

英 語 (問 題)

(100点・80分)

注 意 事 項

1. 試験開始の合図があるまで、この問題冊子の中を見たり、裏返したりしてはいけません。
2. この問題冊子は16ページあり、解答用紙は1枚（両面）です。
試験中に問題冊子・解答用紙の印刷不鮮明、ページの落丁などに気付いた場合は、手を挙げて監督者に知らせなさい。
3. 試験開始後、ただちに解答用紙の所定記入欄に、氏名・受験番号・誕生日をそれぞれ正しく記入し、さらに受験番号・誕生日をその下のマーク欄にマークしなさい。
4. 受験番号・誕生日が正しくマークされていない場合は、採点できないことがあります。

5. 解答は、解答用紙の解答欄に各設問で指示された方法で記入しなさい。
マーク方式は、例えば、

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と表示のある問いに対して③と解答する場合は、次の(例)のように解答番号20の解答欄の③にマークしなさい。

(例)

解答番号	解 答 欄
20	① ② ● ④

6. 問題冊子の余白等は、下書きなどに適宜利用してよいが、各設問で指示された解答は、必ず解答用紙の解答欄に指示された方法で記入しなさい。
7. 試験終了後、提出は解答用紙のみとし、問題冊子は持ち帰りなさい。

Part I 次の英文を読んで設問に答えなさい。

For many years, researchers such as botanists have been debating whether or not plants have feelings, such as pain or happiness, or even intelligence. Although plants have no brain or nervous system like humans do, they react to their surrounding environment. A reaction of plants or other organisms to environmental stimuli such as light, heat, darkness, wind, gravity, or touch, is called a tropism. The behavior is like a sensor. One example is the morning glory. They open up early in the morning into beautiful blue or purple flowers as the sun comes up and air gets warmer, then close when it gets dark in the evening. Other tropisms are young plants sprouting in the direction of the sun or roots growing towards gravity's pull.

However, plants have not been defined as a form of "intelligent life" having emotions such as "pain." Dr. Clifford Slayman, a professor at Yale University stated: "We do not know what ⁽⁶⁾constitutes intelligence, only what we can observe and judge as intelligent behavior." Plants have no nerve cells like humans do, but they can send electrical signals by chemicals, similar to the human nervous system. If there is a change in one part of a plant, other parts will sense ⁽⁷⁾it. Some plant species contain dopamine, a hormone also found in animals and humans. In humans, if dopamine levels are too low or too high, it can affect emotions and lead to mental illness or nerve problems.

When there is danger or a need to survive, plants can communicate with other plants, or even with themselves. To communicate plants can release tiny amounts of chemicals from their roots into the soil to reach other plants in the root zone. In addition, large plants can communicate with themselves. For example, a part of a large plant can send a danger warning to its other parts. A recent study reported that a mustard plant can protect itself by sending signals to the other leaves if some of its leaves are cut.

So, if you cut a plant, will it express any kind of pain? Researchers have found that plants actually make noises like a clicking sound if they are stressed from being

cut, dried out, or infected. The finding, published in a popular science journal, showed that the sounds were too high pitched for humans to hear, although the volume was about the same as normal human conversation. Therefore, sounds from plants must be recorded by lab equipment, such as an ultrasonic microphone, to detect them. “Humans usually hear up to 16 kilohertz. These sounds are mostly between 40 and 80 kilohertz,” said Dr. Lilach Hadany from Tel Aviv University. The high pitch can be considered as a scream or shriek due to the pain.

When recorded by ultrasonic microphone, a research collaboration team between Tel Aviv University, MIT, and Harvard discovered that plants, such as tomato, tobacco, and cacti, produced “very short ultrasonic clicks.” When they were healthy, they were nearly quiet, making sounds less than once every hour. However, when cut or exposed to very dry conditions, the amount of sounds the plants made increased. Scientists are still unsure how the sounds are generated, but they think it is by small holes being created in the plants when damaged. If a plant is stressed, small bubbles may appear and when they pop, vibrations occur in the plants possibly creating a type of high whistling sound.

Researchers examined if the emitted sounds varied according to the type of plant being tested. They recorded sounds from tomato, tobacco, and cacti under four conditions: healthy, stressed by cutting, dehydrated, or infected. Upon analyzing the audio data, they found that the sounds from a healthy plant could be distinguished from a stressed plant. Also, Dr. Hadany stated, “We can separate between sounds emitted by tomato and tobacco, between tomato and cacti, and also between cut tomato and dry tomato, a little bit dry tomato, and very dry tomato.” In fact, the sounds could be detected from the tomato before it even began to appear dehydrated, perhaps as a warning system. Thus, acoustic monitoring could be beneficial to use for agricultural production, in addition to typical visual monitoring.

Moreover, plants can communicate with insects and other wildlife. A well-known method is flowers releasing pollen into the air to attract bees, so the plants can pollinate and reproduce. Sounds plants make can be heard by various other

insects as well as mice and bats. Presently, it is unknown how the sounds are used by wildlife, but one study found that if plants sense the sound of bees buzzing around, they will respond by producing sweeter nectar within three minutes.

Some researchers think there is no direct evidence that plants feel “pain” or “emotion” in the human sense. They cannot be sure that the plants feel stress and intentionally make sounds: the sounds could be a purely physical response, such as that of bubbles popping. As far as plants feeling “pleasure,” it is known that talking to plants kindly or peacefully can help them grow, while yelling angrily will not. The plant may not understand the words, but the vibration of calm talking is beneficial for plants. Plants are a part of the environment. They emit oxygen and clean the air. We must all respect and care for them whether they can feel emotions or not.

1 から 7 の質問の答えとして最も適切なものを選び、その番号をマークしなさい。

- 1 What is a tropism?
- ① an organisms' behavior to compete with others
 - ② a reaction of organisms to certain phenomena
 - ③ a reaction of plants to human activities
 - ④ an intention of plants to change the surrounding environment

- 2 According to the passage, how do plants communicate?
- ① They exchange their “emotions” by sending electrical signals.
 - ② They emit sounds, which cannot be identified by humans, or chemicals.
 - ③ They let others know dangers by responding to their behaviors.
 - ④ They allow others to receive a signal which they sent.

- 3 Why can't humans hear the sounds produced by plants?
- ① Because humans can't hear the high-pitch sounds plants emit.
 - ② Because the volume of plants' sounds is too small.
 - ③ Because plants make noises only when stressed out.
 - ④ Because small bubbles appear and pop in plants.

4

Why is acoustic monitoring beneficial?

- ① Because we can copy various types of sounds produced by plants.
- ② Because we can recognize the types of plants by hearing the sounds they produce.
- ③ Because we can identify what states plants are in by detecting their sounds.
- ④ Because we can apply the sounds emitted by plants to improving our mental health.

5

According to the passage, why do plants communicate with insects and other wildlife?

- ① Because plants need to cooperate with them to improve their habitat.
- ② Because plants want to inform them of the dangers they may encounter.
- ③ Because plants need to react to various kinds of weather conditions.
- ④ Because plants try to draw their attention in order to reproduce.

6

Which is the closest in meaning to the underlined word (6)?

- ① advances
- ② develops
- ③ forms
- ④ replaces

7

What does the underlined word (7) refer to?

- ① the system
- ② the part
- ③ the change
- ④ the plant

8

下の表は、この文章のメインポイントを段落ごとに順番に並べたものです。本文の流れに沿って、空欄に適する選択肢をひとつ選び、その番号をマークしなさい。ただし、同じ選択肢は一度しか使えません。

Plants reacting to their surrounding environment

8-1

The way of communicating among plants

Noises made by plants when being stressed

8-2

8-3

Plants communicating with insects and other wildlife

Significance of talking nicely to plants

- ① Communication difficulties between human beings and plants
- ② The level of dopamine that affects humans' mental health
- ③ Importance of using the ultrasonic microphone in research
- ④ Different kinds of sounds from different types of plants
- ⑤ Dr. Hadany's statement regarding the plants' conditions
- ⑥ Difficulty in defining the intelligence of plants
- ⑦ The way plants can produce noises
- ⑧ Uniqueness of the plants making bubbles

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最後の段落には下記の質問の答えがあります。その答えを日本語で要点を押さえて述べなさい。解答は解答欄に書きなさい。

9-1

According to the passage, how would plants react if people yell angrily at them?

9-2

According to the passage, what attitude do we need to better understand plants?

Part II 次の英文の空欄 から に入る最も適切な単語を選択肢から選び、その番号をマークしなさい。ただし、同じ選択肢は一度しか使えません。

When was the last time you had a complete health checkup? If you cannot , you are not alone. Many people today forget or a regular physical examination. They believe that they don't need it because they are perfectly fine or that they are too busy with their fast-paced lives. Others say they are afraid of potential diseases or that will be discovered after examination. Regardless of the reasons for not taking a routine health check, medical professionals the significance of taking it as a life-saving habit. Having a regular checkup helps you that you can stay healthy for years to come. Regular checkups allow medical professionals to identify risk for certain diseases. When detecting any health issues, they can take quick to prevent them from going worse. Regular checkups allow doctors to ongoing conditions of people suffering from lifestyle-related diseases such as diabetes, stroke, cancer, or heart disease. They can help patients properly manage their conditions, leading to improving their of life. With better understanding of the importance of a regular health checkup, you should not wait for an appointment to see a doctor.

選択肢

- | | | |
|-----------|-----------|------------|
| ① ensure | ② factors | ③ monitor |
| ④ quality | ⑤ recall | ⑥ skip |
| ⑦ steps | ⑧ stress | ⑨ symptoms |

Part III 次の英文と図表を読んで、19 から 22 の質問の答えとして最も適切なものを選び、その番号をマークしなさい。

Quality Education is one of the Sustainability Development Goals (SDGs) and it includes numerous aspects. One of the most important aspects is providing conditions for students of all genders and economic conditions to have access and support to finish their studies. However, there are other important educational goals with the development of technology. For example, digital literacy is becoming an important skill to master from an early age, such as primary school.

Figure 1 shows the completion rates for each level of education from primary to upper secondary in 2018 per country. Figure 2 shows the changes over time in the percentages of primary schools that have access to computers. Let's compare the situation in Japan with other countries!

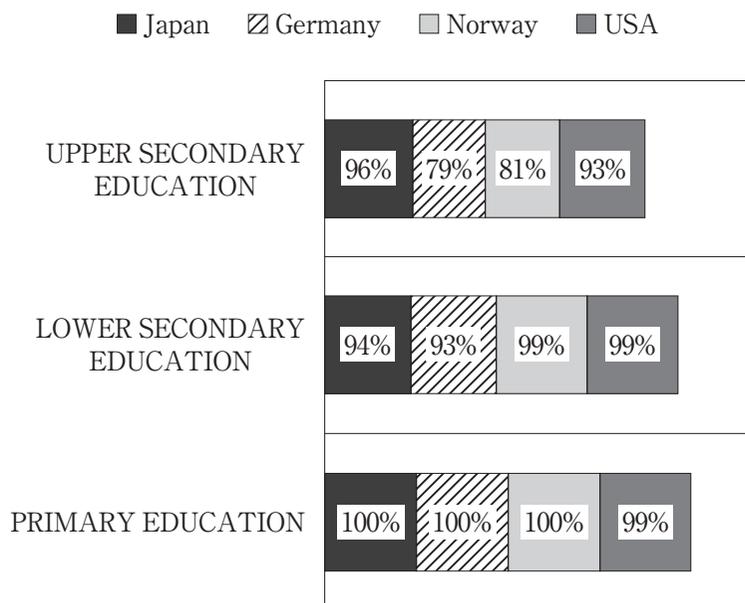


Figure 1. The completion percentage per type of education in 2018

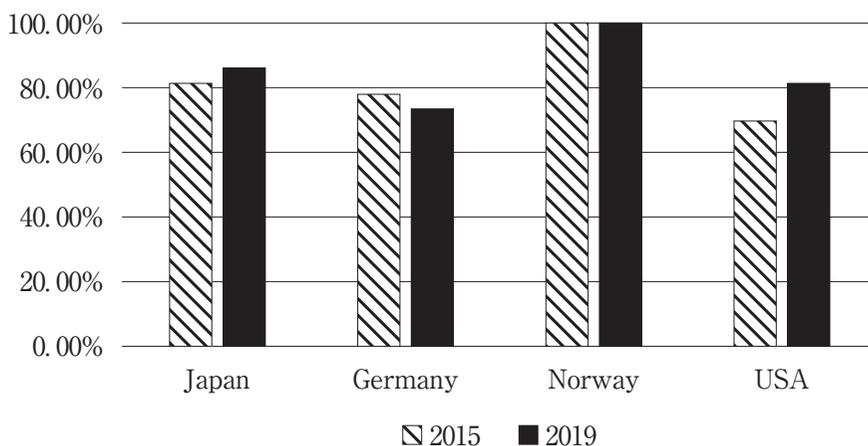


Figure 2. The percentages of primary schools with access to computers for educational purposes

Progress towards ensuring Quality Education has been slow. COVID-19 pandemic along with technological advancements resulted in both positive and negative impacts on education. While the integration of new technologies allows for more inclusive educational practices, access to such technologies might result in widening inequalities. Therefore, bridging the digital divide alongside with providing training for more inclusive education should be prioritized.

Source: <https://unstats.un.org/sdgs>

19

What is mainly discussed in the passage?

- ① Advancement of education from a technological viewpoint
- ② Consideration of education in terms of access to digital devices
- ③ Importance of the goal of Quality Education for developing countries
- ④ Problems in education between different gender and economic groups

20

Which of the following is true regarding education completion rates?

- ① Japan records the third highest rate of students completing education at the lower secondary level.
- ② In Germany, about 90 percent of students decided to go to upper secondary education.
- ③ Norway constantly shows 100% completion rates in primary education from 2015 to 2019.
- ④ The rate of completion of school programs declines at more advanced levels.

21

Which of the following can be said from Figure 2?

- ① Application of computers increased in most primary and secondary schools.
- ② Educational demand for internet access significantly rose in 2019.
- ③ There was a declining rate of computer use only in German primary schools.
- ④ The number of Japanese students who didn't have access to computers increased in 2019.

22

What is the author's opinion about the impact of COVID-19 on education?

- ① Better educational practices led to more innovative tools for education.
- ② Education started to combine different digital devices into teaching materials.
- ③ Inclusion of technology into education had conflicting results.
- ④ Technological advancements had fully positive impacts on education.

Part IV 次の 23 から 26 の会話の空欄に入る最も適切な表現を選び、その番号をマークしなさい。

23

Kim : Hello, Jane. What is the flyer you are looking at?

Jane : Oh, I just got it on the street. It's a workshop on making a feeding table for dogs and cats. It says it will be next Sunday from 10:00 in the morning at Central Community Center.

Kim : Oh, that sounds fun. My dog, Ginger, will be happy if he gets a new one. How much do they charge?

Jane : It says that the workshop is free and does not require registration, but they ask participants to bring a donation for the animal shelter. ().

Kim : That sounds very interesting. I would like to join you if you go.

Jane : Oh, that's great, let's do that together. There are some more details on the website. You can check them out if you want.

- ① We can bring pet food or money
- ② We can bring sick or injured pets
- ③ You can protect your pets
- ④ You can water your pets

Allen : If you have a chance to move again, would you like to live in a city or a rural area?

Kana : Well, I prefer to live in the city because there are more work opportunities for young people in cities than in rural areas.

Allen : I see. I like to live in rural areas since I like nature. It keeps my mind at peace.

Kana : That's true. I like nature, too. But many jobs in rural areas are seasonal and life is unstable. ().

Allen : But living in a city is so expensive, especially renting an apartment or a house.

Kana : Even though the cost of living is higher in cities than it is in rural areas, people who work in cities tend to have much higher salaries.

Allen : I see. I will do some research and think carefully about where I move next.

- ① Employing people in nature costs more
- ② It is more common for large companies to be based in cities
- ③ The cost of living is lower in urban areas
- ④ Unemployment is much higher in urban areas

25

Tracy : I'm often so upset about some people on the trains.

Mike : You mean their bad manners?

Tracy : Exactly. I can't stand it when they talk loudly on the phone, listen to music at high volume, or eat, drink, and litter after that.

Mike : (), Tracy.

Tracy : I can't believe such people seem to feel no shame with their bad behaviors.

Mike : It's terrible! There should be some penalty for such shameless passengers.

- ① I feel the same way
- ② I think they will be sorry for that
- ③ I want to know more about it
- ④ I wonder why you think so

26

Steve : Hi, Jack. I'm on the way to the stadium, but I'm going to be late for the game. There is heavy traffic ahead of us.

Jack : Oh, no! You're driving on the highway?

Steve : Right. It's moving very slowly. I haven't even gotten any traffic news about an accident up ahead.

Jack : Can you tell what time you'll be here?

Steve : I can't give an exact time, but we'll be at least one hour late.

Jack : OK, Steve. Keep on driving safe. ().

- ① No pain, no gain
- ② Less is better than more
- ③ Better late than never
- ④ The sooner, the better

Part V 次の各英文を読み，その内容を理解した上でカッコ内の語句をすべて使って，**27** および **28** の下線部を正しく並べ換えなさい。ただし，他の語句を加えてはいけません。解答は作成した部分のみを解答欄に記入すること。

27

Do you feel bad when you get angry? If so, you don't necessarily have to feel that way. According to medical experts, you should not feel guilty or embarrassed about your rage. Anger is a normal emotional response to something we hate, fear, or find frustrating. They claim anger is an emotion we need to prepare for danger and respond to it properly. However, if you are unable to regulate your anger effectively, you could turn it toward your family, friends, or coworkers, damaging the relationships. So you should learn (under / to keep / a / peaceful life / your anger / how / and live / control).

28

I eat bananas every day. I always buy fresh and yellow ones at the grocery store. On the other hand, some people buy bananas when they are green even though they are too early to eat. Regardless, no one wants them to turn brown or black before eating them. So if you want to make your bananas last a little longer, follow these simple tips. First, using plastic wrap to individually cover the stems will slow down the release of ethylene gas that causes bananas to change their color. Second, storing them on the kitchen counter helps you preserve them for an extended period of time. You should (be / that / in mind / in the fridge / stored / should not / keep / bananas).