

英 語

問題冊子 2

注 意

「問題冊子 2」に印刷されている問題は、**2** から **3** までで、2 ページから
13 ページまであります。

2

次の対話の文章を読んで、あとの各問に答えなさい。

(*印の付いている単語・語句には、本文のあとに〔注〕がある。)

Aya and Ken go to the same high school in Tokyo. Mr. Brown is their English teacher. He is from Australia. They are talking in their classroom after school. They are sitting by the window.

Aya: Look! An airplane is flying over there. I get excited when I see airplanes in the sky.

Ken: I love airplanes, too. I want to be a pilot in the future.

Mr. Brown: I understand how you feel. Airplanes are amazing. When I flew from Australia to Japan, I wondered how such a big thing could fly in the sky.

Aya takes a book out of her bag.

Aya: I am reading this book. It's a book about things that people invented.

Mr. Brown: I've read that book, too. The first part is about airplanes.

Ken: Oh, really? What does it say?

Aya: It says that people have had a dream of flying in the sky for a long time. They worked hard to *realize their dream by studying how birds fly.

Mr. Brown: I was especially interested in the scientist who tried to invent airplanes in the 15th century.

Aya: That scientist first tried to make wings for humans to fly like birds. He studied the shape of birds' wings. He also watched how birds move them when they fly. He worked very hard, but could not invent wings for humans.

Ken: Oh, I feel sorry for him. (1)-a I heard that the first airplane flight was realized at the beginning of the 20th century.

Aya: Exactly. To realize their dream, people worked on it for hundreds of years. During that time, they did a lot of research and experiments. They got many new ideas from birds. Birds were their teachers.

Ken: We have to thank birds when we use airplanes.

Mr. Brown: (2) I agree. In fact, your story reminds me of an architect who got ideas from *termite *mounds.

Ken: Termite mounds? I've never seen one.

Mr. Brown: In some places in Africa, termites build big mounds out of *mud. Some of them are five or six meters high! To build them, they spend many years. In those areas in Africa, the temperature goes up to about 50°C during the day, and goes down to about 0°C at night. Even in such an environment, the temperature in the termite mounds stays at around 30°C without using electricity.

Aya: Wow! They are eco-friendly! How can it be possible?

Mr. Brown: We don't exactly know how, but we know that there are many *tunnels running in and under the mounds. They run in different directions. Some of them go up through the mounds like *chimneys. Some scientists say that the tunnels help the air in the mounds stay cool.

Ken: Mr. Brown, you said that an architect got ideas from termite mounds. I want to know more about that.

Mr. Brown: The architect was asked to build a shopping center in Africa that does not use air conditioners to control the temperature inside. (1)-b Then he thought of termite mounds. He designed his new building by getting hints from them. The building has eight floors. There is an *opening in the middle of the building that works like a chimney. At night, air near the ground gets cool, and the air is sent to each floor by big *fans. During the day, the cool air sent at night keeps each room cool. When the air gets warm, it goes up and out of the building through the opening. In this way, the building is kept cool without using much electricity.

Aya: That's amazing! Termites taught him how to build a building that can save electricity.

Ken: So not only birds but also *insects can be our teachers.

Mr. Brown: (3) Insects, birds, animals, fish and plants have survived in *harmony with the environment for a long time. I won't be surprised if we can get more new ideas from them.

Ms. Kawada, their science teacher, comes into the classroom.

Ms. Kawada: Hi! What are you doing here?

Ken: Hello, Ms. Kawada. We are talking about learning from nature.

Ms. Kawada: Learning from nature?

Aya: Yes. If we want to make our lives better, it may be helpful to find hints in nature.

Ms. Kawada: That's wonderful. Oh, I have one story that may be interesting to you.

Ken: What is it about? I want to hear it.

Ms. Kawada: First, I want to ask you a question. (4)

Mr. Brown: Why do you ask such a strange question, Ms. Kawada?

Aya: That sounds impossible!

Ms. Kawada: Well, of course nobody can do such a thing. But there are insects that can do it.

Ken: What insects? Do they live in Japan?

Ms. Kawada: No, they are *beetles that live in a *desert in Africa. They have small *bumps on their backs. These bumps can collect water from the air to make a *drop of water. When it gets bigger, it flows down the spaces between the bumps. Those spaces are *water resistant, so the water easily flows down like drops of water on

an umbrella. Then on *foggy days, they stand on their heads and wait for water to *flow into their mouths.

Mr. Brown: That's exciting!

Ms. Kawada: Some scientists and *experts are very interested in how the beetles collect water. They are trying to make tools that can collect water from the air in the same way. If these tools become common, people living in hot dry areas may be able to get water more easily. It may be possible to solve the problem of water *shortage.

Aya: (1)-c

Ken: By learning from nature, I'm sure we can solve many other problems that we have.

Ms. Kawada: I agree, but it is not that easy, Ken. To solve one problem, many experts have to work together. It 【 ① different ② difficult ③ experts ④ fields ⑤ for ⑥ from ⑦ is ⑧ share ⑨ to 】 information and help each other. We need a good *organization to connect these experts. So I hope you, young people, will develop one in the future.

Aya: I hope we can, Ms. Kawada. But first of all, we must study hard and keep watching what is happening around us.

Mr. Brown: Exactly. Something in nature may be a big hint for making our lives better.

Ms. Kawada: We should not forget that nature does not come to us and tell us what we should do. (1)-d

Ken: I see. In the future, I want to be a scientist and invent something by learning from nature.

Aya: Really? I thought your dream was to be a pilot!

〔注〕 realize 実現する	termite シロアリ	mound アリ塚
mud 泥	tunnel トンネル	chimney 煙突
opening 開口部	fan 扇風機	insect 昆虫
harmony 調和	beetle 甲虫	desert 砂漠
bump こぶ	drop しずく	water resistant 耐水性の
foggy 霧の立ちこめた	flow 流れる	expert 専門家
shortage 不足	organization 組織	

〔問 1〕 本文の流れに合うように、 ~
の中に英語を入れるとき、最も適切なものを次のア～カの中からそれぞれ一つ
ずつ選びなさい。ただし、同じものは二度使えません。

- ア We've learned a lot from scientists, so we don't have to learn any more from nature.
- イ He wondered how he could do it.
- ウ I think we can help a lot of people if we can solve it.
- エ We believe that some experts come to us to help us by giving hints.
- オ I believe it was very difficult.
- カ We have to discover hints by ourselves.

〔問 2〕 ⁽²⁾I agree. とあるが、この内容を最もよく表しているものは、次の中ではどれか。

- ア We were able to realize our dream thanks to an architect.
- イ Humans needed centuries to realize their dream of flying like birds.
- ウ We can travel to different places thanks to airplanes.
- エ We should not forget birds gave us hints to realize our dream.

〔問 3〕 本文の流れに合うように、 に英語を入れるとき、
最も適切なものは、次の中ではどれか。

- ア We can learn from many things that live in nature.
- イ Living things should not depend on each other.
- ウ Many things in nature tell us that we can live without them.
- エ There are many teachers who study about insects in Africa.

〔問 4〕 本文の流れに合うように、 に英語を入れるとき、
最も適切なものは、次の中ではどれか。

- ア Can you guess what I am going to say about nature?
- イ Can you guess what kind of insect I have at home?
- ウ Can you collect water in the air and drink it?
- エ Can you collect water in the way the termites do?

〔問5〕 ⁽⁵⁾It 【① different ② difficult ③ experts ④ fields ⑤ for ⑥ from ⑦ is ⑧ share ⑨ to】 information and help each other. とあるが、本文の流れに合うように、【 】内の単語を正しく並べかえたとき、【 】内で2番目と5番目と8番目にくるものの組み合わせとして最も適切なものは、次のア～カの中ではどれか。

	2番目	5番目	8番目
ア	①	②	③
イ	①	③	④
ウ	①	④	⑧
エ	②	①	⑨
オ	②	④	⑧
カ	②	⑥	⑨

〔問6〕 本文の内容と合っているものを、次のア～キの中から二つ選びなさい。

- ア A long time ago, people were afraid of flying in the sky because it was dangerous.
- イ When we want to make our lives better, getting hints from nature may help us.
- ウ Many scientists did a lot of experiments for architects to make mounds.
- エ To survive on the Earth, insects have learned from humans.
- オ Some termites live in areas that are very cold at night and very hot during the day.
- カ The beetles that live in a desert in Africa get water by using the bumps on their head.
- キ Learning from nature is the only way we can survive.

〔問7〕 次の文章は Aya が書いた日記の一部である。(a) ~ (d) の中に英語を入れるとき、最も適切なものを下のア~クの中からそれぞれ一つずつ選びなさい。ただし、同じものは二度使えません。

Today I enjoyed talking with Ken, Mr. Brown and Ms. Kawada after school. I learned that people have got a lot of useful information from nature to make our (a) better, though we may not think about it so often. Thanks to some insects in Africa, we were able to build an (b) building. There are other insects that give us hints which may help us (c) the water shortage problem. I am excited because I may be able to (d) more hints in nature! I hope I can make people happier with the help of nature.

ア eco-friendly

イ solve

ウ tell

エ find

オ impossible

カ insects

キ lives

ク make

3 次の文章を読んで、あとの各問に答えなさい。

(*印の付いている単語・語句には、本文のあとに〔注〕がある。)

When you come to a river and you want to cross it, what will you do? Of course, you will look for a bridge. If you can find one, it will be easy to reach the other side. But if you cannot, you will be in trouble. A bridge is very important when you want to go across a river.

Where can you find bridges in your daily life? Are they all for crossing a river? When you are walking and come to a busy street with a lot of cars, you can sometimes go over a bridge. It is for crossing the road. At a big station, you may walk over a bridge to get to a train. It is for crossing railroads. Bridges are not only for people to walk over. For example, trains and cars can also use bridges. There are some bridges that even carry water to the other side.

By the way, what is a bridge? One professor says, "A bridge connects two points that are *apart from each other to create a new way." When a bridge is built, two places are joined. Then, people and other things can go over the bridge.

(1)-a Also, it will be possible to move more things. In this way, the bridge may become the center of traffic and this can affect how towns and cities are made. If the bridge is also beautiful or big, it will attract a lot of people.

The professor says, "I think the first bridge was a tree bridge. When people wanted to go over a river, they only had to cut down a tree and put it across the river. It was easy." It is believed that putting a tree or a board across the river was the beginning of the *beam bridge. However, when people wanted a bridge longer than any tree they could find, it was difficult to make a beam bridge. People thought about building a bridge by connecting stones. This idea became the

*arch bridge. In Europe, you can still see some old arch bridges. Look at Picture 1. This arch bridge in Italy is more than 2,000 years old. People also used *vines to make a bridge. Vines were easily found in the forest or mountains. (1)-b People think that this was the beginning of the *suspension bridge. There are many types of bridges now, but you can say that these three have been the *basic types of the bridge since a long time ago.

Let's see how these three types of bridges are supported.

Take three small blocks and a plastic ruler. As you can see in Picture 2, put the ruler on two of the blocks, one at each end. This is a *model of the beam bridge. The ruler is the beam and the two blocks are the *supports of this bridge model. The *distance between two supports of the bridge is called a *span. Now, push down in the middle of the ruler with a finger. It will *bend quite easily. Put the other block under the center of the ruler. You will now have a bridge with two spans and three supports. Try to push down with one finger in the middle of

<Picture 1>

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each span. The ruler bends less than before. (2)

How is the arch bridge supported? Look at Picture 3. Part A is supported by Part Bs on both sides by pushing them and being pushed by them. Part Bs are also supported by Part A and Part Cs. The whole arch bridge is supported like this. If both ends of the bridge shown as Part Ds are not *fixed, the bridge may fall down. However, if they are fixed like in Picture 4, the arch can be kept in good shape and can support *weight on the bridge.

Now look at Picture 5. This is a model of the suspension bridge. The suspension bridge is held by main *cables, and they are supported by heavy *anchorage at both ends and two tall towers. ⁽³⁾ ① to ② are ③ the beam ④ hung from ⑤ a lot of ropes ⑥ the main cables ⑦ and fixed to support it. In this model, the two tall towers work as supports of the bridge.

New *materials and modern technologies have made bridges stronger and changed people's lives greatly. In the old days, most bridges were made of natural materials like wood, stone or vine. However, during the time of the *Industrial Revolution, *iron bridges appeared. These new bridges meant that people could build railroads across Europe and then were able to travel and carry a lot of things a long way more easily. Iron was developed into *steel and now we are able to make stronger and longer bridges. *Concrete has also greatly helped us build such bridges. Today, steel and concrete are usually used together. (1)-c Also, computer technology has helped us understand how to make them safer.

When you build a bridge, you must look at the ground carefully to decide where you will build one that can hold the weight of the bridge itself, people, cars, trains and other things that go over it.

(4)

Look at some big bridges between islands in the sea. Most of them are suspension bridges.

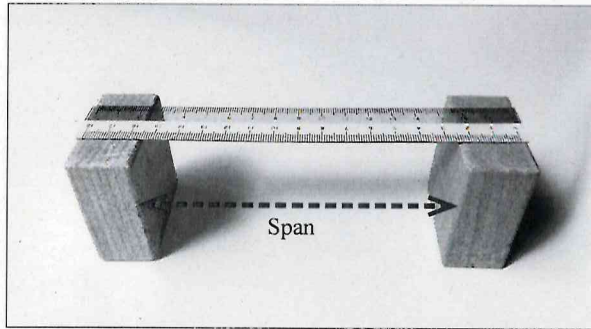
Did you know that the suspension bridge with the longest span in Japan was the longest in the world until recently? The bridge is almost 4,000 meters long and its towers are about 300 meters high. The two towers are almost 2,000 meters apart. Not only these tall towers but also very strong main cables made of steel support this suspension bridge. (1)-d

Bridges today may look very different from the ones in the old days. We usually don't use stone but steel to make arch bridges, and their shapes have changed a lot. Huge suspension bridges are now supported by strong steel cables instead of vines. However, the basic ideas of the three main types of the bridge haven't changed very much since then.

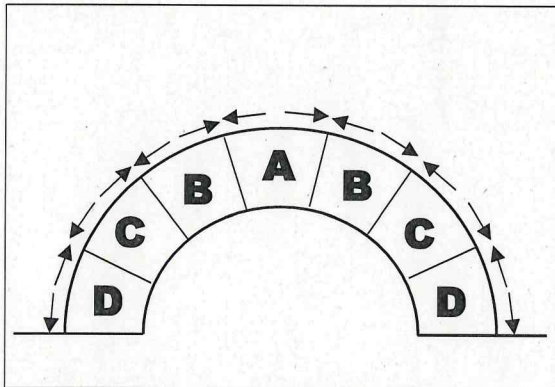
When you next see a bridge, try to find out the type of the bridge. It will be interesting to think about how it is built and how it supports the weight on it.

〔注〕	apart 離れて	beam (橋の) けた	arch アーチ
	vine (植物の) つる	suspension bridge つり橋	basic 基本の
	model モデル	support 支え	distance 距離
	span 橋の支えと支えの間またはその距離	weight 重さ	bend 曲がる
	fix しっかり固定する	anchorage つり橋の固定基礎	cable ケーブル
	Industrial Revolution 産業革命	material 原材料	iron 鉄
	steel 鋼	concrete コンクリート	

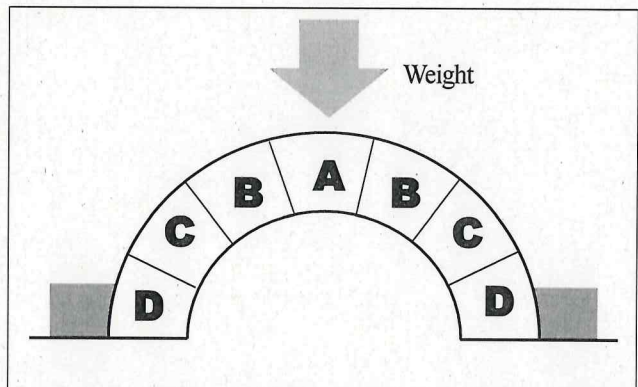
<Picture 2>



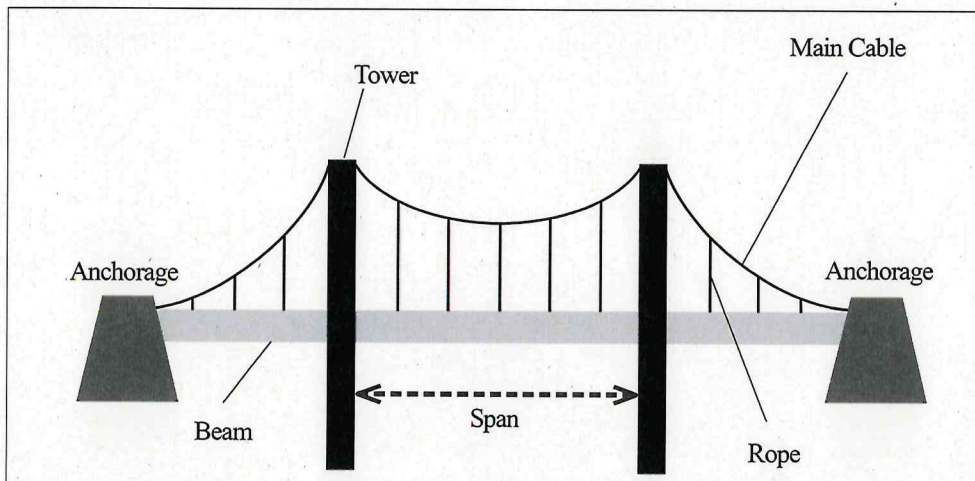
<Picture 3>



<Picture 4>



<Picture 5>



〔問1〕 本文の流れに合うように、 ～ の中に英語を入れるとき、最も適切なものを次のア～カの中からそれぞれ一つずつ選びなさい。ただし、同じものは二度使えません。

- ア Thanks to bridges, people will be able to get to the place they want to reach faster and more easily.
- イ Thanks to the bridge, people can cross the sea between huge islands more freely.
- ウ Thanks to the bridge, people will be able to enjoy views from it without crossing it.
- エ They were so strong and hard that it was difficult to design them into different shapes.
- オ They are strong and can easily be made into different shapes, so you can see various kinds of bridges.
- カ They were usually long and strong if they were connected, and could be designed into various shapes.

〔問2〕 本文の流れに合うように、 に英語を入れるとき、最も適切なものは、次のア～エの中ではどれか。

- ア So, if you can make spans longer, you will be able to make a longer beam bridge.
- イ However, you need to put more supports to make it safe.
- ウ So, if you can build more supports, you will be able to make a stronger beam bridge.
- エ However, you need to remove one of the supports if you want to make the bridge longer.

〔問 3〕 ⁽³⁾【 ① to ② are ③ the beam ④ hung from ⑤ a lot of ropes ⑥ the main cables ⑦ and fixed to 】 support it. とあるが、本文の流れに合うように、【 】内の単語・語句を正しく並べかえたとき、2番目と4番目と6番目にくるものの組み合わせとして最も適切なものは、次のア～カの中ではどれか。なお、文頭にくる語も小文字になっています。

	2番目	4番目	6番目
ア	①	②	③
イ	①	②	⑤
ウ	②	③	⑤
エ	②	⑤	③
オ	②	⑥	③
カ	④	⑥	⑤

〔問 4〕 (4) の中には、次の A～D の文が入る。本文の流れに合うように、正しく並べかえたとき、その組み合わせとして最も適切なものは、下のア～カの中ではどれか。

- A The suspension bridge can cover a long distance with only two supports.
- B You must look for the right places to build it because the condition of the ground is sometimes bad.
- C In many cases, the type of the bridge is decided by its longest span.
- D When you have found some good places, you can start to think about the type of the bridge you will build.

ア B→D→A→C イ B→D→C→A ウ C→A→B→D
 エ C→A→D→B オ D→B→A→C カ D→B→C→A

〔問5〕 本文の内容と合っているものを、次のア～キの中から二つ選びなさい。

- ア Bridges also create ways to carry water.
- イ Making a beam bridge is more difficult than making a bridge by connecting stones.
- ウ It is not very important to fix both ends of the arch bridge when you want to make it safer.
- エ Stone and wood have helped people develop new materials for building bridges.
- オ Though modern technologies have been developed, the bridges haven't become stronger.
- カ The suspension bridge with the longest span in Japan is also the longest in the world.
- キ We still use the basic ideas of some types of the bridge that are similar to the ones in the old days.

〔問6〕 次の質問に対するあなたの考えを、40語以上50語程度の英語で答えなさい。
「.」「,」「!」「?」などは語数に含めません。これらの符号は、解答用紙の下線部と下線部の間に書きなさい。

Imagine you are going to build a bridge. Where do you want to build it? What change will there be after building it?

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