

第8問 (配点 17)

You are working on an essay about **space exploration**. You will follow the steps below:

Step 1: Read a range of opinions gathered from the Internet about exploring outer space.

Step 2: Take a position on space exploration.

Step 3: Create an outline of your essay using additional sources.

► [Step 1] Read a range of opinions

Apu (university professor)

The exploration of space requires a lot of research time and money. All this research has led to many new inventions and boosted humanity's scientific and technical knowledge. While laser eye surgery, solar cells, freeze-dried food, and wireless headsets are just a few examples that have come out of space research, perhaps the invention that has proven the most useful in modern life is the computer mouse. This was developed in the 1960s on a NASA research project.

Christine (company CEO)

Much space exploration relies on international cooperation, a good example being the International Space Station, launched in 1998. The main reasons for this cooperation are to share the huge costs involved and to improve national prestige. More recently, private companies have begun exploring space, though mostly for commercial reasons. In the future, it is possible that countries or corporations will try to colonize parts of the moon or Mars. While financial cooperation and raising prestige are welcome, improper commercial or military use of outer space is not.

Meilin (journalist)

As the famous physicist, Stephen Hawking, once said, it is probably dangerous to broadcast into deep space evidence of the existence of humans here on Earth. If our nearest intelligent aliens are anything like us, then they will seek to conquer Earth and humanity. For me, this is the greatest threat associated with space exploration. The deeper into space we travel, the greater the likelihood Earth will be discovered by an aggressive alien civilization.

Naomi (lawyer)

Historically, jobs working at sea were likely the least safe, with the highest rates of death in the workplace. In modern times, space is no different, if not worse. Once we are just 10,000 meters or so above the surface of the Earth, there is little oxygen and the temperature is too low for human survival. Since the first person went into space in 1961, 19 of 652 astronauts have died on the job: a fatality rate of 2.9%. No other business or industry would tolerate such a high level of danger. Why should the space industry?

Victor (financial analyst)

Space exploration has contributed hugely to economic growth. In the USA, NASA provided work for nearly 340,000 people in 2021, mostly at above-average salaries, and it is estimated that it has contributed \$7.7 billion in taxes to the US government. Space is also being explored by other countries, such as China, India, Japan, and Russia. In the future, further economic growth will be ensured by more private firms entering the space race and by the rise of space tourism, space mining, space colonization, and space militarization.

問 1 Which of the following best expresses Meilin's opinion? 38

- ① Caution is critical.
- ② Invention is invaluable.
- ③ Science is superior.
- ④ Trust is treasure.

問 2 Both Christine and Victor mention that space exploration 39 .

- ① has economic impacts and provides opportunities for private corporations to make money
- ② is gaining popularity and that salaries for people working in the industry are above average
- ③ is politically challenging as it requires coordination among countries with different policies
- ④ needs global cooperation, especially to operate the International Space Station successfully

► [Step 2] Take a position

問 3 Now that you have understood the various opinions, you have taken a position on space exploration and written some notes below. Choose the best options to complete [40] — [42]. (You must have all of [40] — [42] correct to get points.)

POSITION: Space exploration is not a good idea.

- [40] and [41] opinions support this the most.
- An argument common to these two people is that [42].

Options for [40] and [41] (the order does not matter):

- ① Apu's
- ② Christine's
- ③ Meilin's
- ④ Naomi's
- ⑤ Victor's

Options for [42]:

- ① military conflict in outer space is something we should try hard to avoid
- ② space exploration exposes people to a lot of danger and is too risky
- ③ the possibility of alien invasion is too great to be ignored and must be addressed
- ④ the risk of death for people in the industry is extremely high compared with other jobs

► [Step 3] Create an outline of your essay

Essay outline

A Reconsideration of Space Exploration

Introduction

Space exploration is without doubt on the frontline of science, but it should not be a priority for the following three reasons.

Body

REASON 1 from Step 2, based on evidence from the opinions in Step 1

REASON 2 (43), based on evidence from Source A

REASON 3, based on evidence (44) from Source B

Conclusion

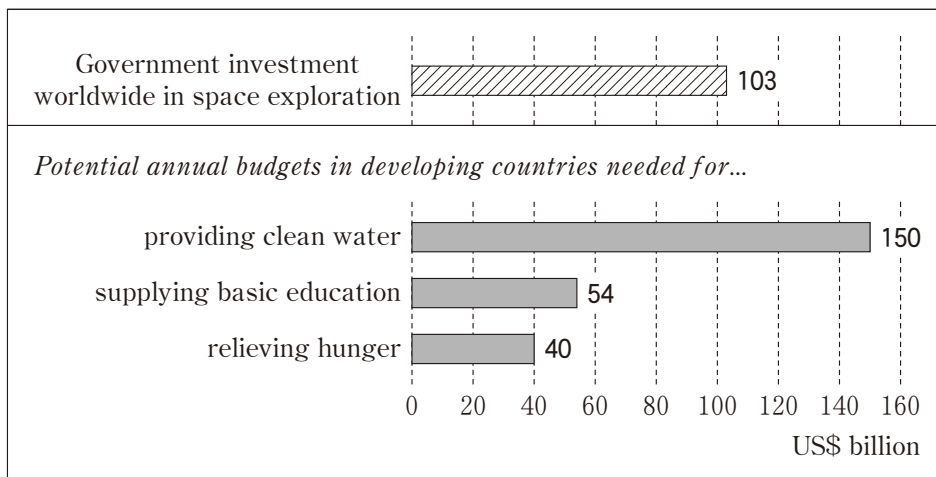
Upon consideration of all its aspects, we should perhaps prioritize other things over exploring space.

Source A

Although you may not make a direct connection between space exploration and environmental problems, a connection does exist. First, the CO₂ emissions of spacecraft are not insignificant. It is estimated that one spacecraft launch emits 200-300 tons of CO₂ and other harmful gases into the Earth's atmosphere. More and more spacecraft are being sent into space, which is damaging for the Earth. The contribution to the greenhouse effect of these craft's CO₂ emissions is causing the Earth's temperature to rise. Second, space exploration is damaging the thermosphere (the space environment close to the Earth). The quantity of space debris, the junked parts of spacecraft or artificial satellites, is on the rise. NASA estimates that, in the thermosphere, there are currently around 23,000 pieces of space debris which are larger than a softball and travel at speeds of up to 28,000 km/h. This poses a risk to future spaceflight, and may even be a potential obstacle to astronomical observation.

Source B

Space exploration is getting more and more costly; in 2022 it was reported that the total amount of money spent by all the governments around the world was more than US\$100 billion. The graph below compares this cost with the annual budgets, estimated by international institutions, that would be required to address some of the world's most important issues.



問 4 Based on Source A, which of the following is the most appropriate for REASON 2?

43

- ① CO₂ emissions produced by spacecraft are huge and are damaging outer space.
- ② It is difficult to update spacecraft with new engines that emit fewer harmful gases.
- ③ Space debris poses risks to humans due to potential collision with airplanes.
- ④ Space exploration is polluting the environment of both the Earth and the thermosphere.

問 5 For REASON 3, you have decided to write *The cost of space exploration is high and the money could be used instead to solve major world problems.* Based on Source B, which option best supports this statement?

44

- ① The amount of money that governments around the world spend on space exploration could not only reduce hunger but also make primary education available in developing countries.
- ② The data show that it costs less to ensure clean water for people in developing countries than for governments around the world to explore space.
- ③ With less than half the money that governments spend on space exploration, it would be possible to address the problem of educational inequality in the developing world.
- ④ With the money currently invested in space exploration, we could provide sufficient food, basic education, and enough clean water in developing countries.