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 16 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。）

*During the summer vacation, Ms. Okada, a high school teacher, is visiting the *laboratory of Professor Jones in a university with her two students. One is Haruko, and the other is Robert. Robert is an *exchange student from Canada.*

Ms. Okada: Thank you very much for giving us an opportunity to visit you.

Prof. Jones: You're welcome.

Haruko: We are studying about the future of robotics for our research project. In robotics, people have long been studying how to design, create, and *operate robots.

Robert: Japanese people love robots very much, right? I have seen many *ideal robots in Japanese comics and anime. I wanted to study how to create these ideal robots, so I came to Japan.

Prof. Jones: Good. Now, there are various robots, and they are becoming smarter.

Robert: (1)-a Are there any robots that use such technology here?

Prof. Jones: Of course. I will show you some of them.

Professor Jones and the three visitors are walking around the professor's laboratory. This laboratory is like a factory and has several big robots.

Haruko: Look! This robot is huge and looks so strong!

Robert: I know this robot! It helps us to do jobs which are really dangerous. This robot is powerful and works in the areas that humans cannot reach, right?

Prof. Jones: Exactly. We can operate such robots from safe places, and they work instead of humans.

Ms. Okada: I hear that these robots are called "tough robots." "Tough" means hard and strong.

Prof. Jones: Yes, we developed a special actuator to make these robots more powerful.

Haruko: Actuator? What is an actuator?

Robert: It is a part of a robot or a machine that receives energy and changes it into *motion. Usually, we use electricity to move things, but the special actuator uses not only electricity but also *oil pressure. It can produce more energy, and we can move heavy things more easily with that actuator.

Haruko: You know a lot!

Prof. Jones: Also, thanks to *artificial intelligence, robots can understand what to do without humans' *instructions. (1)-b

Haruko: How smart they are!

Robert: Now, I have a question. We see many new robots in our daily lives. (2)-a

Prof. Jones: That's a good question. Actually, yes. We are now doing new research about soft robotics.

Haruko: Soft robotics? (2)-b

Prof. Jones: It's a new type of robotics. We have two kinds of robots, "hard robots" and "soft robots."

Robert: Hard robots? They are the robots that we know, right?

Haruko: (2)-c

Prof. Jones: Robert and Haruko, you are right. We have been developing robots that help us in many ways, but the robots that were developed first were industrial robots.

Robert: I hear that industrial robots usually work in factories. They help humans to produce things like cars.

Haruko: I visited a car factory and saw industrial robots for the first time on my school trip in elementary school.

Prof. Jones: What did you think?

Haruko: I thought they were really strong. They never stopped working.

Ms. Okada: They are also accurate. That means that they don't make any mistakes.

Robert: They can also do things that humans cannot do.

Prof. Jones: Yes. We have developed strong and accurate robots that can work instead of humans.

Haruko: Artificial intelligence has been introduced into robots, too.

Robert: Professor Jones, you said industrial robots were developed first, but now robots help us everywhere. They support us in supermarkets, restaurants, schools, and houses, too.

Prof. Jones: That's right, and robots that work in our daily lives have the same *features as industrial robots. Now robot scientists are (3) .

Robert: I see.

Prof. Jones: They are still developing hard robots, and some scientists have already started to develop a new type of robot, "soft robots." They have different features from hard robots.

Haruko: (2)-d

Prof. Jones: No, but they don't have to be as strong as hard robots.

Robert: The materials of hard robots are usually hard like *metal, but the materials of the soft robots are soft like *rubber or *silicone, right?

Prof. Jones: Yes. Any other ideas?

Haruko: Do soft robots move in different ways from hard robots?

Prof. Jones: That's right. Hard robots usually move like machines, and they don't move *smoothly like humans.

Robert: Oh, are you trying to make robots that move smoothly like humans or animals?

Prof. Jones: Yes, we are now watching and studying how humans and animals use their bodies to move.

Robert: I see. You are going to learn from them.

Ms. Okada: Professor Jones, are soft robots accurate like hard robots?

Prof. Jones: Actually, this is one of the problems we have. Hard robots are accurate because the qualities of the materials of those robots will not change over time. If we use rubber or silicone, the robots may not stay in good quality for a long time. However, we think that those materials are necessary for soft robots. I hope that in the future we can create soft materials that will not change their qualities.

Robert: (4) The idea of soft robotics is very different from that of hard robotics. Now, I understand some of the differences.

Haruko: I understand some of them, too.

Prof. Jones: Good. In soft robotics, we are trying to develop robots that will improve the quality of our lives in more *flexible ways. I will show you some examples. Shall we move to another laboratory?

They are now in another laboratory that has some soft robots.

Robert: The (5)【① like ② don't ③ seen now in ④ look ⑤ this laboratory ⑥ we saw ⑦ the robots ⑧ which ⑨ robots】 in the laboratory before.

Prof. Jones: Look at this. Have you ever heard of an endoscope? It has a small camera on a long thin *tube and can be put into a person's body. It can take pictures or videos inside our bodies and check our health. This is also one type of the soft robots which we have developed.

Ms. Okada: Sometimes, we can choose to have a medical test with this endoscope. I've had one before.

Haruko: Does it move smoothly in our body?

Ms. Okada: Yes. It can go through our body without hurting it.

Robert: That's great.

Prof. Jones: Next, look at this robot. (1)-c

Haruko: This robot's hand looks like a human's.

Prof. Jones: Yes. We are now developing soft robot hands.

Ms. Okada: What material is used for these robot hands?

Prof. Jones: (6)

Robert: Do the robot hands change their own shape? That's wonderful!

Prof. Jones: Also, these robot hands are rubber, so they can hold and pick up anything easily because they work like *cushions. If the robot hands are metal, they cannot change their own shape like soft robots, so they will not be able to pick up things that are hard but easy to break like glasses, or things that are soft like fruits.

Haruko: Amazing! These soft robot hands can hold things that are very soft or easy to break. How will they be helpful?

Ms. Okada: Can they be used in factories?

Robert: How about using them on farms? On fruit farms or in factories, farmers have to hold and carry fruits, and put them in boxes. We have to be careful because each size or shape is different, and they are easily damaged. On some farms, there are not enough workers. (7) If we use these soft robot hands, they will help farmers on those farms.

Prof. Jones: Good idea. To make these robots, we need to develop better materials and improve the motions of soft robots. (1)-d

Haruko: Now, I want to do more research and write about soft robot hands for the research project. What do you think, Robert?

Robert: I think that's a good idea. How about studying how soft robot hands will be used?

Prof. Jones: Good. I am looking forward to your research!

〔注〕
laboratory 実験室
operate 操作する
motion 動き
artificial intelligence 人工知能
feature 特徴
rubber ゴム
smoothly 円滑に
tube 管
exchange student 交換留学生
ideal 理想的な
oil pressure 油圧
instruction 指示
metal 金属
silicone シリコン
flexible 柔軟な
cushion 緩衝材

〔問１〕 (1)-a ～ (1)-d の中に，それぞれ次のA～Dのどれを入れるのがよいか。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 They control themselves and help humans.
B This is another example of our new robots.
C We will work hard to make them possible.
D You have developed a lot of technology for robots.

	(1)-a	(1)-b	(1)-c	(1)-d
ア	A	B	C	D
イ	A	D	B	C
ウ	C	A	D	B
エ	C	D	A	B
オ	D	A	B	C
カ	D	C	A	B

〔問２〕 (2)-a ～ (2)-d の中に，それぞれ次のA～Dのどれを入れるのがよいか。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 Are they like the robots we talked about before?
B Do you think you can develop robotics more?
C What is that?
D If they are not hard, are they weak?

	(2)-a	(2)-b	(2)-c	(2)-d
ア	B	A	D	C
イ	B	C	A	D
ウ	C	A	D	B
エ	C	D	B	A
オ	D	B	C	A
カ	D	C	A	B

〔問３〕 本文の流れに合うように，［ (3) ］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　trying to create only stronger robots that can support people in their daily lives
イ　not developing robots that work in factories but creating robots that support us
ウ　doing research about artificial intelligence that can work only in our daily lives
エ　creating robots that support us not only in factories but also in our daily lives

〔問４〕 (4)The idea of soft robotics is very different from that of hard robotics. とあるが，その内容について次のように書き表すとすれば，［ (4)-a ］・［ (4)-b ］にどのような英語を入れるのがよいか。［ (4)-a ］には**９語**で，［ (4)-b ］には**７語**で，それぞれ**本文中の連続する英語**を書き抜き，それぞれその**始めの２語と終わりの２語**を答えなさい。

One of the differences between hard robots and soft robots is their motion. Hard robots usually move like machines, but scientists are now watching［ (4)-a　**９語** ］and studying this to make robots that move more smoothly than hard robots. Another difference is their materials. Hard robots are strong because hard materials are used, but soft robots don’t have to be as strong as hard robots, so they use soft materials. Also, hard robots are accurate because scientists have developed robots that will stay［ (4)-b　**７語** ］. Scientists are now trying to develop better materials for soft robots.

〔問５〕 (5)【① like ② don't ③ seen now in ④ look ⑤ this laboratory ⑥ we saw ⑦ the robots ⑧ which ⑨ robots】について，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るとき，【　　】内で**２番目**と**６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	**６番目**	**８番目**
ア	②	④	⑥
イ	②	⑧	⑦
ウ	③	①	⑧
エ	③	⑦	⑧
オ	⑧	①	③
カ	⑧	②	⑦

〔問６〕 (6) の中には，次の**A**～**D**の英文が入る。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**～**ク**の中ではどれか。

A　This means that it can receive energy and use the energy to change the shape of the robot hands.

B　Now, we are developing that rubber for them, and it works as an actuator.

C　A new type of rubber is used as the material for these hands.

D　Thanks to this motion as an actuator, these robot hands can change their own shape and hold things.

ア	**A → B → D → C**	**イ**	**A → C → B → D**
ウ	**B → C → D → A**	**エ**	**B → D → A → C**
オ	**C → A → D → B**	**カ**	**C → B → A → D**
キ	**D → A → C → B**	**ク**	**D → B → C → A**

〔問７〕 (7)If we use these soft robot hands, they will help farmers on those farms. とあるが，なぜそう言えるのか。文脈から推測し，次の下線部に **15 語以上 20 語以内の英語を入れ，一文**を完成させなさい。本文中の単語や表現を用いても構わない。

なお，「,」「:」「;」などは，語数には含めない。これらの符号は，解答用紙の下線部と下線部の間に入れなさい。

Soft robot hands will be helpful to farmers because those soft robot hands are ＿＿＿

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。）

*Tom is a second-year student at Shibasaki International High School in Tokyo. He is a student from Australia. He went to Okinawa on a school trip. Among activities like cycling, hiking, and bird watching, he chose the *brown sugar making experience. From the experience, he became very interested in *sugarcane.*

I went to a field to experience *harvesting sugarcane with some of my classmates and Mr. Nishiki, my English teacher. This experience was the best memory from my school trip to Okinawa. In this activity, visitors go to a sugarcane field to cut the sugarcane and make brown sugar. I studied sugarcane in science class before visiting Okinawa. It is a tall and green plant that is used to make brown sugar. Also, I learned how sugarcane is grown, how it is harvested, and how it is made into brown sugar. I was surprised that it is one of the largest *crops produced in the world.

In (1) the brown sugar making experience, I cut the sugarcane with a special knife. It was very hard for me to cut the sugarcane, but it was fun! Next, I used a machine in a factory to *squeeze out the juice, and I tasted fresh sugarcane juice for the first time. It was sweet! It was then boiled for a long time and became thick like *syrup. It was very hot, so I put the syrup in a box to make it cool. Then, it turned into hard brown sugar. I got the brown sugar at the end of the experience.

After I finished the activity, I noticed a big *pile of brown and dry material in front of the factory. It looked like *straw, but it was not. I asked Mr. Higa, a farmer, about the pile, “What is all this?” He smiled and answered, “This is bagasse. It is the part of the sugarcane left after the juice is squeezed out. Most people didn’t think much about bagasse, but now they think it is actually very useful.” “Really? What can we do with it?” I asked. Mr. Higa explained, “Well, in the past, people just threw it away and didn’t know what to do with it. Today, they know that bagasse can be used in many ways. It’s not just waste — it’s a precious resource.” I got excited and said, “Please tell me more!” Mr. Higa laughed, “OK. After we harvest sugarcane, we cut it to squeeze out the juice. This juice is used to make brown sugar, and the *fibers that are left are called bagasse. Bagasse is made of tough fibers and is used as an energy resource.” He continued, “One of the most common ways to use bagasse is to make paper. *Cutting down more trees to make paper will damage the environment. Instead of this, we can turn bagasse into paper. It is important to stop deforestation and protect the Earth’s natural environment. Deforestation means cutting down or removing trees from forests. It is a serious issue. Using (2)【 ① is ② to solve ③ paper ④ a great ⑤ to make ⑥ bagasse ⑦ way ⑧ this 】 problem because we don’t have to cut down more trees.” “Wow!” I shouted, “So, bagasse helps to save trees and protect the environment!” “Exactly,” Mr. Higa said.

Mr. Higa added, “Bagasse is also used to make biodegradable plates. Biodegradable plates are plates that can *break down in nature. We use many plastic products, but plastic breaks

down very slowly. They will stay as waste for a long time, and cause plastic pollution in the ocean. However, people can use bagasse plates once, and then the plates will break down by themselves. We don't use bagasse plates much at home, but they are often used to carry food from restaurants. They are better for the environment than [(3)] plates." I thought about all the plastic waste I saw at home. I always felt sad about it, but I didn't know what things we could use instead of plastic goods. I asked him, "What else can bagasse be used for?"

"Bagasse can help us to reduce the amount of CO_2 in the air," Mr. Higa explained. "[(4)-a] First, bagasse is burned to create heat. Then, that heat is used to boil water and create *steam. Finally, we use the steam to *spin a turbine, and then electricity is produced. [(4)-b] Using *coal or oil is not good for the environment, but bagasse is a clean energy resource. Of course, CO_2 is produced when bagasse is burned, but sugarcane *absorbs CO_2 from the air when it grows." "That's amazing!" I said. Mr. Higa explained, "We can use many things that are usually thrown away. For example, fruit *peels can be used to make *compost, and that can help plants to grow. [(4)-c] Bagasse is one of these wonderful examples. [(4)-d]"

I thought about recycling and all of the waste I see every day. "I understand now," I said. "Bagasse is more than just a *leftover material. It is a resource that can help us in so many ways. It can help us to make paper, reduce plastic products, and even provide energy. (5) Now, I realize that it can do such things." Mr. Higa smiled, "That's right. It is important to look at things in a new way. When we recycle, we reduce waste and make our world cleaner. Bagasse is just one example, but there are many other ways to protect the environment."

The next day, on the flight back to Tokyo, (6) I thought about everything I learned from the brown sugar making experience and Mr. Higa. We can use not only bagasse but also other things we usually throw away. Mr. Higa said small actions could change the world. I wanted to share what I learned in Okinawa with my family and classmates.

I got home and sat down at the kitchen table with my mother. "Mom," I said. "I learned something amazing yesterday. Have you heard of bagasse?" My mother said, "No, I haven't. What is it, Tom?" I answered, "Bagasse is something left after we make brown sugar from sugarcane. It can be turned into paper, biodegradable plates, and even used to make energy." My mother looked surprised, "Really? I didn't know that." I continued, "We can use bagasse to help the environment. If we recycle materials like bagasse, we can use [(7)-a] plastic, reduce pollution, and save trees. We can do something to protect the environment." My mother smiled and said, "That's wonderful, Tom. You learned something important during your trip to Okinawa. I'm happy to see that you've become interested in the environment." While my mother was preparing dinner, she called me into the kitchen. "I bought some fried chicken at the restaurant to take home for dinner, and the plates for the fried chicken are made from bagasse! I didn't notice that fact until you told me about the use of bagasse." I was very surprised and said, "Wow! Bagasse is actually used in everyday products."

Since then, I have started to think about producing [(7)-b] waste. I have also become interested in other ways to protect the environment, such as planting trees and using

(7)-c plastic. I have started to recycle (7)-d plastic at home and told my friends at school about the amazing ways to use bagasse. Mr. Nishiki gave me some advice, and I gave a presentation about bagasse in front of my classmates. After learning more about bagasse, I realized that (8) even small steps could make a big difference. I understood everyone could save the Earth. I felt happy to know that bagasse could be used for eco-friendly products. It seems like waste, but it can be part of a solution to protect the environment. So, I want to continue learning and sharing my knowledge. I hope that one day everyone will understand the importance of recycling and will find better ways to use things they don't need anymore. By working together, we will be able to make the world better for the future.

〔注〕
brown sugar　黒糖
harvest　収穫する
squeeze out ～　～をしぼり出す
pile　積み上げられたもの
fiber　繊維
break down　分解する
spin a turbine　タービンを回す
absorb　吸収する
compost　たい肥
sugarcane　サトウキビ
crop　収穫物
syrup　シロップ
straw　わら
cut down ～　～を切り倒す
steam　水蒸気
coal　石炭
peel　（果物などの）皮
leftover　残った

〔問１〕 (1)the brown sugar making experience とあるが，本文の内容と**一致しないもの**は，次の中ではどれか。

ア Tom cut sugarcane with a tool in a field.
イ Tom tried sugarcane juice before making brown sugar.
ウ Tom made brown sugar after harvesting sugarcane.
エ Tom received brown sugar while it stayed soft.

〔問２〕 (2)【 ① is ② to solve ③ paper ④ a great ⑤ to make ⑥ bagasse ⑦ way ⑧ this 】について，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るとき，【　　】内で**１番目**と**３番目**と**７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。

	１番目	**３番目**	**７番目**
ア	③	④	⑧
イ	③	⑥	⑤
ウ	③	⑦	②
エ	⑥	①	②
オ	⑥	③	②
カ	⑥	⑤	⑦

〔問３〕 本文の流れに合うように，(3) の中に入る**同じ段落中の最も適切な英語１語**を書き抜きなさい。

〔問４〕 (4)-a ～ (4)-d の中に，それぞれ次のA～Dのどれを入れるのがよいか。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 energy from burning bagasse is used in the sugarcane factory, and sometimes it even provides electricity to nearby homes.

B　Also, old paper can be used to make new paper or boxes, and used plastic bottles can be made into clothes or bags.

C　We can also produce electricity by using bagasse.

D　We can protect the Earth by recycling many things.

	(4)-a	(4)-b	(4)-c	(4)-d
ア	A	B	C	D
イ	A	C	D	B
ウ	C	A	B	D
エ	C	D	A	B
オ	D	A	B	C
カ	D	C	A	B

〔問５〕 (5)Now, I realize that it can do such things. 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　Now, Tom realizes that bagasse can be used as a resource in a small number of ways.

イ　Now, Tom realizes that bagasse can be used to produce energy and plastic goods.

ウ　Now, Tom realizes that bagasse is not a material that can be used to protect the environment.

エ　Now, Tom realizes that bagasse is not waste but a material that can be used for good purposes.

〔問６〕 (6)I thought about everything I learned from the brown sugar making experience and Mr. Higa とあるが，本文の内容に合う英文の組み合わせとして最も適切なものは，下の**ア**～**シ**の中ではどれか。

① Bagasse is the dry and hard part of the sugarcane plant left after the juice is squeezed out.
② In Mr. Higa's opinion, most people in the past did not realize that bagasse was very useful.
③ Bagasse was thrown away in the past because people did not know how to use it.
④ At home, people can use the same bagasse plates a lot of times after using them once.
⑤ Bagasse is a clean energy resource and it's helpful for us to reduce CO_2 in the air.
⑥ Mr. Higa does not think that it is important to see things in a different way.

ア	① ④	**イ**	① ⑥	**ウ**	① ③ ④
エ	① ③ ⑥	**オ**	① ② ③ ⑤	**カ**	① ② ④ ⑥
キ	① ③ ⑤ ⑥	**ク**	① ④ ⑤ ⑥	**ケ**	② ③ ④ ⑤
コ	② ③ ④ ⑥	**サ**	② ③ ⑤ ⑥	**シ**	③ ④ ⑤ ⑥

〔問７〕 本文の流れに合うように，(7)-a ～ (7)-d の中に英語を入れるとき，そ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。

	(7)-a	(7)-b	(7)-c	(7)-d
ア	less	less	less	more
イ	more	more	more	less
ウ	less	less	more	less
エ	more	more	less	more
オ	less	more	more	less
カ	more	less	less	more

〔問８〕 (8)even small steps could make a big difference とあるが，**本文中からこの英語とほぼ同じ意味をもつ最も適切な連続する６語**を書き抜き，その**始めの２語**と**終わりの２語**を答えなさい。

〔問９〕 次の英文は，Tom がクラスで発表したプレゼンテーションの原稿の導入部分である。本文の内容を踏まえて，下のプレゼンテーションの原稿の下線部に**15 語以上 20 語以内の英語を入れ，一文**を完成させなさい。本文中の単語や表現を用いても構わない。

なお，「,」「:」「;」などは，語数には含めない。これらの符号は，解答用紙の下線部と下線部の間に入れなさい。

Hello, everyone. Do you know what bagasse is? I didn't know what it was before going to Okinawa. I'm going to tell you about it in my presentation.

First, please think about all the plastic waste we produce. I always feel sad about this plastic waste because it _____. However, now I realize that we can use bagasse to make plates without damaging the environment.

第一章 英語