

Student Name _____

OHIO GRADUATION TESTS



Science

Practice Test

September 2004

(Printed August 2004)

SCIENCE TEST

Directions: For multiple-choice items, choose the best answer then blacken the corresponding space on your Answer Document. If you change an answer, be sure to erase the first mark completely. When you respond to the short-answer and extended-response items, you do not have to use the entire area of the space provided. The use of the grid paper in your Answer Document is optional unless otherwise stated. Be sure that your answers are complete and all your work appears in the Answer Document.

1. A scientist's paper is rejected by a journal because the paper did **not** reveal key details about the experiment she performed to get her results. What ethical argument could the editor give for this rejection?
 - A. Sample collection had been done by a graduate student.
 - B. The scientist's findings were similar to results reported for other species.
 - C. The scientist had repeated her experiment several times with identical results.
 - D. Other scientists would not be able to verify her findings without more information.
2. Architects are working with engineers to build a lecture hall. How can they design it so that echoes are reduced and speech is **not** heard as garbled sounds?
 - A. build smooth marble walls, ceilings and polished floors
 - B. construct many flat walls, angled ceilings and smooth floors
 - C. use an ultramodern design of metal walls, pillars and seats
 - D. build walls out of porous materials, upholster the seats and add carpets
3. The feature that identifies an organism as a prokaryote is
 - A. the presence of ribosomes.
 - B. the absence of chlorophyll.
 - C. the presence of a cell membrane.
 - D. the absence of a nuclear membrane.

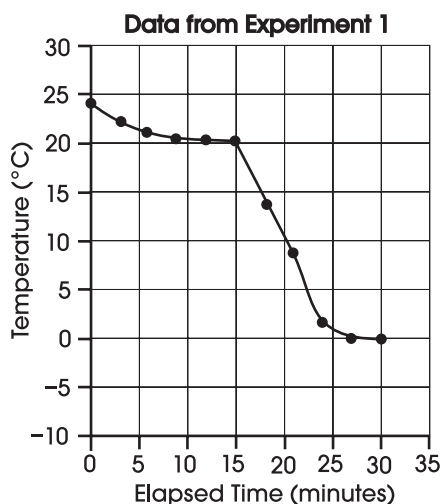
Use the following information to answer questions 4 – 7.

Temperature Experiment

Students pour 250.0 g of water into an open insulated container. The initial temperature of the water inside the container is recorded. The temperature of the contents of the container is recorded every 3.0 minutes. When 73.0 g of ice (at melting point) is added to the container, the students continue to collect temperature data and the mixture is gently stirred. The data from Experiment 1 are listed in the chart below. The data are also plotted on the following graph.

Chart for Experiment 1

Elapsed Time (minutes)	Temperature of System (°C)	Observations
0	24.3	water added
3	22.1	
6	21.0	
9	20.5	
12	20.3	
15	20.2	ice added
18	13.7	
21	8.2	
24	2.2	
27	0.0	
30	0.0	ice still present



4. If the experiment is repeated and the only difference is that twice as much ice (146.0 g) is added to the container of water, the students will observe what difference from Experiment 1?

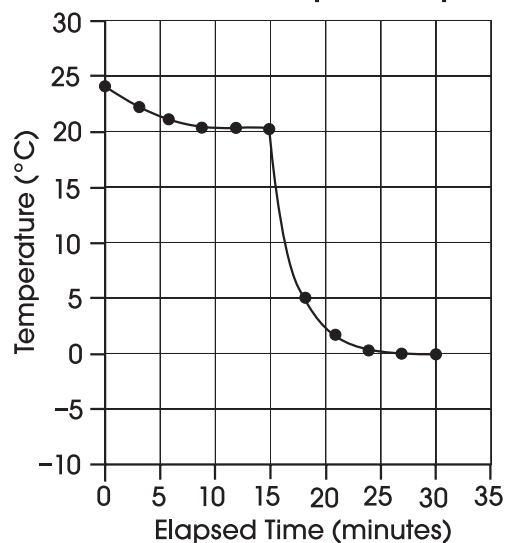
- A. Any remaining ice will sink to the bottom of the container.
- B. The water in the container will be colder at the end of the experiment.
- C. The temperature will fall faster during the last 15 minutes of the experiment.
- D. A significantly larger amount of ice will melt in the last 15 minutes of the experiment.

5. When the ice was added to the water in the container, several energy transfers occurred. Considering only the contents of the container, what would be a likely sequence (order) of energy transfers?

- A. Water transferred energy to the ice as the ice melted.
- B. Water transferred energy to the air as the ice increased in temperature.
- C. Ice transferred energy to the air which then lowered the temperature of the water.
- D. Ice transferred energy to the water which lowered the temperature of the water.

6. In a proposed experiment using twice as much ice and half as much water as in Experiment 1, a student predicts the values shown in the graph below.

Predicted Values for Proposed Experiment



Compare the shapes of the graphed lines from Experiment 1 and the proposed experiment and explain why the predicted values are probable. Respond in the space provided in your **Answer Document**. (2 points)

7. During the first 15 minutes of Experiment 1, the water molecules in the container

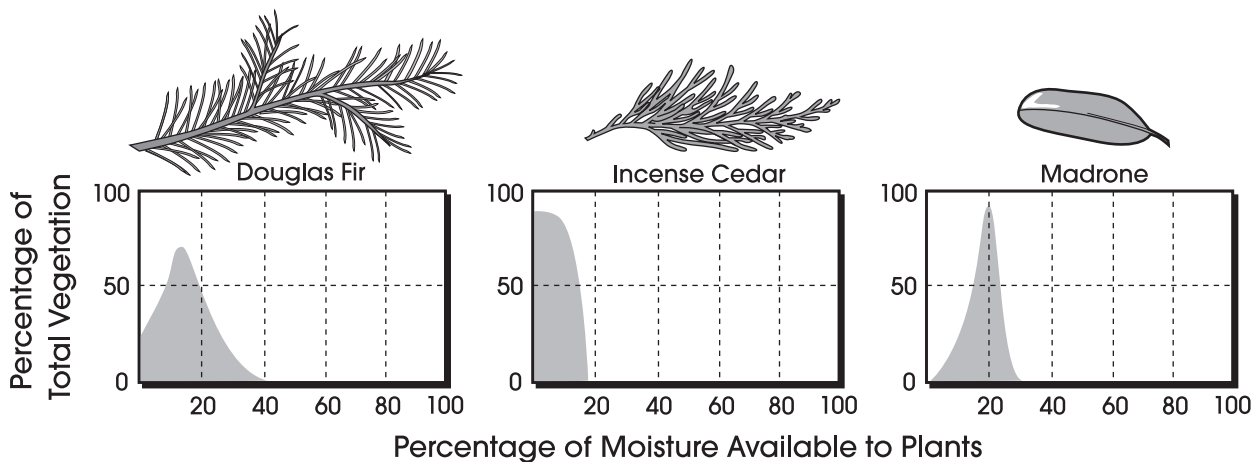
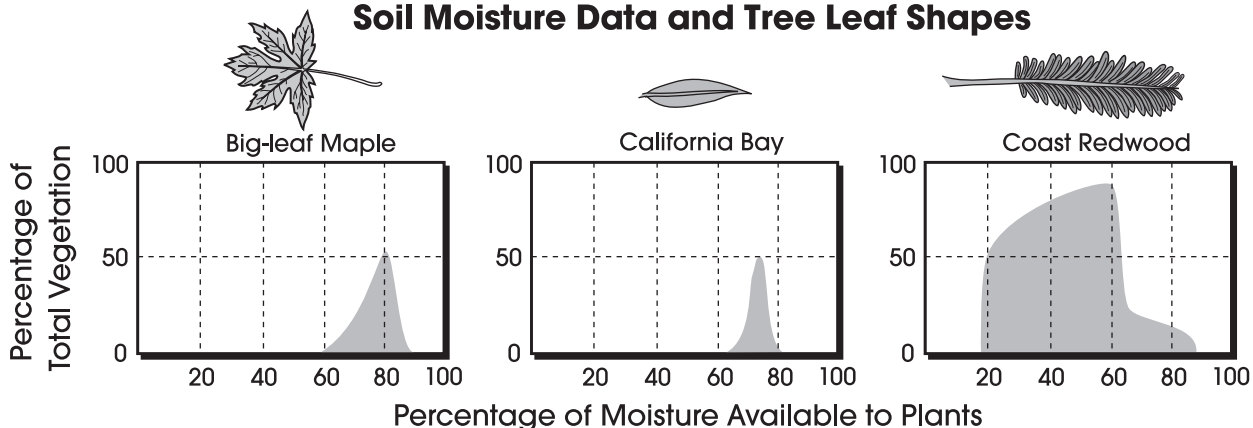
- A. decreased in average speed.
- B. changed the type of bonds present in the water.
- C. changed shape because the temperature changed.
- D. increased in oxygen content compared to the hydrogen content.

Use the information to answer questions 8 - 11.

Plant Distribution

The distribution of plant species depends on many factors, including climate, topography, soil conditions and biological interactions. Data on moisture availability were collected along the coast of Northern California. In this area, each plant community has a dominant tree. The graphs below illustrate a dominant tree's percentage of the total vegetation compared to the percentage of soil moisture available. Each tree species studied has a distinct preference for a certain kind of habitat.

Soil Moisture Data and Tree Leaf Shapes



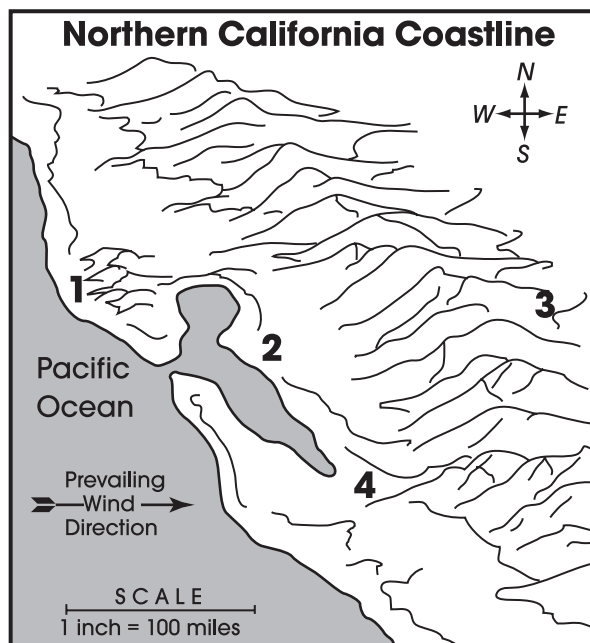
8. An ecologist observes that an area in California has experienced an increase in average soil moisture content. The area was once dominated by incense cedar but is now home to a greater variety of trees. Which types of trees would the ecologist most likely observe in this area if the soil moisture content has risen to 30%?

- A. madrone and California bay
- B. Douglas fir and madrone
- C. incense cedar and big-leaf maple
- D. coast redwood and big-leaf maple

9. A scientist observes that Douglas fir trees survive better than broadleaf species such as big-leaf maple in a certain area. Which is the best explanation for her observation?

- A. Big-leaf maple trees require less soil moisture than Douglas fir trees.
- B. Douglas fir trees are better at conserving water than big-leaf maple trees.
- C. Douglas fir trees and big-leaf maple trees are often found in overlapping habitats.
- D. The big-leaf maple trees are experiencing competition with California Bay trees.

Use the map to answer question 10.



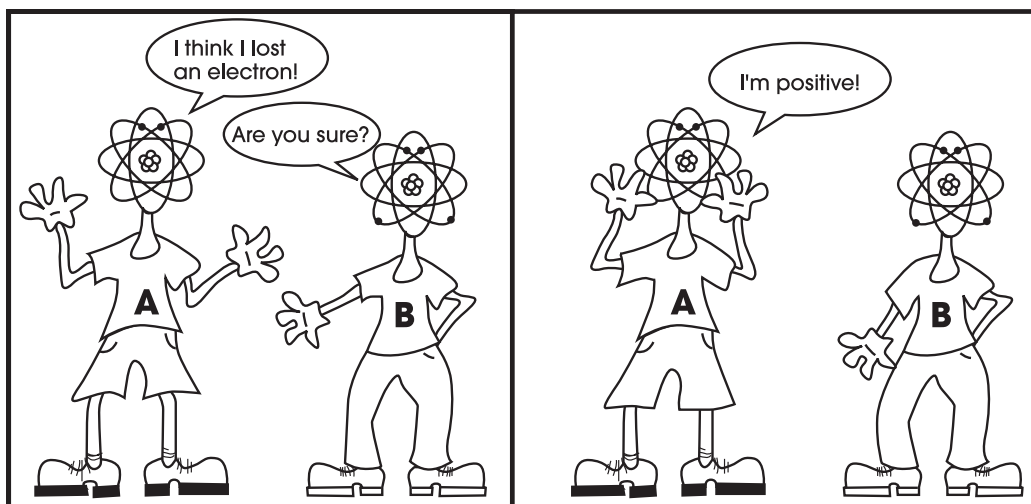
10. In which area would you expect incense cedar and madrone to dominate?

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

11. A survey of a small coastal valley in California finds only Douglas fir, madrone, and coast redwood. The soil moisture availability in this valley is most likely to be

- A. 0 - 20%.
- B. 20 - 40%.
- C. 40 - 80%.
- D. 60 - 80%.

Use the cartoon to answer question 12.

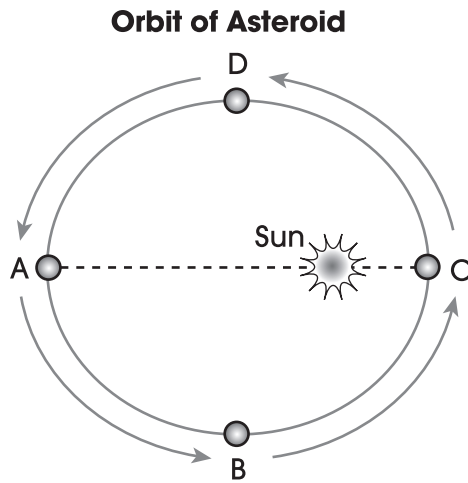


12. Explain the response of atom A in terms of protons and electrons. Describe how protons and electrons affect charge. Respond in the space provided in your **Answer Document**. (2 points)

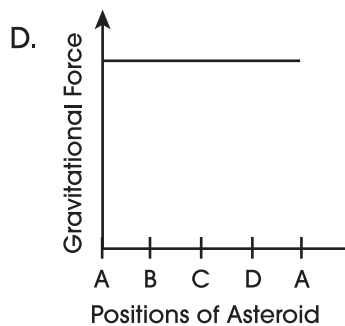
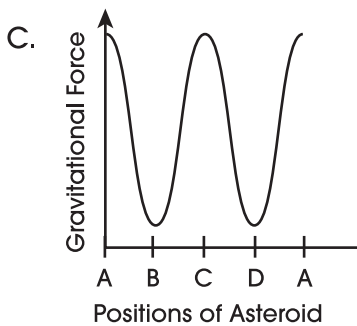
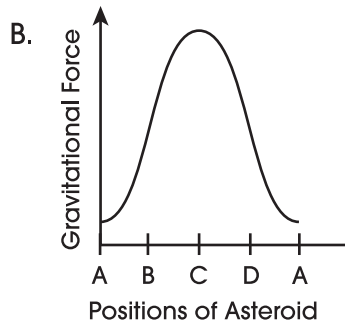
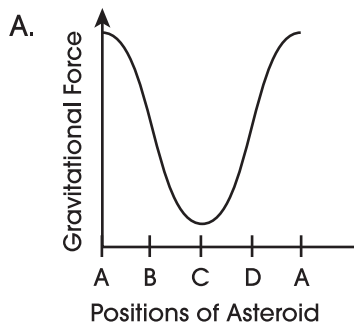
13. In most areas of Ohio, the frost-free growing season is 150 to 180 days. Farms close to Lake Erie have a growing season closer to 200 days. One explanation of this fact is that
- crops grown around the lake are frost-resistant.
 - industries around the lake prevent early freezes.
 - irrigation water from the lake freezes at a lower temperature.
 - heat given off by the lake extends the number of frost-free days.

14. A student is constructing a classification scheme to explain the biological relationships between common local animals. What characteristic would be most helpful to the student in classifying the animals?
- eye color
 - body covering
 - performs respiration
 - performs photosynthesis

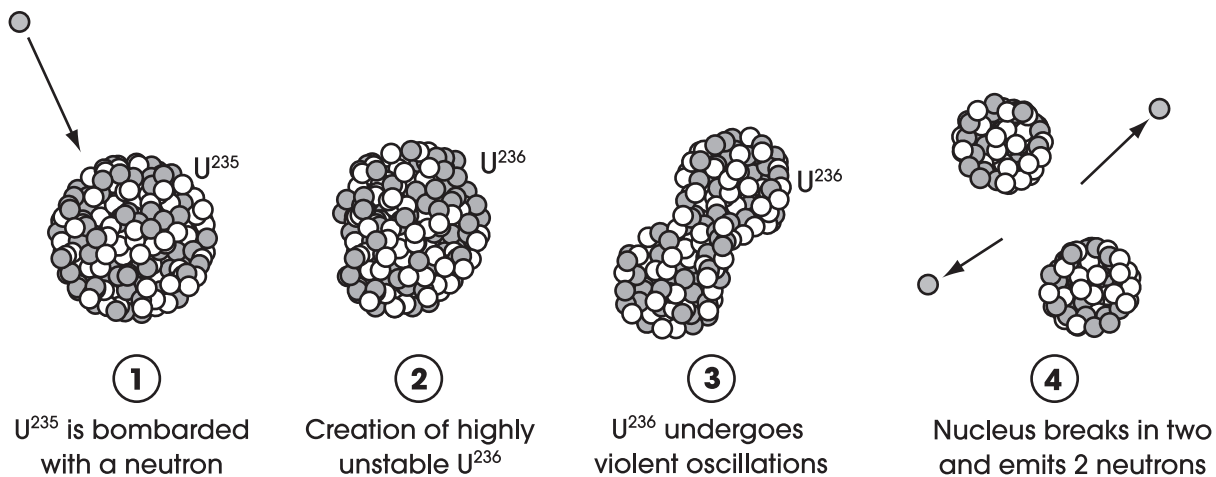
15. Points A, B, C and D in the drawing below represent an asteroid's position during its orbit around the sun.



Which graph shows how the gravitational force between the sun and the asteroid varies with the asteroid's distance from the sun?



Use the sequence of pictures to answer question 16.



16. At what step in the fission process is a massive amount of energy released?

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

17. Two processes that allow cells to release energy from food are

- A. mitosis and meiosis.
- B. excretion and diffusion.
- C. fermentation and cellular respiration.
- D. osmosis and spontaneous generation.

18. Earth's crust is divided into many crustal plates. Their activity is described as plate tectonics. List two effects of plate tectonics and explain how plate tectonics causes each effect. Respond in the space provided in your **Answer Document**. (4 points)

19. What energy transformation occurs in green plants during photosynthesis?
- A. Thermal energy is converted to electrical energy.
 - B. Thermal energy is converted to light energy.
 - C. Chemical energy is converted to mechanical energy.
 - D. Light energy is converted to chemical energy.

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