解答はすべて解答用紙にマークしなさい。

〔Ⅰ〕 次の 1 ～ 12 の英文の（　　）に入る最も適切な語句を，それぞれ下の①～④から一つずつ選びなさい。

1 Because of a rapid increase (　　) population, a lot of apartments are being built now.
① among　② for　③ on　④ in

2 (　　) plastic is often mixed with other materials, it can be difficult or impossible to recycle.
① What　② How　③ Until　④ Because

3 According to research, 103 billion people had lived on Earth by 1975, but only 4 percent of them (　　) alive at that time.
① are　② were　③ have been　④ will be

4 Birds (　　) eggs of a surprising variety of sizes and shapes, and scientists have long wondered why.
① lay　② laying　③ to lay　④ having laid

5 When ocean water freezes, forming sea ice, salt (　　) behind, causing the surrounding seawater to become saltier and denser.
① leaves　② leaving　③ is leaving　④ is left

6 The whole idea of science is that there are many questions (　　) we are trying to answer by studying the world around us.
① that　② how　③ what　④ why

7 There are more than 3 million foreign-born residents in New York City, and over 800 different languages are spoken there, (　　) it the most linguistically diverse city on the planet.
① make　② made　③ making　④ to make

8 The sun accounts for more than 99% of the mass of the solar system, and its diameter is about a hundred times (　　) of the earth.
① it　② that　③ one　④ any

9 It (　　) impossible to study living things if we did not sort them into groups.
① had been　② were　③ would be　④ has been

10 Because plastic takes so long to break down, it could be theoretically possible that nearly every toothbrush made since 1930 (　　) still out there somewhere.
① are　② is　③ to be　④ being

11 At the bottom of the ocean (　　) vast reserves of methane, produced by microbes feeding on the remains of dead algae and animals.
① lie　② lain　③ lying　④ to lie

12 An internship is a structured learning situation (　　) concepts learned in the classroom are applied to the realities of on-the-job experience related to the student's major and career goals.
① which　② how　③ where　④ what

〔II〕 次の（1）～（5）の日本語の意味を表すように英文を作った場合，[13] ～ [27] に入る最も適切な語を，それぞれ下の①～⑦から一つずつ選びなさい。

（1） 古代エジプト人は，ナイル川沿いでタマネギを栽培していたことで知られている。

The ancient Egyptians [ ] [13] [ ] [14] [ ] [15] [ ] the Nile River.

① cultivated ② are ③ have ④ to ⑤ along ⑥ onions ⑦ known

（2） ゴリラは高い知能と豊かな感情を持つ動物で，多くの場合5頭から15頭で構成される群れの一員になる。

Gorillas are a highly intelligent and emotional animal, and they generally become members of [ ] [16] [ ] [17] [ ] [18] [ ] individuals.

① fifteen ② consisting ③ a ④ five ⑤ group ⑥ of ⑦ to

（3） 有害なバクテリアを攻撃して破壊する，抗体と呼ばれる物質をつくり出せる白血球もある。

Some white blood cells can [ ] [19] [ ] [20] [ ] [21] [ ] destroy harmful bacteria.

① antibodies ② attack ③ called ④ which ⑤ substances ⑥ and ⑦ produce

（4） 「我々の研究結果が助けとなり，生産者が美しいリンゴを作るのを目にすることが一番うれしい」とブラウン教授は言った。

Professor Brown said, "Nothing [ ] [22] [ ] [23] [ ] [24] [ ] beautiful apples with the help of our research results."

① growers ② satisfying ③ than ④ is ⑤ seeing ⑥ more ⑦ produce

（5） ある状況で効果的な手法が，他の状況でもうまくいくかどうかについては，多くの疑問があった。

There were a lot of questions [ ] [25] [ ] [26] [ ] [27] [ ] in one context can work in others.

① approach ② whether ③ is ④ about ⑤ an ⑥ effective ⑦ that

〔III〕 次の [28] ～ [32] が自然な会話になるように，（　　）に入る最も適切なものを，それぞれ下の①～④から一つずつ選びなさい。

[28]
A: I bought you a pair of cool jeans.
B: Wow, thank you!
A: I hope they fit.
B: I hope so..., but did you keep the receipt?
A: Why? You think they won't fit?
B: Well, I've put on some weight recently.
A: Really?
B: Yeah. My waist is bigger than it used to be.
A: (　　) These pants have an elastic waistband.

① No problem. ② My pleasure.
③ Nothing much. ④ My fault.

[29]
A: That's the bookstore we've been looking for just across the street.
B: Wait! You can't cross the street in the middle of the block! You have to cross at the corner.
A: Oh, come on. Let's cross here.
B: Look out! You nearly got hit by that car just now!
A: Sorry. (　　)

① You'll see it at the corner. ② You hit me first.
③ I know where you left the car. ④ I should have been more careful.

[30]
A: Congratulations, Gino! Or should I say, "Vice President Martinelli"?
B: Not yet, Marie. It doesn't take effect until next month. I am excited about the new opportunity, though. And a little scared, too, to tell you the truth. It's more money, but also a lot more responsibility. I'm not sure if I'm ready for it.
A: (　　) You've earned your new position, so relax. I'm proud of you!

① It couldn't be worse! ② Sure you are!
③ You got that right! ④ Let's have it!

31 A: How about a boat trip around the bay? We could do that in the morning, and then have a nice dinner in the evening.
B: That sounds like a great way to end my vacation.
A: (　　)
B: Yes, it's a pity. This week has gone so quickly. I feel like I've only just arrived.
A: Well, I'm going to make sure that your last day is a really special one.

① It's been a long time since last time.　② It's too late to be sorry.
③ It's too bad you can't stay longer.　④ It's all over my head.

32 A: Do you know who this is?
B: Is it you when you were in junior high school?
A: No, it isn't. It's my mother when she was young.
B: Wow! She looks exactly like you.
A: Actually, I look a lot like her.
B: (　　)

① I was just wondering.　② I'm really ashamed.
③ You must be kidding.　④ You can say that again.

〔IV〕 次の英文中の 33 に入る最も適切なものを下の①～④から一つ選びなさい。

The COVID-19 pandemic demonstrated the critical importance of sanitation, hygiene and adequate access to clean water for preventing and containing diseases. Hand hygiene saves lives. According to the World Health Organization, handwashing is one of the most effective actions you can take to reduce the spread of pathogens and prevent infections, such as COVID-19. 33 , billions of people around the world still lack access to clean fresh water, and funding is inadequate.

① Likewise　② Nevertheless　③ Accordingly　④ Furthermore

〔V〕 次の英文の内容に合致するものを下の①～④から一つ選びなさい。

It is well-known that plastics floating in the ocean are a huge problem. They can accumulate in areas over twice the size of Texas, and microplastics in particular can harm marine organisms when swallowed.

Researchers Justine Barrett, Chris Wilcox, and their team at the Commonwealth Scientific and Industrial Research Organisation (CSIRO), an Australian Government agency, quantified the amount of microplastics in the Great Australian Bight, a large ocean area south of Australia that is home to many marine species. The researchers utilized a remotely operated vehicle to collect samples from around 1,600 to 3,000 meters deep in the ocean. They then adapted a characterization technique to filter and purify these deep ocean samples to better evaluate the amount of plastics they contained. Using microscope images, the CSIRO team counted the number of microplastic particles in different samples and estimated, based on the counts from this region, that 14 million tons of microplastics exist globally on the ocean floor.

This research from Barrett's team has significant implications for understanding the gravity of the plastics problem in the ocean. A lot of earlier research focused on the idea that plastics float on the surface of the ocean, with researchers only beginning to explore the idea of their role in the deep sea. However, these findings show that the amount of plastics in the deep ocean is becoming a serious problem. We need to act faster to ban plastic dumping in order to prevent such accumulations.

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① The accumulation of plastic waste in the ocean almost covers the size of Texas.
② Barrett's team used robotic equipment to collect plastic samples in the deep ocean.
③ The CSIRO team gathered 14 million tons of microplastics on the ocean floor.
④ The growing issue of plastics in the deep ocean had already gained a lot of focus.

〔VI〕 次の英文の内容に合致するものを次ページの ① ～ ④ から一つ選びなさい。

Tasmanian devils (*Sarcophilus harrisii*), a small, bear-like marsupial species native to Australia, were supposed to be extinct by now. With a deadly, highly contagious face cancer destroying its population, forecasts over the past decade or so gave the animal no hope of survival. Approximately only 25,000 devils remain, down from about 150,000 in the 1990s, but a new analysis offers hope. Devil facial tumor* disease has become far less transmissible since the peak of the epidemic, suggesting it will not wipe out the species, researchers reported in *Science* in December, 2020. Instead, the disease may stay at lower levels, or "the tumor itself might eventually go extinct," says Andrew Storfer, an evolutionary geneticist at Washington State University in the US.

Storfer and his colleagues reconstructed the history of the tumor's spread by analyzing changes in tumor genes that evolve in a regular manner. Samples from 51 tumors dating back to 2003 helped the researchers adjust this timeline. Though the disease was discovered in 1996, the study found that it probably originated years earlier, in the '80s, circulating slowly at first. At its peak in the late '90s, each infected devil was infecting 3.5 other devils on average, usually through biting. Recently, that number has fallen to one, suggesting the epidemic might be fading out.

The slowdown may derive from population decline — fewer devils means fewer transmission opportunities for a disease that spreads fastest within dense groups. Additionally, the tumor itself might have become less transmissible; the researchers identified some genes that could influence this shift. Finally, the devils themselves seem to have evolved resistance to the disease. But devils are still endangered, and some experts want to introduce captive-bred animals — ones born and raised in a place like a zoo or a farm — to increase numbers. That could have the opposite effect, Storfer says, by allowing the disease to spread again. "It sounds boring, but doing nothing might be the best option for the devils."

tumor* = 腫瘍

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① In Storfer's calculation, Tasmanian devils will go extinct soon due to the spread of the facial tumor disease.

② The facial tumor disease was so contagious that one out of 3.5 Tasmanian devils got infected with the disease.

③ The population decline of Tasmanian devils caused by the face cancer may have slowed down the cancer's spread.

④ Captive-bred Tasmanian devils have been introduced in order to overcome the population crisis.

〔VII〕 次の英文の内容に合致するものを次ページの①～⑥から二つ選びなさい。

John Nábělek and Václav Kuna are seismologists, or earthquake researchers, who are interested in the structure of rock layers beneath the seafloor. The two used a network of 54 ocean-bottom seismometers in the northeast Pacific Ocean to detect waves that travel through the ground, such as those caused by earthquakes. It turns out that they can also pick up songs from passing whales.

Underwater sounds can produce seismic echoes. When sound waves traveling through the water meet the ground, some of the waves' energy converts into seismic waves. Those seismic waves can help scientists "see" underground as they bounce off different rock layers, because the way they bounce can help researchers estimate the thickness of the layers. Changes in the seismic waves' speed also can reveal what types of rocks the waves passed through.

Fin whale songs can be up to 189 decibels. That is as noisy as a large ship. Nábělek and Kuna's seismometers picked up the sound waves of a fin whale's songs, recording six songs in 2012 and 2013. Each song lasted from 2.5 to 4.9 hours, and was made by a single male whale.

Echoes from the whale showed the researchers that its sound waves had passed through layers of sediment and underlying rock. They revealed structural details of the crust beneath three sites over which the whale had been singing. All three had what the scientists considered a "classic" ocean-floor structure. There were layers of sediment between 400 and 650 meters thick. Below those sat a layer of basalt rock about 1.8 kilometers thick. Beneath the basalt was a dense oceanic rock known as gabbro.

The new data suggest fin-whale songs can be effective tools to study the seafloor. Large research ships tend to perform seismic surveys using air guns. These instruments make very loud noises that can travel long distances. But their noise can also disrupt ocean life — especially the behaviors of whales and other animals that rely on sound to hunt or communicate. In contrast, the songs of fin whales can be recorded without disturbing marine life. These songs may help seismic studies when typical survey methods are not possible or recommended.

36 37

① The research team was able to pick up songs from a passing whale, using ocean-bottom seismometers.

② How rocks bounce underwater can help researchers estimate the thickness of several rock layers.

③ Whether researchers can detect sound waves depends on how many rocks the waves pass through.

④ Nábělek and Kuna had to wait from 2.5 to 4.9 hours each time to start recording the six fin whale songs.

⑤ The sound waves of a fin whale's songs showed researchers the detailed structure of ocean floor.

⑥ In traditional seismic surveys, researchers tried to avoid making loud noises to protect ocean life.