

Name _____ Date _____ List #: ____ - ____

TOEFL 1

Questions 1-13

Atmospheric pressure can support a column of water up to 10 meters high. But plants can move water much higher, the sequoia tree can pump water to its very top, more than 100 meters above the ground. Until the end of the nineteenth century, the movement of water in trees and other tall plants was a mystery. Some botanists hypothesized that the living cells of plants in which all the cells are killed can still move water to appreciable heights. Other explanations for the movement of water in plants have been based on root pressure, a push on the water from the roots at the bottom of the plant. But root pressure is not nearly great enough to push water to the tops of tall trees. Furthermore, the conifers, which are among the tallest trees, have unusually low root pressures.

If water is not pumped to the top of a tall tree, and if it is not pushed to the top of a tall tree, then we may ask, How does it get there? According to the currently accepted cohesion-tension theory, water is pulled there. The pull on a rising column of water in a plant results from the evaporation of water at the top of the plant. As water is lost from the surface of the leaves, a negative pressure, or tension, is created. The evaporated water is replaced by water moving from inside the plant in unbroken columns that extend from the top of a plant to its roots. The same forces that create surface tension in any sample of water are responsible for the maintenance of these unbroken columns of water. When water is confined in tubes of very small bore, the forces of cohesion (the attraction between water molecules) are so great that the strength of a column of water compares with the strength of a steel wire of the same diameter. This cohesive strength permits columns of water to be pulled to great heights without being broken.

- ____ 1. How many theories does the author mention? _____ 4. What do the experiments mentioned in lines 5-7 prove?
- (A) One
(B) Two
(C) Three
(D) Four
- (A) Plant stems die when deprived of water
(B) Cells in plant stems do not pump water
(C) Plants cannot move water to high altitudes
(D) Plant cells regulate pressure within stems
- ____ 2. The passage answers which of the following questions? _____ 5. How do botanists know that root pressure is not the only force that moves water in plants?
- (A) What is the effect of atmospheric pressure on foliage?
(B) When do dead cells harm plant growth?
(C) How does water get to the tops of trees?
(D) Why is root pressure weak?
- (A) Some very tall trees have weak root pressure.
(B) Root pressures decrease in winter.
(C) Plants can live after their roots die.
(D) Water in a plant's roots is not connected to water in its stem.
- ____ 3. The word "demonstrated" in line 6 is closest in meaning to _____ 6. Which of the following statements does the passage support?
- (A) ignored
(B) showed
(C) disguised
(D) distinguished
- (A) Water is pushed to the tops of trees.
(B) Botanists have proven that living cells act as pumps.
(C) Atmospheric pressure draws water to the tops of tall trees.
(D) Botanists have changed their theories of how water moves in plants.

_____7. The word "it" in line 12 refers to

- (A) top
- (B) tree
- (C) water
- (D) cohesion-tension theory.

_____8. The word "there" in line 14 refers to

- (A) treetops
- (B) roots
- (C) water columns
- (D) tubes

_____9. What causes the tension that draws water up a plant?

- (A) Humidity
- (B) Plant growth
- (C) Root pressure
- (D) Evaporation

_____10. The word "extend" in line 18 is closest in meaning to

- (A) stretch
- (B) branch
- (C) increase (D) rotate

_____11. According to the passage, why does water travel through plants in unbroken columns?

- (A) Root pressure moves the water very rapidly.
- (B) The attraction between water molecules is strong.
- (C) The living cells of plants push the water molecules together.
- (D) Atmospheric pressure supports the columns.

_____12. Why does the author mention steel wire in line 22?

- (A) To illustrate another means of pulling water
- (B) To demonstrate why wood is a good building material
- (C) To indicate the size of a column of water
- (D) To emphasize the strength of cohesive forces in water

_____13. Where in the passage does the author give an example of a plant with low root pressure?

- (A) Lines3-4
- (B) Lines5-7
- (C) Lines10-11
- (D) Lines12-13

