令和５年度入学者選抜試験問題

人文社会科学部
地域教育文化学部
医学部

外　国　語

（英　　語）

前　期　日　程

注　意　事　項

1　試験開始の合図があるまで，この問題冊子の中を見てはいけません。

2　この問題冊子の本文は１ページから７ページまでです。

3　試験中に問題冊子の印刷不鮮明・落丁・乱丁，解答用紙の汚れなどに気が付いた場合は，手を挙げて監督者に知らせてください。

4　監督者の指示にしたがって，解答用紙に**学部名**と**大学受験番号**を正しく記入してください。**大学受験番号**が正しく記入されていない場合は，採点されないことがあります。

5　問題冊子のほかに，解答用紙２枚，下書き用紙１枚を配付してあります。

6　試験終了後，問題冊子と下書き用紙は持ち帰ってください。

次のページから問題冊子の本文が始まります。

I *Read the text and answer Q1-Q6.*

Ⓐ Astronomers spend their careers looking up at the sky, away from Earth, but now some of them say their field has to struggle with the fact that observing the cosmos is contributing to their home planet's climate emergency. A new estimate of the greenhouse gas emissions linked to all ground-based and space-based telescopes, in the journal *Nature Astronomy*, says the annual carbon footprint* of astronomy's research infrastructure is equivalent to about 20 million metric tons* of carbon dioxide. "Just to give you some perspective—20 million metric tons of CO_2—this is the annual carbon footprint of countries like Estonia, Croatia, or Bulgaria," says Jürgen Knödlseder, an astronomer at IRAP, an astrophysics* laboratory in France.

Ⓑ He and IRAP colleagues including Annie Hughes and Luigi Tibaldo got the idea to do this study while making an estimate of the greenhouse gas emissions from their own institute. "The only missing piece of our assessment was the footprint of the observational data," says Knödlseder, whose own research, for example, has relied on observations made with the Fermi Gamma-ray Space Telescope. "No study had ever tried to calculate the carbon emissions due to the construction and operation of all the telescopes and space missions that astronomers use to make observations," notes Hughes.

Ⓒ That's just what this research team set (**A**) to do. Data were sometimes hard to come (**B**), but they did their best to calculate greenhouse gas emissions associated with nearly 50 space-based missions and 40 ground-based telescope facilities. The largest scale emitters were the biggest, most expensive observatories*, such (**C**) the new James Webb Space Telescope and the Square Kilometer Array, according (**D**) the report. By dividing up the total annual emissions by the number of astronomers worldwide, the researchers figure that each astronomer's share of the profession's emissions is around 36 metric tons per year.

Ⓓ Knödlseder points out that this is about the amount of emissions from driving an average car in France 165,000 kilometers. And that's just from using the telescopes—it doesn't include things like scientists' travel to conferences, supercomputing power and office heating. "For our lab, the total is actually about 50 metric tons of equivalent CO_2 per year an astronomer," he says. Hughes believes that astronomers need to set an example when it comes to action to lessen climate change. "If we as scientists do not react to the reports and warnings from our colleagues," she says, "then it's a bit like your father telling you that you shouldn't smoke, while he himself is smoking a cigarette. Why would you take his word seriously?"

Ⓔ The researchers urge space agencies and funders of astronomy research to commit to requiring an environmental assessment of every observing facility they support, and making them public. What's more, they say, until research can be made more sustainable, through measures like renewable energy sources, one option to reduce emissions is to slow down the pace of building ever larger and more sophisticated new telescopes. "Some of our colleagues are a bit shocked by this idea," says Tibaldo. "What we really think is that these options must be on the table. The emergency we are facing is so big and clearly we are playing a role in it with our work."

F The astronomers hope that other scientific fields will be inspired to take a similar global inventory of the greenhouse gas emissions from their research infrastructure. "As far as I know," says Knödlseder, "this is the first time that this kind of study has been done for any research field." This study is important because it draws attention to the contribution of astronomy to climate change, says Travis Rector, an astrophysicist at the University of Alaska Anchorage, who is one of the organizers of the group Astronomers for Planet Earth. "I think the overall picture is clear that we do have substantial emissions associated not only with the operations of our facilities, but also the construction," says Rector. "And this is something we've been aware of for some time. And there are efforts to try to reduce the emissions associated with those."

G Already, some observatories either use solar power or are looking into greener energy options. A spokesperson for the National Science Foundation, a major funder of astronomy research, told NPR* that "we have explored and implemented clean energy alternatives, such as installing solar panels at our Gemini North and South facilities, and we built the possibilities of future solar upgrades into the buildings."

H Even though astronomy is a relatively small profession and may have less of a climate impact than some other human activities, he says, "that doesn't give us the right to say, 'well, this isn't our problem.' We recognize that we are—that we need to be part of the solution as well."

(Adapted from Nell Greenfieldboyce, "Astronomy's contribution to climate change rivals the emissions from some countries," *NPR*, 21 March 2022)

Vocabulary

carbon footprint 温室効果ガス排出量
metric tons メートルトン （1メートルトン＝1000キログラム）
astrophysics 天体物理学
observatories 天文台
NPR National Public Radio

Questions

Q1 Which of the four choices (A)-(D) below is the closest in meaning to the underlined words in the text?

(1) equivalent in paragraph A

(A) beneficial
(B) comparable
(C) familiar
(D) unique

(2) due to in paragraph B

(A) hiding from
(B) operating from
(C) resulting from
(D) shrinking from

(3) lessen in paragraph D

(A) activate
(B) ease
(C) investigate
(D) study

(4) measures in paragraph E

(A) criticisms
(B) methods
(C) qualities
(D) weights

Q2 Fill in the blank spaces in paragraph C with the following words to correctly complete the sentences. Each word may be used **only once**.

as / by / out / to

Q3 In paragraph D, astronomers are compared to a smoking father. Explain the similarity between astronomers and the smoking father in 60-90 **Japanese** characters.

Q4 Which of the following statements (A)-(D) best matches the meaning of the underlined text in paragraph F?

(A) A large amount of carbon emissions are specifically related to the installation of solar panels at astronomy facilities.

(B) Building larger telescopes not only increases greenhouse gases but also prevents the operation of clean energy research facilities.

(C) It is clear that greenhouse gas emissions are generally connected to the operation and construction of scientific research fields outside of astronomy research.

(D) On the whole, a large amount of greenhouse gas emissions are connected to the building of larger telescopes.

Q5 Explain **in Japanese** what *that* and *this* refer to in the underlined text in paragraph H.

Q6 Choose the correct statement from (A)-(C) below according to the content of the text.

(A) Astronomy researchers in the past made a significant contribution to the reduction of CO_2.

(B) The idea of postponing construction of new telescopes is surprising to a number of astronomy researchers.

(C) The National Science Foundation has refused to consider future solar upgrades at their observatories.

II *Read the text and answer Q1-Q6.*

Ⓐ In September 2021, product marketing manager Blaine Bassett moved from San Francisco to scenic Lake Tahoe, 300 km away on the California-Nevada border. He wanted "to take advantage of what was predicted to be a once-in-a-lifetime winter*," he says. "Tahoe was expecting record snowfall this year; in fact, the mountain got more than 5 meters of snow in December. I wanted to be here to take advantage of a ton of days to snowboard and snowshoe, a new hobby I picked up this winter."

Ⓑ At the time, his San Francisco-based employer, travel and expense-management company TripActions, was still operating remotely; he figured it was only a matter of time before things returned to pre-pandemic* norms, so he considered the move temporary. Seven months later, however, Bassett is still living in Lake Tahoe, even as his company has started calling staff back to the office, a four-hour drive away. That means for Bassett, a once-daily commute is being replaced with a less frequent—but much longer—one. It's called a 'super commute': defined as a commute that takes 90 minutes or longer one-way.

Ⓒ "As you can imagine, it takes a bit of planning," says Bassett, who travels two or three times a month by car from his home to his company's headquarters. He can't go into the office at a moment's notice anymore, and has to "check traffic times well in advance, leave at dawn and try to pack as many in-person meetings into the day as possible. I frequently spend the night with friends or at a hotel so I can get two days in the office out of the commute." But the long-distance travel and increased costs are worth it, since he's able to keep living in Lake Tahoe, working remotely the rest of the month. "When I need a break or I have a person-to-person conversation," he says, "I take calls while walking in the forest, or down at the lake."

Ⓓ Super-commuters aren't a new phenomenon. In vast countries like the US, for example, some workers, mainly senior executives, have been commuting long distances for years. But the pandemic has increased this phenomenon, as more people shift to an employment model that combines remote work and occasional visits to the office. Could this new form of commuting be the future, as workers embrace hybrid, and build lives further away from urban centers?

Ⓔ Historically, the workers doing these kinds of long-distance commutes have had certain things in common; they were often very senior or wealthy knowledge workers in areas like tech, who were allowed to live far away and come in infrequently, sometimes even by commuter flight services. But now, super-commuting is evolving into something a bit different. Remote work has become far more normalized, even in areas where it was rare pre-pandemic. It's common across more levels of the workforce; employees well below the executive level now expect to work more flexibly. Many companies are responding by allowing a far wider range of employees to request working conditions that suit their personal circumstances.

Ⓕ For some people, that means living far from the office, potentially somewhere cheaper, and working a hybrid schedule, combining home working days with visits to the office—whether weekly, monthly or quarterly—via a significantly longer commute. Data suggests many workers think this is a reasonable

compromise; 4.9 million Americans have moved since 2020 because [do / enabled / remote work / so / them / to], while more Australians moved out of major cities in 2021 than at any point in the last two decades.

G Robert Pozen, senior lecturer at the Massachusetts Institute of Technology's Sloan School of Management, says the evolution of the hybrid workplace means that new-style super-commuting is here to stay. "The super-commuters are mainly knowledge professionals who don't have to be physically present every day—that's about half the workers in the US," he points out. Bill Fulton, director of the Kinder Institute for Urban Research at Rice University in Texas, says it's likely that super-commuters who commute between states work at higher-level jobs—not at the very top, but higher up. But Pozen believes that more people will be able to super-commute as hybrid gets more established. "The group of super-commuters has expanded as companies have allowed middle-class knowledge workers to come into the office two days a week, or one week a month," he says.

H Fulton points out it's not all smooth sailing. "Companies want their workers, especially the supervisors, in the office on a regular basis—maybe not five days a week, but more than once a month. So, there's a lot of tension right now between those who want to commute long distances very occasionally and employers who want them close." Bassett acknowledges his new work model comes with challenges, too. "There are definitely disadvantages to living far away from the office. I'm hardly ever at the office for after-work drinks, there is no longer 'water cooler talk*,'" he says. "Meetings are now much more intentional, building team culture is a bit harder than it used to be, and it's tiring being in the car so much." Yet none of this is enough to discourage him. "Super-commuting is something that I'd like to keep doing," says Bassett.

(Adapted from Bryan Lufkin, "The workers taking on new 'super commutes,'" *BBC*, 15 April 2022)

Vocabulary

once-in-a-lifetime winter 一生に一度あるかないかの冬
pre-pandemic 新型コロナウイルス感染症の世界的流行以前の
water cooler talk 休憩中の雑談

Questions

Q1 Which of the following statements (A)-(D) best describes super-commuters in the text?

(A) You need to commute at least an hour and a half away and work remotely.
(B) You need to commute at least four hours away every day.
(C) You need to commute more than two hours away and stay overnight in the office.
(D) You need to work part-time and use your time in the office efficiently.

Q2 Which of the following statements (A)-(D) best describes the reason for the underlined text in paragraph C?

(A) Bassett can have a person-to-person meeting very easily at Lake Tahoe.
(B) Bassett can spend most of the month at Lake Tahoe.
(C) Bassett can take calls when he is in the forest.
(D) Bassett enjoys the four-hour drive from Lake Tahoe to his company.

Q3 Which of the following statements (A)-(D) best describes the meaning of the underlined text in paragraph D?

(A) Workers enjoy a combination of work in the office and from home.
(B) Workers promote flexible hours in the office.
(C) Workers take the opportunity to interact with others.
(D) Workers use an increasing number of hybrid cars.

Q4 Put the following underlined words in the correct order to match the context of paragraph F.

because [do / enabled / remote work / so / them / to],

Q5 Translate the underlined text in paragraph H into **Japanese**.

Q6 Do you think the trend of super-commuting will continue to increase? Why or why not? Explain in 40-50 **English** words.