**Reading Passage 2**

**74-Preventing Overgrowth among Tree Branches**

One way trees prevent themselves from having too many branches is simply by shedding (dropping off) branches once they have fulfilled their purpose. This happens as the tree gets bigger and grows new outer layers of foliage that shade the inner and lower branches. In most large trees, the center of the canopy contains only large branches, small branches and fine twigs are found only at the canopy’s edge. In the shaded center, the small branches that would once have occupied that space are long gone. Trees like the true cypresses regularly shed small twigs complete with leaves toward the end of summer. Most other trees shed only branches that prove unproductive. If a branch is not producing enough carbohydrate to cover its own running costs—i.e., it needs to be subsidized by other branches because, for example, it is being shaded and receives little light—it will usually be got rid of. This prevents unproductive branches from being a drain on the tree and removes the wind drag (the force of air resistance) from useless branches.

Branches are shed for reasons other than lack of light. In dry parts of the world, it is common for trees and shrubs to lose smaller branches to save water. Small branches have the thinnest bark (the protective outer covering of a tree) and greatest surface area and thus are the source of most water loss once the leaves have been lost. The creosote bush of United States deserts self-prunes, or removes parts of itself, in the face of (facing, encountering, etc.) extreme heat or drought, starting from the highest and most exposed twigs and working downward to bigger and bigger branches, it’s a desperate act because if the creosote bush loses too much food, it dies. Shedding branches can also be useful for self-propagation(自我传播). Most poplar trees and willow trees characteristic of waterways will readily drop branches, which take root when washed up on muddy banks further downstream. 大多数杨树和柳树的水道特征让他们很容易掉落树枝，当被冲到下游的泥泞河岸上时，树枝会生根

How are branches shed? In the simplest cases, dead branches rot and fall off, or healthy branches are snapped off by wind, snow, and animals. Some willows have a brittle zone at the base of small branches that encourages breaking in the wind, seemingly for propagation. Other cases of “natural pruning” are more startling: elm trees, and to a certain extent others, such as oaks, have a reputation for dropping large branches (up to half a meter in diameter) with no warning on calm, hot afternoons. Such dramatic shedding appears to be due to a combination of internal water stress coupled with heat expansion affecting cracks and decayed wood.

Many trees, however, shed branches deliberately有意的. In this situation, branches are shed in the same way as foliage树叶 in autumn by the prior事先的 formation of a corky layer that leaves the wound sealed over with cork, which in turn is undergrown with wood the following year. In hardwoods, branches up to a meter in length and several centimeters in diameter can be shed normally after the leaves have fallen in the autumn (maples are unusual in casting branches mainly in spring and early summer). Oaks tend to shed small twigs up to the thickness of a pencil, beech may shed larger ones, and birches dump whole branches of dead twigs. Pine trees shed their clusters of needles (which really are short branches), and members of the redwood family shed their small branchlets with leaves. Typically in hardwood trees, something around 10 percent of terminal branches are lost each year through a mixture of deliberate shedding and being broken off.

Another way of reducing potential congestion is to make some branches smaller than others. Branches in the shade grow smaller than those in the sun. But trees can also regulate branch length from within. In many trees there is a clear distinction between long and short branches or shoots. The long shoots build the framework of the tree, making it bigger. The job of the short shoots (called spur shoots by horticulturalists) is to produce leaves, and commonly flowers, at more or less the same position every year. To maintain flexibility, any one shoot can switch from long to short or vice versa depending on internal factors, light levels, and damage.

Paragraph 1

One way trees prevent themselves from having too many branches is simply by shedding (dropping off) branches once they have fulfilled their purpose. This happens as the tree gets bigger and grows new outer layers of foliage that shade the inner and lower branches. In most large trees, the center of the canopy contains only large branches, small branches and fine twigs are found only at the canopy’s edge. In the shaded center, the small branches that would once have occupied that space are long gone. Trees like the true cypresses regularly shed small twigs complete with leaves toward the end of summer. Most other trees shed only branches that prove unproductive. If a branch is not producing enough carbohydrate to cover its own running costs—i.e., it needs to be subsidized by other branches because, for example, it is being shaded and receives little light—it will usually be got rid of. This prevents unproductive branches from being a drain on the tree and removes the wind drag (the force of air resistance) from useless branches.

1. All of the following situations are mentioned in paragraph 1 for a tree to shed its branches EXCEPT

* endangering other branches
* building up on a tree
* wasting a tree’s resources
* growing larger

2. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave

out essential information.

* A tree will usually shed branches that use more carbohydrate than they produce.
* Branches that are shaded usually do not receive enough light to produce all the carbohydrate they need.
* If a tree gets rid of a branch, it is usually because other branches lack enough carbohydrate to subsidize it.
* If a branch is shaded and cannot produce as much carbohydrate as it needs, it will usually be subsidized by other branches.

3. According to paragraph 1 most twigs of the true cypresses would be arranged in which of the following manner

* Most small twigs on true cypresses have been found located at the margins of the canopy.
* The shaded center areas of true cypresses are generally occupied by many small twigs and branches.
* True cypresses shed twigs that grow on large, unproductive branches.
* True cypresses seasonally shed small twigs without regard to whether they are productive or not.

Paragraph 2

Branches are shed for reasons other than lack of light. In dry parts of the world, it is common for trees and shrubs to lose smaller branches to save water. Small branches have the thinnest bark (the protective outer covering of a tree) and greatest surface area and thus are the source of most water loss once the leaves have been lost. The creosote bush of United States deserts self-prunes, or removes parts of itself, in the face of extreme heat or drought, starting from the highest and most exposed twigs and working downward to bigger and bigger branches; it’s a desperate act because if the creosote bush loses too much wood, it dies. Shedding branches can also be useful for self-propagation. Most poplar trees and willow trees characteristic of waterways will readily drop branches, which take root when washed up on muddy banks further downstream.

4. Which of the following best describes the role of the explanation offered in paragraph 2?

* Paragraph 2 questions this explanation by providing counterexamples of some trees.  Paragraph 2 presents additional evidence supporting this explanation.
* Paragraph 2 discusses some additional reasons why trees shed branches
* Paragraph 2 points out some additional consequences for trees besides the shedding of branches

5. The word “exposed” in the passage is closet in meaning to

* distant
* unprotected
* easily replaced
* unproductive

6. According to paragraph 2, what is true of the creosote bush of United States deserts?

* It tends to grow small branches during dry parts of the year.
* It loses more water through its bark than through its leaves.
* It loses its lower branches only after losing upper ones.
* It sheds branches for the purpose of propagating itself.

Paragraph 3

How are branches shed? In the simplest cases, dead branches rot and fall off, or healthy branches are snapped off by wind, snow, and animals. Some willows have a brittle zone at the base of small branches that encourages breaking in the wind, seemingly for propagation. Other cases of “natural pruning” are more startling: elm trees, and to a certain extent others, such as oaks, have a reputation for dropping large branches (up to half a meter in diameter) with no warning on calm, hot afternoons. Such dramatic shedding appears to be due to a combination of internal water stress coupled with heat expansion affecting cracks and decayed wood.

7. The phrase “with no warning” in the passage is closet in meaning to

* without any benefit
* without any stress
* without any indication beforehand
* without any damage

8. All of the following are mentioned in paragraph 3 as a way in which branches can be lost EXCEPT:

* being broken off by the wind
* being shed for propagation
* becoming rotten
* becoming too large in diameter

9. Which of the following is mentioned in paragraph 3 in the shedding of large branches by oaks on calm, hot afternoons?

* The development of a brittle zone at the base of the branches
* The enlargement of cracks in the branches due to heat
* The rise of sudden bursts of wind that snap off decayed wood
* The seasonal need to propagate new trees

Paragraph 4

Many trees, however, shed branches deliberately. In this situation, branches are shed in the same way as foliage in autumn by the prior formation of a corky layer that leaves the wound sealed over with cork, which in turn is undergrown with wood the following year. In hardwoods, branches up to a meter in length and several centimeters in diameter can be shed normally after the leaves have fallen in the autumn (maples are unusual in casting branches mainly in spring and early summer). Oaks tend to shed small twigs up to the thickness of a pencil, beech may shed larger ones, and birches dump whole branches of dead twigs. Pine trees shed their clusters of needles (which really are short branches), and members of the redwood family shed their small branchlets with leaves. Typically in hardwood trees, something around 10 percent of terminal branches are lost each year through a mixture of deliberate shedding and being broken off.

10. According to paragraph 4, what information can be learned from the deliberate shedding of branches by the trees?

* Limiting the size of branches being shed to comparatively small ones
* Forming a new layer of wood to seal the wounded area immediately after shedding
* Shedding leaves at the same time that branches are being shed
* Forming a layer of protective tissue before branch shedding begins

Paragraph 5

Another way of reducing potential congestion is to make some branches smaller than others. Branches in the shade grow smaller than those in the sun. But trees can also regulate branch length from within. In many trees there is a clear distinction between long and short branches or shoots. The long shoots build the framework of the tree, making it bigger. The job of the short shoots (called spur shoots by horticulturalists) is to produce leaves, and commonly flowers, at more or less the same position every year. To maintain flexibility, any one shoot can switch from long to short or vice versa depending on internal factors, light levels, and damage.

11. The word “congestion” in the passage is closet in meaning to

* loss
* damage
* overcrowding
* stress

12. According to paragraph 5, what is the main purpose of the long branches or shoots?

* To regulate the length of large branches
* To increase the size of the tree
* To produce leaves and flowers
* To help create shaded areas

Paragraphs 1-2

One way trees prevent themselves from having too many braches is simply by shedding (dropping off) branches once they have fulfilled their purpose. This happens as the tree gets bigger and grows new outer layers of foliage that shade the inner and lower branches. In most large trees, the center of the canopy contains only large branches, small branches and fine twigs are found only at the canopy’s edge. In the shaded center, the small branches that would once have occupied that space are long gone. Trees like the true cypresses regularly shed small twigs complete with leaves toward the end of summer. Most other trees shed only branches that prove unproductive. If a branch is not producing enough carbohydrate to cover its own running costs—i.e., it needs to be subsidized by other branches because, for example, it is being shaded and receives little light—it will usually be got rid of. This prevents unproductive branches from being a drain on the tree and removes the wind drag (the force of air resistance) from useless branches.■

Branches are shed for reasons other than lack of light. ■In dry parts of the world, it is common for trees and shrubs to lose smaller branches to save water. ■Small branches have the thinnest bark (the protective outer covering of a tree) and greatest surface area and thus are the source of most water loss once the leaves have been lost. ■The creosote bush of United States deserts self-prunes, or removes parts of itself, in the face of extreme heat or drought, starting from the highest and most exposed twigs and working downward to bigger and bigger branches, it’s a desperate act because if the creosote bush loses too much food, it dies. Shedding branches can also be useful for self-propagation. Most poplar trees and willow trees characteristic of waterways will readily drop branches, which take root when washed up on muddy banks further downstream.

1. Look at the four squares [■] that indicate where the following sentence can be added to the passage.

**A tree will also shed branches if its water supply is insufficient.**

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

1. Directions: An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some answer choices do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2 points.**

Drag your choices to the spaces where they belong. To review the passage, click on **View Text**.

**For trees to remain healthy as they grow and as circumstances change, tree branches must change in various ways.**

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1. Trees can benefit from shedding inefficient branches that consume more carbohydrates than they produce or that are a major source of water loss.
2. Branches can be lost as a result of damage from whether, animals, or disease, but they can also be shed when they are no longer useful, much as leaves are shed in autumn.
3. While branch shedding is common and may be necessary for a tree’s survival, the corky layer that forms at sites where branches have been shed prevents additional growth in those areas for several years.
4. Shedding large branches is such a desperate act for survival that the creosote bush is one of the few plants to use this mechanism for removing wood.
5. Larger trees can self-propagate when water stress and heat expansion break off branches, as long as the shed branches fall on or can be transported to a location favorable for taking root.
6. Trees prevent branch overcrowding in part by varying branch length through internal mechanisms such as having shoots that can switch from long to short or from short to long, as needed.