

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 **4** までで、2 ページから 15 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。)

Three high school students, Ken, Yui, Emma, and their science teacher, Mr. Sato, are talking in the science room. Emma is a student from America.

Mr. Sato: Hi everyone, did you watch the program I told you about the other day?

Ken: Yes, I watched it last night. It was all about things like climate change and pollution.

Yui: What did you think about it?

Ken: I thought the speakers on the program were just saying nice things.

(1) - a They know things won't change.

Emma: That's not true. I think we can make a difference if we try hard. I also watched the program. It introduced "The Billion Oyster Project." That is from my hometown, New York, and shows there is a project that is actually doing something valuable.

Yui: Oh, what is it? Tell us more about it, Emma.

Emma: OK. It's a project to recover the ocean around New York. The project started in 2014, and its goal is to bring back one billion oysters by 2035.

Ken: Wait, oysters? Why oysters?

Emma: They are actually called natural water cleaners. One adult oyster can clean about 190 *liters of water a day.

Yui: That's amazing. How does that work?

Mr. Sato: I'm glad you learned something important from the program. You know, oysters eat things in a different way. They open their *shells and pull in water. Inside, they use very small hairs to catch *plankton and trash. They eat them and push out clean water. Oysters can do this all day.

Yui: What hard workers!

Mr. Sato: So, if this project brings back *oyster reefs, the water becomes clearer. That means light can reach the ocean floor again, and sea plants can grow better.

Ken: I can understand how things work, but a billion sounds like a dream.

Emma: I know, but they've already recovered over 100 million oysters and about 70,000m² of reefs.

Ken: Do you think that's big?

Yui: That's pretty big!

Ken: Really? I don't think so. ⁽²⁾ Do you know how big the ocean is?

Mr. Sato: It's a small action if you think about the size of the ocean.

Ken: Yes, that's the point.

Mr. Sato: But there is still a meaning to this project. The best part is that students are doing the work. The project began in schools. Students raise oysters in cages called ORSs—Oyster Research Stations. They see how big the oysters grow, what percent of them survive, and how clean the water is. It's science in action.

Emma: And they also recycle oyster shells from over 80 restaurants. The cleaned shells are used to create new reefs. It's a *cycle—trash can be used as something that helps life grow.

Ken: They've been doing this for over 10 years and only achieved 10% of their goal. Is it really making *progress? Do you think they can reach their goal?

Mr. Sato: I know. But, if you think too much about the goal, you will miss something important. It's about learning, taking action, and recovering nature little by little. Even small steps mean something. The most important thing is that students are part of the project and learning how to take care of the environment.

Yui: I agree. I'm the kind of person who starts doing something first, and then thinks about how to make it better. I don't worry too much about success at the beginning.

Emma: Sometimes the *process is more important than the progress.

Ken: Now I understand that they are also doing this for education. But, it's just one example in New York.

Yui: I don't think so. The cycle of this project reminds me of the world science event which I went to with my family last year. I saw something (3) - a there. It's called "aquaponics."

Ken: Aquaponics? Is it a kind of aquarium or something?

Yui: Yes, but it's not the same. Aquaponics is a closed cycle system which fish and plants live together in. The fish live in a *tank, and their *waste becomes food for the plants. The plants take it and clean the water. This keeps the environment good for the fish.

Emma: As Yui said, that sounds like a small Billion Oyster Project. Living things clean the water.

Yui: That's true. Also, it can save our natural resources.

Mr. Sato: It's a smart system. Aquaponics uses about 90% (3) - b water than traditional farming. No *soil is needed, so it can work anywhere.

Ken: But if it works so well, why do you think it's not common now? Do you think more cities or schools should be using it?

Mr. Sato: That's a good point, Ken. One reason is that it still costs a lot. Setting up an aquaponics system needs special tools, and it can be very expensive. Also, you need to know both farming and fish care. So, not many people in Japan are using it yet.

Yui: But if it was shown at the world event, that means it is something new and has a lot of chances for the future, right? (1) - b If we only think about the problems, we'll never try anything.

Ken: I know, but I cannot stop thinking about negative sides. For example, even if we save nature with aquaponics, there are always people who destroy nature by doing things like cutting down trees.

Emma: How do you know that, Ken? Have you had a bad experience about the environment before?

Ken: Actually, yes. When I was an elementary school student, I liked visiting my grandmother's house. She often took me to a place called "Forest Garden" near her house. This garden told us how forests, nature, and people all helped each other to live together.

Emma: How exactly did they help each other?

Ken: In the garden, almost every plant had a part. Some trees made fruit, and others provided *shade. There were flowers for bees, and *herbs that helped the soil. Everything grew together like a small natural *community.

Emma: Wow, what a nice idea! There are people who are serious about the SDGs and taking action here, too.

Ken: But that garden was lost because the city built a shopping mall there.

Emma: I see... You went through something really sad.

Mr. Sato: Thank you for sharing your experience. (1) - c However, that doesn't mean we should give up. Let me tell you about something called "agroforestry."

Ken: Agro...forestry?

Yui: Oh, I have read about it once. The book says that people grow trees and *crops on the same land.

Mr. Sato: Yes. It's designed to copy natural *ecosystems. The trees provide shade, improve the soil, and even help to keep water in the ground. Then, the crops grow healthier and need fewer *chemicals.

Ken: At first, I thought the two ideas were different from each other. In forests, nature is left alone, and *agriculture is about changing it. But in agroforestry, they work together.

Yui: That's right, Ken! I also think it sounds really smart. So, agroforestry is creating a kind of small ecosystem, right?

Mr. Sato: Exactly. As Ken says, it can take care of problems better than farms that grow just one thing.

Ken: That's like Forest Garden in my grandmother's town. I didn't know there were people thinking about the balance of life in the same way.

Emma: You're starting to get the idea, Ken. I can see your way of thinking is beginning to change a little bit.

Ken: I agree. (4) I'm starting to see things from a different point of view.

Yui: Ken, I didn't think that you would say such a thing!

Ken: You gave me courage. Maybe it's important to take action as a team. We can do something if we work together.

Emma: All right, so if we want to start something at school, what can it be? We don't have oyster reefs or a big forest.

Ken: How about trying to build a small aquaponics system at school? We need a fish tank, some water *pipes, and a bed for plants, and then we can raise herbs or vegetables.

Yui: Maybe we can use this science room and the garden club wants to help us with the plants.

Ken: OK. Let's write down things we will need and check! Fish, plants, testing tools, timers, and maybe a small *solar panel.

Mr. Sato: I'm happy that you are trying to take action.

Yui: (1) - d We may just go our own way and things won't work without you.

Emma: Our team will not do well without Ken.

Mr. Sato: Well, this is getting exciting. Everyone, please remember this moment. This is real learning, when knowledge turns into action, and action into change.

〔注〕 liter リットル (単位)
plankton プランクトン
cycle 循環
process 過程
waste 排せつ物
shade 日影
community 共同体
ecosystem 生態系
agriculture 農業
solar panel 太陽光パネル

shell 貝殻
oyster reef カキ礁
progress 前進
tank 水槽
soil 土壌
herb ハーブ
crop 作物
chemical 化学物質
pipe パイプ

〔問1〕 会話の流れに合うように、本文中の空所 ～
 の中に英文を入れるとき、最も適切なものを次のア～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。

- ア Maybe some of the speakers of the TV program will agree with you.
- イ Everything has good and bad sides.
- ウ But when you are with a team, you are not careful at all.
- エ I can understand how you feel.
- オ But they are not doing much.
- カ You should not remember what you experienced there.
- キ The event will not work well because of its cost.
- ク We need someone like you.

〔問2〕 ⁽²⁾ Do you know how big the ocean is? とあるが、この Ken の発言の意図を次のよ
うに書き表すとき、 に入るものとして最も適切なもの
は、下のア～エの中ではどれか。

Ken wanted to .

- ア say that the result of the project was so small that it would not reach the goal
- イ ask Mr. Sato how big the ocean is because he really didn't know the answer
- ウ suggest that all the students in New York should join the project to reach the goal
- エ tell them that he didn't understand the system of the project

〔問3〕 会話の流れに合うように、本文中の空所 (3)-a と (3)-b に英語を入れるとき、最も適切な組み合わせは、次のア～エの中ではどれか。

	(3)-a	(3)-b
ア	similar	more
イ	similar	less
ウ	different	more
エ	different	less

〔問4〕 (4) I'm starting to see things from a different point of view. とあるが、以下は Ken がこの会話の後に書いた日記の一部である。会話の内容を踏まえて、文章の流れに合うように [] の中に、書き出しに続けて **30 語以上 40 語以下の英語** を書きなさい。

英文は二つ以上にしてもよい。なお、「,」「.」「!」「?」などは語数に含めないものとする。また、I'll のような「'」を使った語や e-mail のような「-」で結ばれた語はそれぞれ 1 語と扱うこととする。

My Turning Point

Today, I talked about SDGs with some of my classmates and Mr. Sato. Through the conversation, I started to look at things in a different way. Before the conversation, []

This is something I realized. I am looking forward to working on our own aquaponics project with my classmates.

〔問5〕 本文の内容と合っているものを、次のア～クの中から二つ選びなさい。

- ア The purpose of the oyster project in New York is to take the oysters there to another place to save them.
- イ Oysters clean the sea by eating plankton and pushing out trash they caught.
- ウ By joining the project in New York, the students will learn how to help the restaurants there.
- エ Yui starts to do something without thinking too much about success first, and then she tries to make it better.
- オ Ken went to Forest Garden in his grandmother's house when he was an elementary school student and loved that garden.
- カ Mr. Sato explained forests and agriculture were different, but later Ken realized they can work together in Agroforestry.
- キ Thanks to Emma's action, the group planned an aquaponics project at Forest Garden.
- ク The group accepted Ken's idea to do a group project and started to take action.

3 次の文章は、Hibiya 高校にて行われた Dr. Len による特別講義である。これを読んで、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。)

There are a lot of expressions using “time.” At that time, one more time, save time, over time. Time is always around us, so we believe we know about time. But, how much do we know about time? We know time never stops and never turns back. We know it keeps going on from the past to the future. However, can we explain what time is? How do we know that time *exists? We can feel time, but we cannot touch or see it. This feature of time makes it difficult to understand. In *Rome, there was a *philosopher who said, “If nobody asks me what time is like, I know what it is. However, (1) ” Like him, you may think you know about time, but you actually don’t know about it. At the same time, some people have thought about time from different points of view for a long time. Let’s look back at the early days of this discussion and see how people tried to explain “time.”

About 2400 years ago, there was a philosopher in *Greece who wondered what time and *motion share for the first time. (2) – a For example, if we use a *candle, we can notice that time is passing because the candle becomes shorter. He thought that time does not exist without motion or changes. We can understand this idea from the motion of things in the sky such as the sun, the moon, or stars. In the past, people looked at them to tell the time. When the sun rose, they woke up, and a day started. When the sun went down, they noticed that a day ended and went to bed. When the full moon appeared, they learned a month passed.

(3) ① In those days, they cut a day into day and night and each period into twelve parts, and decided how long one hour was. ② But in summer, day was longer than it was in winter. ③ By trying to learn that time passes in this way, they could know the best time to grow their plants. ④ In Egypt, people used this idea and thought a new year started when the brightest star, Sirius, rose in the east just before the day started. ⑤ However, it doesn’t mean that they knew how to count the time exactly. So, one hour in winter was shorter than one in summer. Therefore, one hour was different in each season.

“Time” people in Egypt used was not perfect because they decided the time by looking at something they could see. However, in the late sixteenth century, a scientist in Italy helped to solve this problem by looking at things from a *scientific point of view. This new point of view opened the door for a lot of scientists to solve more problems. (4) So, how can we be scientific? There are important things you need to follow. First, we need to understand what *logical thinking is. It is about understanding how things connect. When we try to be scientific, we should check that things go together. Also, we should support our ideas with facts. By collecting them, more people will believe our idea is true. Moreover, we should

check that the results are the same in another *experiment done by other people. ⁽⁵⁾ By following these steps, [① first are ② things that ③ sometimes wrong ④ realize ⑤ at ⑥ we ⑦ true ⑧ seemed]. This point of view helped us to discover a scientific law about a *swaying lamp of a church. When the scientist in Italy saw it, he realized that even if the *distance from side to side was different, the time of *a round trip was the same. It was always about two seconds when a one-meter rope swayed. He tried this experiment many times at different distances, but the result didn't change. This discovery helped people to create a clock that kept time at *regular periods. As a result, more people started to believe in the importance of experiments and logical thinking.

In the seventeenth century in England, another scientist showed people a new idea of time, *absolute time. This is a *universal and unchanging *flow of time that exists without being affected by anything. According to him, even if all the clocks that we use disappeared from the world, time would still pass. His idea was very different from the idea of "time" that people knew, but it may not be so strange because we use this idea in our daily life. For example, when you check the time and your clock says eight o'clock in the morning, you may think that a clock in your office or school far away also says eight o'clock in the morning without checking those clocks yourself. (2) - b Nothing can escape from the time flow that is like a line going on forever. It has no "beginning" or "end." Of course, some disagreed with his idea because they still believed that time can be affected by motion and changes. This means time can't exist alone. However, a lot of people accepted the idea of absolute time because it was necessary for the law explaining a *physical phenomenon which was already believed.

More and more people believed in this idea, but a scientist born in Germany developed a new idea in the early twentieth century by doing experiments only in his mind. One day, he asked himself, "If someone and light moved at the speed of light in the same way, would light stay still?" He could not imagine light staying still in the air. According to his idea, time passes more slowly for very fast-moving things. Imagine we have two of the same clock, and put one in a rocket and the other outside the rocket. The rocket with the clock is moving at a high speed, and the other clock stays on the ground. Then the time of the clock in the moving rocket runs more slowly than the clock on the ground. Even if you exchange the clocks, the same thing happens, so time passes at different speeds, and it depends on the motion. Time is not absolute but *relative. (2) - c Such situations were almost impossible, so he spent a lot of time creating a new idea of time that people can use in any situation.

The new idea says time passes more slowly around planets with stronger *gravity. For example, on the sun, time passes slower than on the Earth by one minute in a year. If gravity increases, the difference will be bigger. This happens because time flow changes under strong gravity. Another example is a black hole. It has such strong gravity that if you stay around it

for three years, about 100 years pass on the Earth. Imagine there are two people who are both 15 years old. One stays near the black hole, and the other stays on the Earth. After some time, if the person near the black hole is 18 years old, the person on the Earth will be about .

In this way, so many people have tried to explain what time is, but we still cannot explain it. Why do we keep thinking about time? We know it is not a waste of time to spend our time thinking about something. Through the *process, our understanding sometimes changes, or a scientific way of thinking develops. There is something more important than answering questions or solving problems. Even if your process is not the fastest way, the process itself or things created in the process are valuable. Things you have done show that you have taken steps forward or learned new things. You can put value on time you spend trying new things.

〔注〕 exist 存在する	Rome ローマ
philosopher 哲学者	Greece ギリシャ
motion 動き	candle ろうそく
scientific 科学的な	logical 論理的な
experiment 実験	sway 揺れる
distance 距離	a round trip 一往復
regular 等間隔の	absolute 絶対的な
universal and unchanging 普遍的で不変の	flow 流れ
physical phenomenon 物理現象	relative 相対的な
gravity 重力	process 過程

〔問1〕本文の流れに合うように、本文中の空所 に入る発言を 10 語以上 15 語以下の英語で書きなさい。

英文は二つ以上にしてもよい。なお, 「,」 「.」 「!」 「?」などは語数に含めないものとする。また, I'll のような 「'」を使った語や e-mail のような 「-」で結ばれた語はそれぞれ 1 語と扱うこととする。

〔問2〕本文の流れに合うように、本文中の空所 (2)-a ~ (2)-c に次の①～⑥のいずれかの英文を入れるとき、最も適切な組み合わせは、下のア～カの中ではどれか。

- ① This idea, however, can be used only in some situations.
- ② However, some people think time passes in a different way if they visit places they don't know.
- ③ He thought that we can realize time has passed only when something moves or changes.
- ④ Our society believes that time keeps flowing at the same speed all the time around the world.
- ⑤ On the other hand, the idea can stand alone if some problems can be solved.
- ⑥ In those days, people could know what time was like when things stayed still.

	(2)-a	(2)-b	(2)-c
ア	①	②	④
イ	①	④	⑤
ウ	③	②	⑤
エ	③	④	①
オ	⑥	②	④
カ	⑥	④	①

〔問3〕⁽³⁾ の①～⑤の文を、本文の流れに合うように、最も適切な順に並べかえたとき、**2番目**と**4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	4番目
ア	①	④
イ	②	④
ウ	③	①
エ	③	②
オ	⑤	③
カ	⑤	④

〔問4〕 (4) So, how can we be scientific? とあるが、その説明の一部として、最も適切なものは次の中ではどれか。

- ア We should understand how things connect and check that things go together.
- イ We should do experiments before thinking in a logical way.
- ウ We should collect a lot of other people's ideas to make them facts.
- エ We should check the process is the same in another experiment done by the same people.

〔問5〕 (5) By following these steps, 【① first are ② things that ③ sometimes wrong ④ realize ⑤ at ⑥ we ⑦ true ⑧ seemed】. とあるが、文章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、①～⑧の中で3番目と5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。

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

〔問6〕本文中の空所 に数字を入れるとき、最も適切なものは次の中ではどれか。

- ア 18 イ 21 ウ 112 エ 115

〔問7〕 本文の内容と合っているものを，次のア～クの中から二つ選びなさい。

- ア Time is difficult to understand because we can't feel, touch or see it.
- イ The idea of a scientist in Italy was not accepted because a lot of people did not realize how important experiments and logical thinking were.
- ウ An idea of time a scientist introduced in England was new for people then because they thought time can't exist alone.
- エ An idea about time of a scientist in England was not accepted because a lot of people believed in the law he created for a physical phenomenon.
- オ A scientist from Germany started thinking about the speed of light and he imagined light could stay still in the air.
- カ Dr. Len says that things created in the process of thinking are valuable and show you have learned something new.
- キ The idea of absolute time and relative time says that time is the same everywhere and passes at the same speed.
- ク The discoveries about swaying lamps and black holes show that gravity does not affect the flow of time.

4

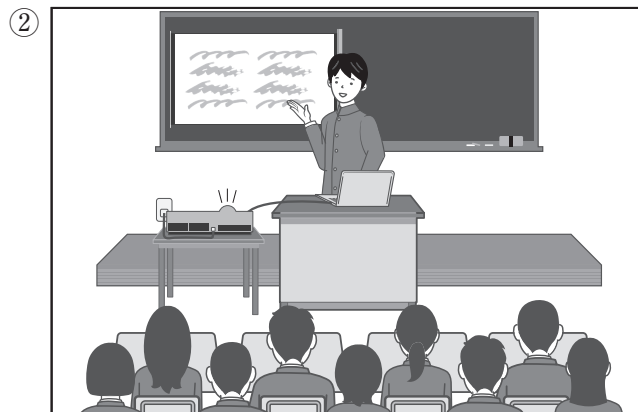
あなたはクラスで発表をする予定がある。次の資料1の今後の発表予定のうち、どちらか1つを選び、その場合、資料2のどちらの発表の形式がクラス全体にとってより適しているか、あなたの考えを50語程度の英語で書きなさい。

英文は二つ以上にしてもよい。なお、「,」「.」「!」「?」などは語数に含めないものとする。また、I'llのような「'」を使った語やe-mailのような「-」で結ばれた語はそれぞれ1語と扱うこととする。

資料1：今後の発表予定



資料2：発表の形式



8
目

英

語