

2月4日(日)

令和6年度 A日程入学試験問題

外 国 語

— 注意事項 —

- 1 問題は1ページから11ページ、解答用紙は1枚である。
- 2 解答はすべて別紙解答用紙に記入すること。
- 3 試験時間は60分である。

1 この問題は、解答欄 ～ に解答すること。

次の英文を読んで、後の問いに答えなさい。(34点)

Scientists have known for years that plants respond to sounds around them. For example, flowers make sweeter *nectar to the sound of buzzing bees. But now scientists in Israel have shown that plants also seem to be some “talking”.

Professor Lilach Hadany and her team at Tel Aviv University set up microphones to record tomato and tobacco plants under different conditions. Their recordings (1) revealed that the plants made *ultrasonic sounds.

When the researchers adjusted their recordings so that humans could hear (2) them, they heard sharp clicking noises, like the snapping sound of *bubble wrap being popped.

As the scientists studied the sounds, they began to notice (3) patterns. Plants clicked hardly at all when they had enough water. But as their soil got drier, they clicked more and more.

When scientists cut off a stem from the plants — as if an animal had just taken a bite — the plants also clicked more. But the clicking wasn’t the same as when the plants needed water.

It’s not clear how the plants make the sounds. One idea is that air bubbles form inside the plant’s stem, and that these popping bubbles make a clicking sound. It’s also not clear that the plants are making the sounds on purpose. Sometimes people’s knees *creak, too, but they’re not doing it on purpose.

But the plants are definitely making noise, and creating much more noise when they’re stressed (not enough water, stem cut off) when they’re not.

In fact, the researchers trained an Artificial Intelligence (AI) system to identify the different kinds of clicking sounds. (4) The system was able to tell the difference between plants that needed water and plants with cuts about 70% of the time.

The result suggests that researchers may one day be able to use a plant’s sounds to out when it is having trouble, and what trouble it is having. That could be very helpful to farmers.

The new discovery raises many more questions. One important question is: Do plants make sounds to communicate with each other?

Other research has shown that plants do seem to communicate in some ways. (5) [ア by insects / イ send / ウ attacked / エ chemicals / オ into the air / カ plants being]. Soon, nearby plants (6) that haven’t been attacked yet start to make other chemicals that don’t taste good to insects. (7) It’s possible that the ultrasonic sounds could work in a similar way.

Another big question is: Is anything listening to the plants? Dr. Hadany points out that mice

and *moths, for example, depend on plants, and can hear *ultrasonic frequencies. The clicks may tell these animals when a plant isn't healthy, so they can (8) avoid it.

Dr. Hadany tells *NFK that she and her team are "... planning to explore the effect of the sounds on other *organisms, both animals and plants." They also hope to learn what else might cause the plants to make sounds, and whether AI can help identify those conditions, too.

(9) The team's research has already changed our ideas about plants. As Dr. Hadany says, "Even in a quiet field, there are actually sounds that we don't hear, and those sounds carry information."

(出典 : NFK Editors. "Plants 'Talk' — Especially When They're Stressed." *NewsForKids.net*.)

注 nectar 花の蜜

ultrasonic sounds 超音波

bubble wrap 緩衝用気泡シート (俗称・プチプチ)

creak きしむ

moths ^が蛾

ultrasonic frequencies 超音波の周波数

NFK NewsForKids.net

organisms 生物

問1 空欄 に入るのに最もふさわしいものを、次の ア～オ の中から1つ選び、
解答欄 にマークしなさい。

ア able to イ do ウ done エ doing オ made of

問2 下線部 (1) の言い換えとして最もふさわしいものを、次の ア～エ の中から1つ選
び、解答欄 にマークしなさい。

ア assumed イ buried ウ brought to light エ recorded

問3 下線部 (2) が指すものとして最もふさわしいものを、次の ア～エ の中から1つ選
び、解答欄 にマークしなさい。

ア humans イ researchers ウ ultrasonic sounds
エ microphones

問4 下線部 (3) が指すものとして最もふさわしいものを、次の ア～エ の中から1つ選び、解答欄 にマークしなさい。

ア Plants rarely click when there is plenty of water. But as the soil dried out, the clicks increased.

イ Plants click a lot when there is enough water. However, as the soil dries out, they click less often.

ウ As the soil dries out, compared to when there is plenty of water, the clicks produced by the plants become fewer.

エ The clicking sound of plants is related to the dryness of the soil, with a quiet sound when there is not enough water and an increase in sound when there is a lot of moisture.

問5 空欄 に入るのに最もふさわしいものを、次の ア～オ の中から1つ選び、解答欄 にマークしなさい。

ア including イ than ウ out エ while オ or

問6 下線部 (4) の意味として最もふさわしいものを、次の ア～エ の中から1つ選び、解答欄 にマークしなさい。

ア このシステムは、水分を含む植物と水分をカットされた植物の違いを、約70%の確率で見分けることができた。

イ このシステムは、水分を含む植物と、その時点で水分を約70%カットされた植物の違いを見分けることができた。

ウ このシステムは、茎が約70%カットされた植物の、その時点での必要な水分量をかなりの確率で見分けることができた。

エ このシステムは、水を必要とする植物と茎をカットされた植物の違いを、約70%の確率で見分けることができた。

問7 空欄 に入るのに最もふさわしいものを、次の ア～オ の中から1つ選び、解答欄 にマークしなさい。

ア drop イ hold ウ reach エ speak オ figure

問8 下線部 (5) が「昆虫から攻撃を受けた植物は、化学物質を空気中に放出する。」という意味になるように [] 内の語句を並べ替えるとき、3番目と5番目にくるものは何か。次の ア～カ の中からそれぞれ1つ選び、3番目にくるものを解答欄 に、5番目にくるものを解答欄 にマークしなさい。ただし、文頭の語も小文字で表記してある。

- ア by insects イ send ウ attacked エ chemicals
オ into the air カ plants being

問9 下線部 (6) と同じ用法で使われているものを、次の ア～オ の中から1つ選び、解答欄 にマークしなさい。

- ア Rina said that her goal is to lead this team to the championship.
イ Where is the letter that came from Alex this morning?
ウ “Wow, isn’t it crazy cold today?” “Really? It’s not quite that cold, I think.”
エ Come on! Do it the way that I do.
オ It was when she was in Paris that Steffie fell in love.

問10 下線部 (7) の内容として最もふさわしいものを、次の ア～エ の中から1つ選び、解答欄 にマークしなさい。

- ア Ultrasonic sounds alone may not be as effective at keeping insects away from plants as chemicals.
イ Ultrasonic sound-affected chemicals keep insects away from plants.
ウ Ultrasonic sounds and chemicals could attract insects to plants in similar ways.
エ Ultrasonic sounds, like chemicals, could keep insects away from plants.

問11 下線部 (8) の言い換えとして最もふさわしいものを、次の ア～オ の中から1つ選び、解答欄 にマークしなさい。

- ア ignore イ clear ウ stand エ taste オ suffer

問12 下線部 (9) の内容として最もふさわしいものを、次の ア～エ の中から1つ選び、解答欄 **13** にマークしなさい。

ア Even in a quiet field with no plants, there are sounds that we cannot hear that carry a lot of information.

イ In a quiet field with plants, we can actually hear sounds, but we cannot understand the information they convey.

ウ Even in a quiet field full of plants, there are actually sounds that we cannot hear, and that sound carries information.

エ Even if plants make sounds that we can hear in a quiet field, the information we can obtain from them is limited.

問13 本文の内容に合致するものを、次の ア～キ の中から2つ選び、解答欄 **14** に2つマークしなさい。

ア 科学者たちは、植物が周囲の音に反応することを、長年知らなかった。

イ 科学者たちが茎を切り離すと、植物は動物にかじられたときのように、さらに音を出すようになった。

ウ 植物がどのように音を出しているのかが、明らかになってきた。

エ どうやら、植物は意図的に音を出しているようだ。

オ 研究者らは、カットされた植物のクリック音だけを識別できるように人工知能 (AI) のシステムを変更した。

カ この新しい発見があっても、そこからそれほど多くの疑問は生まれてこなかった。

キ Dr. Hadany は、ネズミや蛾などの、植物に依存する生物は、超音波を聞き取ることができる指摘している。

2 この問題は、解答欄 **21** ~ **32** に解答すること。

次の英文を読んで、後の問いに答えなさい。(34点)

How do people learn? This question is one that everyone from teachers and students to researchers and psychologists have been trying to answer for (1)centuries. Although theories have been developed regarding the process of learning, there is still quite a lot of debate on the exact details. However, (2)one specific part of most theories of learning has proven to be extremely important: feedback.

Feedback is a sign a learner gets from their instructor, textbook, or other learning resource that shows whether they are doing something correctly or not. A red “X” through an answer on a test means we did something wrong. “Good job!” written by a teacher on an essay means we did well. But what kind of feedback is the most effective?

Animal training offers some clues to what kinds of feedback might be effective, even in humans. In general, feedback can be divided into two types: positive and negative. (3)Positive feedback is generally some kind of reward for when we do something right. Giving a dog a treat when they sit down or roll over on command is an example of positive feedback. (4)Negative feedback is a punishment of some kind. Scolding, yelling at, or hitting an animal for doing something wrong are examples of this.

What is clear from animal training is that (5)negative feedback not only does not work well, it can create problems. When animals are yelled at or hit, they become nervous, or even angry. They will avoid making mistakes, but will also avoid the person who is training them. Rather than learn something new, or learn how to do something correctly, they simply avoid anything to do with the task. Yelling at a dog you are trying to teach to sit will result in the dog becoming scared, running away, or even becoming (6)aggressive. Positive feedback, through praise and treats, not only allows the dog to learn the skill, but also creates trust between the dog and the trainer, (7)making it easier to teach the dog other skills.

One technique used to train dogs is the use of a small device that makes a “click” sound when it is pressed. This “clicker” is used when the dog does something correct, along with the dog receiving praise and a small food treat. During training, the trainer slowly stops giving the dog treats, but continues to use praise and the clicker. Eventually, praise is used only occasionally, but the clicker is used every time the dog does something right. The goal is to get the dog to associate the click with praise, making the dog aware that they have done something **A**.

The question some instructors had is whether (8)this technique could be used to train people as

well. It might seem silly to think of trying to train a human the same way you would train a dog. However, we use positive and negative feedback to learn, like animals. It is also widely known that people respond better to positive feedback than negative, again like animals.

In a study involving medical students, it was shown that students who trained with instructors using a clicker were able to master complex skills better than students learning with (9) conventional instruction. An instructor used a clicker to signal when a student was performing steps in a particular treatment correctly, but neither said nor did anything when a student made a mistake.

Although this form of instruction appears to help students learn complex tasks better, there are still areas for concern. While positive feedback helps people learn faster, negative feedback is sometimes necessary, especially when a mistake could prove to be harmful or even fatal. However, what is clear is that teachers will benefit from finding more ways to offer positive feedback to learners, rather than simply (10) pointing out faults and shortcoming.

問1 下線部 (1) の意味として最もふさわしいものを、次の ア～エの中から1つ選び、解答欄 にマークしなさい。

- ア two or three years イ a dozen years ウ hundreds of years
エ thousands of years

問2 下線部 (2) が指すものとして最もふさわしいものを、次の ア～オの中から1つ選び、解答欄 にマークしなさい。

- ア people イ debate ウ learning エ feedback
オ question

問3 下線部 (3) と (4) のそれぞれの例の組み合わせとして最もふさわしいものを、次の ア～エの中から1つ選び、解答欄 にマークしなさい。

(3) Positive feedback — (4) Negative feedback

- ア yelling — hitting
イ praise — yelling
ウ praise — a treat
エ scolding — a reward

問4 下線部 (5) の内容として最もふさわしいものを、次の ア～エ の中から1つ選び、
解答欄 にマークしなさい。

- ア Negative feedback works well and can help solve problems.
- イ Negative feedback is not very effective and can cause issues.
- ウ Negative feedback only works well and has no problems.
- エ Negative feedback is not effective but causes no issues.

問5 下線部 (6) の言い換えとして最もふさわしいものを、次の ア～オ の中から1つ選
び、解答欄 にマークしなさい。

- ア eager イ tired ウ lazy エ violent オ bored

問6 下線部 (7) の理由として最もふさわしいものを、次の ア～エ の中から1つ選び、
解答欄 にマークしなさい。

- ア Because the dog already knows other skills.
- イ Because the dog stops trusting the trainer.
- ウ Because the dog comes to trust the trainer.
- エ Because the dog avoids learning other skills.

問7 空欄 に入るのに最もふさわしいものを、次の ア～オ の中から1つ選び、
解答欄 にマークしなさい。

- ア slowly イ wrong ウ silly エ poorly オ right

問8 下線部 (8) が指すものとして最もふさわしいものを、次の ア～エ の中から1つ選
び、解答欄 にマークしなさい。

- ア using questions for training
- イ using medical students for training
- ウ using dogs for training
- エ using a clicker for training

問9 空欄 **B** と **C** に共通して入るのに最もふさわしいものを、次の ア～オの中から1つ選び、解答欄 **29** にマークしなさい。

ア be イ as ウ just エ is オ for

問10 下線部 (9) の言い換えとして最もふさわしいものを、次の ア～エの中から1つ選び、解答欄 **30** にマークしなさい。

ア convenient イ traditional ウ irregular エ biological

問11 下線部 (10) の言い換えとして最もふさわしいものを、次の ア～エの中から1つ選び、解答欄 **31** にマークしなさい。

ア ignoring mistakes イ handing out treats
ウ praising effort エ giving negative feedback

問12 本文の内容と合致するものを、次の ア～エの中から1つ選び、解答欄 **32** にマークしなさい。

ア Theories on learning have settled the debate on how people learn.
イ Unfortunately, animal training can't really tell us much about how people learn.
ウ Yelling at or hitting animals will cause them to make more mistakes.
エ Negative feedback is occasionally required for people.

3 この問題は、解答欄 **41** ~ **48** に解答すること。

次の 1~8 の文の空欄に入るのに最もふさわしいものを、下の ア~セの中からそれぞれ1つずつ選び、**41** ~ **48** にマークしなさい。ただし、各語は一度しか使わないものとする。(16点)

1. Comments or suggestions concerning our service **41** always welcome.
2. Customers who purchase game tickets will be charged a 5% service fee **42** they pay by cash or by any other method of payment.
3. Although the museum has taken steps to discourage the use of cell phones inside the facility, **43** effectiveness remains limited.
4. Alex is, so **44** speak, a grown-up baby.
5. It **45** without saying that Judy is an excellent pianist.
6. You **46** better be in bed before midnight.
7. I don't recommend that you use a travel agent for this trip. You may save money **47** making your own flight and hotel reservations.
8. The cost of lunch on the sightseeing boat is included **48** that tour package.

ア by	イ whether	ウ must	エ to	オ even
カ weather	キ had	ク in	ケ is	
コ them	サ goes	シ are	ス being	
セ their				

4 この問題は、解答欄 61 ~ 68 に解答すること。

次の英文の空欄に入るのに最もふさわしいものを、下の ア~エ の中からそれぞれ1つずつ選び、解答欄 61 ~ 68 にマークしなさい。(16点)

Jill woke 61 early on Sunday morning. She wanted to go to the market before ten in order to get a head start on the day. She needed to be 62 home before noon so she would have plenty of time to bake a cake. Her cousin was coming 63 that evening. She hadn't seen him 64 years. She hardly remembered what he looked 65. She only remembered that he loved strawberries. She decided to make a strawberry cake. Unfortunately, she couldn't find 66 fresh ones. So, she gave up and changed her plan. She would make a chocolate one instead. It would 67 her an hour longer to do, but she didn't mind. It was a special occasion, after all, and it wouldn't be 68 more trouble.

- | | | | | |
|----|----------|---------|--------|---------|
| 61 | ア around | イ up | ウ down | エ over |
| 62 | ア the | イ in | ウ back | エ to |
| 63 | ア over | イ to | ウ at | エ under |
| 64 | ア many | イ since | ウ but | エ in |
| 65 | ア as | イ up | ウ like | エ in |
| 66 | ア that | イ any | ウ a | エ much |
| 67 | ア take | イ spend | ウ make | エ be |
| 68 | ア little | イ many | ウ long | エ much |