes increases and sometimes decreases
    4 remains the same

15. Condensation most likely occurred at approximately
    1 6 a.m.
    2 9 a.m.
    3 7 p.m.
    4 10 p.m.

16. The air's capacity to hold water vapor was greatest at
    1 2 a.m.
    2 6 a.m.
    3 2 p.m.
    4 10 p.m.

17. As pressure gradient force increases, the wind velocity in that region
    (1) increases (2) decreases (3) remains the same

Base your answers to **questions 18 - 20** on the map below. The map represents a high pressure center located over the central United States. The air pressure field lines are in millibars and letters represent the locations of weather stations.

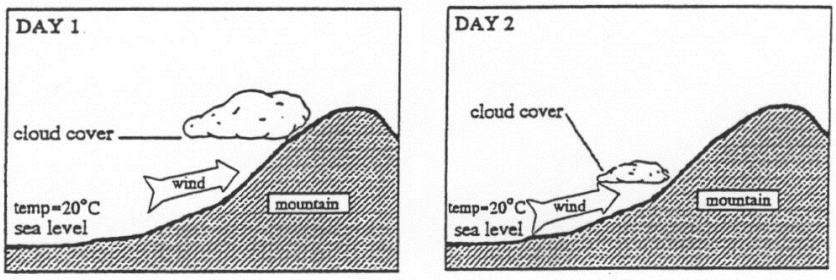


18. Along which line would wind speeds be the greatest?
    (1) EF
    (2) AB
    (3) CD
    (4) GH

19. If the high pressure center follows the typical direction of movement of an air mass across the United States, it will probably move toward the
    (1) northwest
    (2) southwest
    (3) northeast
    (4) southeast

20. What weather conditions would be associated with this high pressure system?
    (1) cool and dry
    (2) hot and humid
    (3) cool and humid
    (4) hot and dry

Base your answers to **questions 21-22** on the diagrams below. The diagrams represent the weather conditions on two consecutive days. The sea level air temperature for both days at the time shown is 20°C and the arrow in each diagram represents the wind direction.



21. Which change in phase of water directly resulted in the formation of clouds on both days?
    1 evaporation
    2 freezing
    3 condensation
    4 melting

22. On both days the clouds formed as the rising air was
    1 warmed by compression
    2 cooled by compression
    3 warmed by expansion
    4 cooled by expansion

23. Precipitation that begins as rain and freezes during its fall to the Earth is known as
    1 snow
    2 sleet
    3 freezing rain
    4 hail

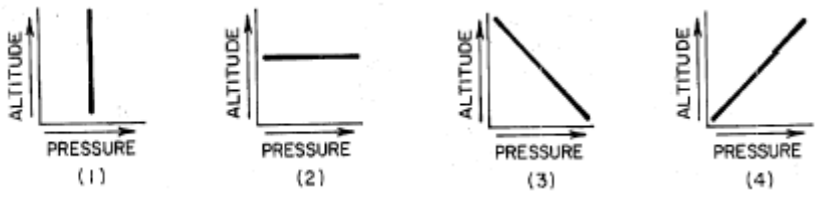
24. If the dewpoint is 2 °C, at which temperature will dew most likely form?
    1 40°C
    2 2°C
    3 5°C
    4 4°C

25. Which weather instrument is used to measure relative humidity?
    (1) psychrometer
    (2) wind vane
    (3) anemometer
    (4) thermometer

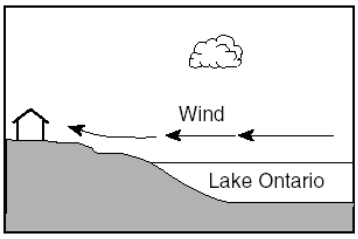
26. The paths of the surface planetary winds are curved due to Earth's
    (1) revolution
    (2) tilt
    (3) circumference
    (4) rotation

27. At which latitude are prevailing northeast winds most likely found?
    (1) 15°S
    (2) 45°N
    (3) 15°N
    (4) 45°S

28. Which graph best represents the relationship between altitude and air pressure?



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



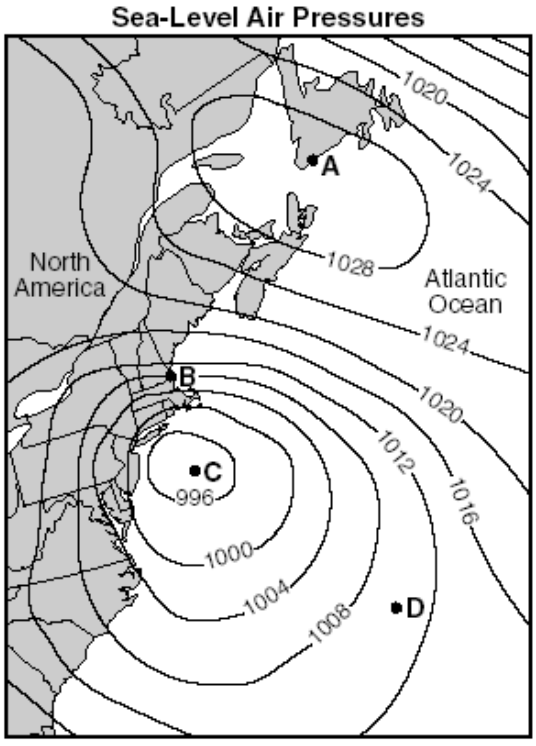
(Not drawn to scale)

Under which conditions would the wind shown in the cross section most likely occur?
(1) at 2 a.m., when the air over land is 70°F and the air over the lake is 80°F
(2) at 6 a.m., when the air over land is 70°F and the air over the lake is 70°F
(3) at 2 p.m., when the air over land is 80°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

30. Which statement best explains why an increase in the relative humidity of a parcel of air generally increases the chance of precipitation?
(1) The dewpoint is farther from the condensation point, causing rain.
(2) The air temperature is closer to the dewpoint, making cloud formation more likely.
(3) The amount of moisture in the air is greater, making the air heavier.
(4) The specific heat of the moist air is greater than the drier air, releasing energy.

Base your answers to **questions 31 through 33** on the map below, which shows sea-level air pressure, in millibars, for a portion of the eastern coast of North America. Points *A, B, C,* and *D* are sea-level locations on Earth's surface.

31. Which weather instrument was used to measure the air pressures?
(1) thermometer
(2) wind vane
(3) sling psychrometer
(4) barometer



32. The highest air pressure is located near point
(1) *A* (3) *C*
(2) *B* (4) *D*

33. The air pressure in the area of Long Island is probably closest to
(1) 1008 mb
(2) 1028 mb
(3) 1014 mb
(4) 998 mb