

U₂ 英語 問題

注意

1. 試験開始の指示があるまでこの問題冊子を開いてはいけません。
2. 解答用紙はすべて**HB**の黒鉛筆または**HB**の黒のシャープペンシルで記入することになっています。HBの黒鉛筆・消しゴムを忘れた人は監督に申し出てください。(万年筆・ボールペン・サインペンなどを使用してはいけません。)
3. この問題冊子は**12ページ**までとなっています。試験開始後、ただちにページ数を確認してください。なお、問題番号はI～Vとなっています。
4. 解答用紙にはすでに受験番号が記入されていますので、出席票の受験番号が、あなたの受験票の番号であるかどうかを確認し、出席票の氏名欄に氏名のみを記入してください。なお、出席票は切り離さないでください。
5. 解答は解答用紙の指定された解答欄に記入し、その他の部分には何も書いてはいけません。
6. 解答用紙を折り曲げたり、破ったり、傷つけたりしないように注意してください。
7. この問題冊子は持ち帰ってください。

マーク・センス法についての注意

マーク・センス法とは、鉛筆でマークした部分を機械が直接よみとって採点する方法です。

1. マークは、下記の記入例のようにHBの黒鉛筆で枠の中をぬり残さず濃くぬりつぶしてください。
2. 1つのマーク欄には1つしかマークしてはいけません。
3. 訂正する場合は消しゴムでよく消し、消しきずはきれいに取り除いてください。

マーク記入例：

A	1	2	3	4	5
	○	○	●	○	○

(3と解答する場合)

I. 次の文を読み、下記の1～10それぞれに続くものとして、本文の内容ともっともよく合致するものを、各イ～ニから1つずつ選び、その記号を解答用紙の所定欄にマークせよ。

Last year, a team of climbers led by Will Blozan measured the tallest tree in the eastern United States: a 192-foot tulip tree in the Great Smoky Mountains. Although the achievement was significant, it served to emphasize just how small Eastern trees are compared with the giants along the Northern California coast.

The current height champion out West is Hyperion, a 379-foot coast redwood standing somewhere in California's Redwood National Park. (Researchers have kept the precise location quiet to protect the world's tallest tree.) That's just a little less than double the size of the tallest Eastern tree. In fact, even the average coast redwood grows more than 100 feet taller than any tree in the East.

And the height difference isn't limited to redwoods. *Douglas firs in the western United States and Canada might have grown close to 400 feet tall before logging eliminated the tallest representatives of the species. (There are historical accounts of equally tall mountain ash trees in Australia around a century ago, but those have suffered the same fate as the tallest Douglas firs and redwoods.)

There's no denying it: Trees are simply taller out in the West. But why? Temperature plays a major role. Both freezing temperatures and extreme heat can cause a phenomenon known as cavitation, which prevents trees from growing very tall. Here's how it works: Trees conduct water and nutrients from the ground to their leaves through tubelike passages known as xylem. When water in the xylem freezes and then thaws, air previously dissolved in the water forms a bubble. Those bubbles block the flow of fluid and nutrients to the leaves.

Since tall trees have to convey so much water and nutrients to their extensive leaf system, their xylem passages are very broad, especially near the bottom of the trunk. Such large-bore tubes are particularly vulnerable to freeze-and-thaw cavitation. Trees in the East that experience these weather extremes, therefore, restrict their height to keep the xylem narrow, which prevents cavitation.

Heat can also cause cavitation. When the surrounding air is warm and dry, it tends to pull moisture from the leaves. At extreme levels, the surrounding air begins to pull very strongly on the water inside the tree.

“Heat can stretch the water column inside the xylem like a rubber band,” says George Koch, a plant scientist who has studied the biological limits of tree height at Northern Arizona University. “If the difference in pressure between the surrounding air and the cells grows high enough, the water column tears apart, bubbles form, and water can’t flow.”

To understand why Eastern trees are relative dwarfs, therefore, all you have to do is look at temperature ranges. In Redwood National Park, it rarely gets much above 70 degrees or much below 40 degrees. Few areas along the Eastern seaboard can boast such a narrow temperature range.

The advantages of moderate temperatures go beyond cavitation. Maples, oaks and many of the other trees that dominate the East manufacture sugar-alcohol compounds that act as an antifreeze. As a result, when temperatures drop very low, ice crystals form only on the outside of cells. Redwoods do not make these chemicals, which means a freeze can kill them.

Returning to the hotter end of the temperature range, hot and dry air can keep a tree growing. When warm air tries to pull moisture from leaves, it can close its ^{**} pores to maintain its water supplies. But closing the pores also means stopping carbon dioxide from coming in, and carbon dioxide is what makes ^{***} photosynthesis go. On hot summer days, therefore, trees have to decide between growing tall and keeping their moisture.

Temperature isn’t the only issue. Soil is rich in the areas where the tallest trees grow. The ample supply of nutrients gives them the freedom to grow tall.

“The life of a plant is about balancing water, nutrients, carbon dioxide and light,” says Koch. “If a tree has plenty of all the others, life becomes a race to the light.”

Then there’s the fog. As anyone who has visited redwood country knows, it’s pretty foggy out there. Foggy air is wet air, and wet air means the trees can open their pores up without risking a major loss of moisture. And where the redwoods grow tallest, the fog rolls in in the afternoon and evening, after the sun has dried out the soil.

The degree to which redwoods rely on fog for their growth and health has some researchers very concerned. Environmental scientists James Johnstone and

Todd Dawson of the University of California at Berkeley have discovered a surprising trend in West Coast fog: Over the past half-century, the redwoods' environment has become 33 percent less foggy, yet another result of global climate change. Dawson projects that, in 40 to 70 years, continued decrease of coastal fog would threaten the survival of the redwoods of coastal Northern California.

Not everyone is convinced that this change in climate is disastrous for the redwoods, though.

"The loss of fog isn't necessarily a bad thing for redwoods," says Stephen Sillett, a renowned ecologist at Humboldt University, in the heart of California's redwood country. "When you look at the tree rings, you see that the redwoods have grown at historically fast rates during the time Professor Dawson studied. When fog decreases, light increases. And more light means more growth."

While the long-term effects of climate change on the world's tallest trees aren't yet clear, one thing is: The world's tallest trees are not likely to get much taller. Koch's research suggests that cavitation becomes so common in trees taller than 420 feet that they lose the ability to bring sufficient water and nutrients to their crowns. Any extra light they get from loss of fog won't go toward height.

"Redwoods experience 90 to 95 percent of their height growth in the first 30 percent of their lifetimes of around 400 years," Koch says. "They grow fast and hit a ceiling. Then they just grow wider, kind of like humans."

*Douglas firs : ダグラスモミ , 北米産松科の大木

** pores : 気孔

*** photosynthesis : 光合成

1. The passage suggests that the average West Coast redwood grows to about

- イ. 100 feet.
- ロ. 200 feet.
- ハ. 300 feet.
- ニ. 400 feet.

2. One reason trees in the East don't grow as tall as in the West is that they
- イ. are more likely to suffer from climate change.
 - ロ. stop growing after 30 years.
 - ハ. are exposed to a broader range of temperatures.
 - ニ. have no way to protect themselves from cold weather.
3. The passage suggests that cavitation
- イ. causes the xylem to freeze and tear.
 - ロ. occurs less frequently in large trees.
 - ハ. causes trees to grow fast when young.
 - ニ. restricts the transport of nutrients.
4. According to the passage, high temperatures make it hard for trees to absorb
- イ. carbon dioxide.
 - ロ. oxygen.
 - ハ. heat.
 - ニ. light.
5. The underlined word "relative" (paragraph 8) is closest in meaning to
- イ. almost.
 - ロ. connected.
 - ハ. comparative.
 - ニ. extreme.
6. The underlined word "go" (paragraph 10) is closest in meaning to
- イ. disappear.
 - ロ. move.
 - ハ. separate.
 - ニ. work.

7. The passage mentions all of the following environmental factors that can affect tree growth EXCEPT

- イ. moisture in the air.
- ロ. air pressure.
- ハ. soil nutrients.
- ニ. temperature.

8. According to the passage, scientists are divided over

- イ. the future survival of redwoods.
- ロ. the impact of climate change on East Coast trees.
- ハ. the importance of sunlight to the growth of redwoods.
- ニ. the occurrence of cavitation in East Coast trees.

9. The passage suggests that

- イ. redwoods would grow well on the East Coast.
- ロ. trees are taller now than ever before in history.
- ハ. East Coast trees will grow taller in the future.
- ニ. there is a natural limit to tree height.

10. The most appropriate title for this passage is

- イ. Tree Height and Global Warming.
- ロ. Why Do West Coast Trees Grow So Tall?
- ハ. Redwoods: The Tallest Trees in the World.
- ニ. How Does Climate Affect Plant Growth?

II. 次の文中の空所(1)～(6)を補うのもっとも適当なものを、それぞれ対応する下記のイ～ニの中から1つずつ選び、その記号を解答用紙の所定欄にマークせよ。

The American appetite for energy, primarily in the form of oil, promises to pose serious political and economic challenges for many years to come. The United States does not produce enough petroleum to (1) our appetite, making us dependent on foreign sources. We have low gasoline prices and a love affair with large vehicles. Supporters of energy independence are sharply divided on how to proceed. One group wishes to (2) more oil reserves in the U.S., primarily in Alaska, while others are unwilling to sacrifice national wildlife preserves for what is at best a temporary solution. Unwilling to seriously contribute to mass transportation and pedestrian paths and bikeways, the United States (3) some 200 million dollars per day on road construction.

The United States has about 4 percent of the world's population, and consumes a quarter of the world's energy. Of course, other highly industrial countries also consume energy (4). For each dollar of Gross Domestic Product (GDP), however, the U.S. consumes about 40 percent more energy than Japan or the European Union.

Global climate change has (5) our attention to another problem, the coming crisis in water resources. The Southwestern desert has virtually bloomed with agricultural expansion as a result of the dam projects of the last century. But while agricultural use is expected to be reduced, the municipal demand in places like Nevada and Arizona is to continue to increase. These hot, dry areas are the (6) population centers in the U.S.

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|-----------------|-----------------------|--------------------|------------|
| (1) イ. agree | ロ. feel | ハ. keep | ニ. satisfy |
| (2) イ. create | ロ. produce | ハ. save | ニ. utilize |
| (3) イ. extends | ロ. makes | ハ. spends | ニ. taxes |
| (4) イ. annually | | ロ. consciously | |
| | ハ. disproportionately | ニ. normally | |
| (5) イ. directed | ロ. distracted | ハ. diverted | ニ. divided |
| (6) イ. aging | | ロ. fastest growing | |
| | ハ. rapidly declining | ニ. working | |

Ⅲ。次の文中の空所(1)～(8)を補うのもっとも適当なものを、それぞれ対応する下記のイ～ニから1つずつ選び、その記号を解答用紙の所定欄にマークせよ。

The brain's power to focus can make a single voice seem like the only sound in a room full of chatter, a new study shows. The results help explain how people can (1) out a speaker from a confusing stream of incoming sounds. For the project, researchers studied (2) happens in the brains of people who are trying to follow one of two talkers.

Volunteers listened to two speakers, one female and one male, (3) nonsense sentences such as "Ready tiger go to red two now." The participants had to report the color and number spoken by the person who said one of two call signs ("apple" or "tiger"). Immediately after the male voice said "tiger," for instance, the listener knew to focus on that speaker and (4) the other. The volunteers also performed the task while listening to each speaker solo.

Throughout the experiment, the researchers were recording brain activity and sorting that activity into patterns that reflect voices and words. Before the call sign was uttered, these patterns were unstable. But (5) the listener heard the right call sign, attention snapped to that voice, and brain activity shifted to a pattern similar to (6) seen when the listener heard a solo speaker.

In trials (7) the volunteers tracked the wrong voice, something different happened. The big attention switch happened before a call sign was uttered, (8) that the listener had selected the wrong voice early and stuck with it.

- | | | | |
|-------------------|----------------------|----------------|---------------|
| (1) イ. bring | ロ. pick | ハ. set | ニ. throw |
| (2) イ. how | ロ. what | ハ. where | ニ. why |
| (3) イ. being said | ロ. said | ハ. saying | ニ. to say |
| (4) イ. criticize | ロ. evaluate | ハ. ignore | ニ. prefer |
| (5) イ. as soon as | ロ. if | ハ. long before | ニ. though |
| (6) イ. that one | ロ. the one | ハ. what | ニ. which |
| (7) イ. in that | ロ. where | ハ. whether | ニ. with which |
| (8) イ. suggesting | | ロ. suggests | |
| | ハ. to have suggested | | ニ. to suggest |

IV. 次の1～8それぞれの空所を補うのもっとも適当なものを、各イ～ニから1つずつ選び、その記号を解答用紙の所定欄にマークせよ。

1. We decided to move to a town a few kilometers outside Omiya and within () of Ikebukuro by train.

イ. business

ロ. commuting distance

ハ. communications

ニ. suburban areas

2. Recent experiments have () that vitamin C has little effect on cancer.

イ. conducted

ロ. demonstrated

ハ. designed

ニ. produced

3. The poem () the mood of New England in the early 1920s.

イ. accurately sights

ロ. correctly answers

ハ. faithfully reflects

ニ. thoroughly reviews

4. The researcher says that the health problems () to air pollution may in part be due to heavy smoking.

イ. addicted

ロ. attributed

ハ. referred

ニ. succeeded

5. The company () obey the new anti-pollution law and was investigated by the local government.
- イ. compromised to
 - ロ. dared to
 - ハ. failed to
 - ニ. tended to
6. () the wealth of evidence, there is still a dispute about the nature of animal communication.
- イ. Among
 - ロ. Despite
 - ハ. For
 - ニ. In view of
7. If he () international relations at university, he could have worked for the United Nations.
- イ. had studied
 - ロ. has studied
 - ハ. studied
 - ニ. studies
8. All of my new classmates are friendly, but I can't think of anybody () to my party.
- イ. to have invited
 - ロ. to invite
 - ハ. whom to invite
 - ニ. whom to be invited

V. 次の文中の空所(1)~(6)を補うのもっとも適当なものを、それぞれ対応する下記のイ~ニから1つずつ選び、その記号を解答用紙の所定欄にマークせよ。

Because the United States is such a diverse country, it may at first seem impossible to describe a central common culture. (1), this is true: there are so many cultural groups here that there is no single set of cultural values that represents all groups. (2), there is tremendous variation within groups, so that the opposite of any true statement might also be true, at least for some members of some groups. That being said, most experts will agree that there is a dominant U.S. culture, a culture that is (3) enough among people with influence that social, political, and business life will embody that culture and its values.

Because we are a diverse country with a strong emphasis on individualism, we are likely to notice things that make us different from (4). However, there are aspects of our culture that bind us together. It should come as no surprise that in the United States, the (5) culture is that shared by European Americans. And because European Americans have (6) run the institutions of government, education, and commerce, these institutions reflect European American values.

- | | |
|----------------------|----------------------|
| (1) イ. Absolutely | □. In one sense |
| ハ. Nonetheless | ニ. On the contrary |
| (2) イ. Alternatively | □. Except |
| ハ. However | ニ. In addition |
| (3) イ. shown | □. taken |
| ハ. thought | ニ. widespread |
| (4) イ. all of us | □. one after another |
| ハ. one another | ニ. all together |
| (5) イ. alternative | □. authoritarian |
| ハ. mainstream | ニ. minority |
| (6) イ. fair | □. long |
| ハ. past | ニ. well |

【以下余白】