

2021年度 入学試験問題

英 語

注 意

- (1) 解答用紙には受験番号の記入欄が3か所ある。
3か所とも正確、明瞭に記入すること。
- (2) 解答用紙には氏名の記入欄が1か所ある。
正確、明瞭に記入すること。
- (3) 解答はすべて解答用紙の所定欄に記入すること。
解答用紙の裏面は使用してはならない。
- (4) 問題紙の本文は17ページある。
試験開始後、落丁・損傷がないか確認すること。
- (5) 試験終了後、問題紙は各自持ち帰ること。

[I] 次の文章を読んで設問に答えなさい。[*印のついた語句は注を参照しなさい。](79点)

In December, a spacecraft named Hope was motionless in the middle of a large clean room on the campus of the University of Colorado, mounted securely on a stand.

(中略)

While this spacecraft was assembled on American soil, it will not be exploring the red planet for NASA. Hope is instead an effort by the United Arab Emirates, an oil-rich country smaller than the state of Maine and one that has never sent anything out into the solar system.

Emirati* engineers worked here, close to the ski slopes of the Rocky Mountains and far from the sands of the Middle East, learning from their American counterparts. It was part of the Emirates' planning for the future when petroleum no longer flows as bountifully*, to invest its current wealth in new "knowledge-based" industries.

"How do you develop highly skilled people that are able to take on higher risks?" said Sarah al-Amiri, the minister of state for advanced sciences for the U.A.E., who also leads the science portion of the Mars mission. "That was the reason to go to space exploration."

As a newcomer, the U.A.E. has taken a novel approach. It could have tried to do everything itself, developing homegrown technology similar to what India has done. That would have taken years longer. Alternatively, it could have bought someone else's spacecraft design, which would have been the quickest path.

Instead, the country has sought partners with long experience in sending machines into space. This, its space team believed, would help avoid many of the pitfalls* of trying to pull off such missions for the first time, while training future engineers who will be expected to step up to

bigger roles in the next mission. In the process, the country's leaders hope to sow seeds for future companies.

^(d) “The government really wanted to create that ecosystem or at least help in creating that ecosystem,” said Omran Sharaf, the project manager for the Emirates’ Mars mission. “Soon. They want to accelerate the process. Don’t start (Y) scratch. Work with others. Take it to the next level now.”

(中略)

Last year, for a nascent* astronaut program, the Emirates bought a seat on a Russian Soyuz rocket. They sent Hazzaa al-Mansoori for an eight-day stay at the International Space Station.

Hope will be just one of a flotilla* of robotic spacecraft scheduled to launch this summer during a once-in-26-months alignment* of Earth and Mars that enables a relatively short trip of some 300 million miles and seven months to the red planet.

The other three will be the products of established space powers: NASA, China and a collaboration between Russia and the European Space Agency.

Compared with those, Hope is modest in size and scope, with costs fitting into what managers described as a “tight budget.” While the other missions each aim to put a rover* on the surface, the Emirati spacecraft will make observations from orbit.

Still, it will be more than just a technical triumph.

“We were requested to send a spacecraft to Mars, but not send space junk, basically,” Ms. al-Amiri said. “Send a spacecraft that not only captures an image of the planet to declare you’re there, but actually provides you with valuable scientific data.”

In September 2014, India celebrated putting a spacecraft in orbit around Mars and boasted how its price tag was a fraction of that for MAVEN, a NASA probe that arrived two days earlier. Both are still there.

But the Indian spacecraft did not have scientific instruments sensitive enough to make significant discoveries. (Z), MAVEN has determined how quickly the Martian atmosphere is being stripped away by the solar wind: about four pounds a second. This (あ) is an important clue in the puzzle of understanding (い) early Mars, (う) was warmer and (え), turned into the cold, barren, (お) airless place it is today.

Hope's aim is to fill in a gap in MAVEN's findings by looking at the dynamics closer to the ground that influence the rate of leaking.

(7)

"You need to understand the role that Mars plays in the loss of its atmosphere," Ms. al-Amiri said.

When a planet-wide dust storm raged on Mars in the summer of 2018, MAVEN observed that the amount of hydrogen in the upper atmosphere rose. The three instruments on Hope — an infrared spectrometer*, an ultraviolet spectrometer* and a camera — would be able to help explain how the dust pushed the hydrogen upward.

In addition, from its high-altitude perch* — an elliptical* orbit that varies from 12,400 miles to 27,000 miles above the surface — Hope will give scientists a global view of Martian weather, noting changes in temperature and other conditions during the course of a day.

"That's one of the fundamental new measurements we haven't seen before," said Bruce M. Jakosky, a professor of geological sciences at the University of Colorado who is MAVEN's principal investigator and a member of the science team for the Emirati mission.

Previous orbiters have generally swooped* much closer to the Martian surface, usually in orbits devised to pass over a given location at the same time of day each time. That was more useful for detecting slow changes on the surface rather than in the air.

"I think the atmosphere has been understudied*," said Philip R.

Christensen, a planetary sciences professor at Arizona State University, which built the infrared spectrometer for Hope. That instrument will capture data on the dust particles and ice clouds and track the movement of water vapor and heat through the atmosphere.

The spacecraft is to spend at least two years in orbit, monitoring a full cycle of Martian seasons.

“I think we’re going to learn a tremendous amount,” Dr. Christensen said.

(By Kenneth Chang, writing for *The New York Times*, February 15, 2020)

- [注] Emirati アラブ首長国連邦 (the U.A.E.) の
bountifully 豊富に
pitfalls 落とし穴、思いがけない危険
nascent 初期の
flotilla 一隊
alignment 並び方
rover 探査車
infrared spectrometer 赤外分光計
ultraviolet spectrometer 紫外分光計
high-altitude perch 高度の高い位置
elliptical 楕円形の
swooped (swoop 急降下する)
has been understudied 十分に研究されていない

I - A 空所(Y)と(Z)に入るもっとも適切なものを次の1～4の中からそれぞれ一つ
選び、その番号を解答欄に記入しなさい。

- | | | | | | | | | |
|-----|---|-----------|---|-------------|---|-------------|---|--------------|
| (Y) | 1 | at | 2 | from | 3 | in | 4 | on |
| (Z) | 1 | Above all | 2 | By contrast | 3 | In addition | 4 | Without fail |

I - B 下線部 (a)~(g) の意味・内容にもっとも近いものを次の 1 ~ 4 の中からそれぞれ一つ選び、その番号を解答欄に記入しなさい。

(a) their American counterparts

- | | |
|-----------------------|--------------------------|
| 1 the American copies | 2 the American engineers |
| 3 the American hills | 4 the American skiers |

(b) a novel approach

- | | |
|------------------------|---------------------|
| 1 a familiar method | 2 a romantic path |
| 3 an economical manner | 4 an innovative way |

(c) pull off

- | | |
|--------------|-------------|
| 1 break down | 2 call off |
| 3 carry out | 4 give away |

(d) sow seeds

- | | |
|--------------------|---------------------------|
| 1 develop manpower | 2 eat nuts |
| 3 harvest plants | 4 increase the population |

(e) that ecosystem

- 1 the country that promotes the green revolution
- 2 the environmentally friendly workplace
- 3 the structure that nurtures its own people
- 4 the workplace full of greenery

(f) price tag

- | | |
|----------------|--------|
| 1 compensation | 2 cost |
| 3 reward | 4 toll |

(g) raged

- | | |
|-----------------------|-----------------------|
| 1 asked for criticism | 2 blew up wildly |
| 3 made off angrily | 4 sparked an argument |

I - C 波線部 (ア)~(ウ) の意味・内容にもっとも近いものを次の 1~4 の中からそれぞれ一つ選び、その番号を解答欄に記入しなさい。

(ア) it will not be exploring the red planet for NASA

- 1 the spacecraft to Mars is not an American project
- 2 the spacecraft to Mars is not made to investigate the red soil
- 3 the spacecraft to Mars is opposed by America
- 4 the spacecraft to Mars is unable to go to America

(イ) the Emirates bought a seat on a Russian Soyuz rocket

- 1 they arranged to put one of their own astronauts on a Russian rocket
- 2 they booked a ticket to a Russian science exhibition
- 3 they purchased a Russian chair made from aerospace material
- 4 they secured visas to Russia

(ウ) the dynamics closer to the ground that influence the rate of leaking

- 1 the cause identified as responsible for flooding
- 2 the cause specified for landslides
- 3 the mechanics concerned with atmospheric variations
- 4 the mechanics related to human reasoning

I - D 二重下線部の空所(あ)~(お)に次の 1~7 の中から選んだ語を入れて文を完成させたとき、(い)と(う)と(お)に入る語の番号を解答欄に記入しなさい。同じ語を二度使ってははいけません。選択肢の中には使われないものが二つ含まれています。

This (あ) is an important clue in the puzzle of understanding (い) early Mars, (う) was warmer and (え), turned into the cold, barren, (お) airless place it is today.

- | | | | |
|----------|---------------|-----------|-----------|
| 1 almost | 2 information | 3 neglect | 4 shorter |
| 5 wetter | 6 which | 7 why | |

I - E 本文の意味・内容に合致するものを次の1～8の中から三つ選び、その番号を解答欄に記入しなさい。

- 1 The U.A.E. is highly advanced in space technology and has launched many spacecraft to the solar system.
- 2 The U.A.E. assumes that it won't be able to produce as much petrol in the future.
- 3 Sarah al-Amiri said that the U.A.E. needed to foster talented people who could contribute to the nation's space development.
- 4 One of Hope's rival spacecraft is a joint development between China and Russia.
- 5 Despite its size, Hope required a great deal more money to build than other countries' spacecraft.
- 6 Although Hope was specifically designed to dig into the Martian surface, it was not equipped with advanced scientific tools.
- 7 In the summer of 2018, MAVEN measured the level of hydrogen on the surface of Mars.
- 8 Philip R. Christensen hopes that the equipment attached to Hope will help study the atmosphere.

I - F 本文中の太い下線部を it の意味を明らかにして日本語に訳しなさい。

Alternatively, it could have bought someone else's spacecraft design, which would have been the quickest path.

〔Ⅱ〕 次の文章を読んで設問に答えなさい。[*印のついた語句は注を参照しなさい。](71点)

Twin calamities* marked the end of the Cretaceous period*, and scientists are presenting new evidence of which drove one of Earth's great extinctions. (a)

Some 66 million years ago, forests burned to the ground and the oceans acidified* after the Chicxulub meteorite* hit Earth in the Gulf of Mexico. Around the same time, on the other side of the planet, erupting volcanoes were busy covering much of the Indian subcontinent with lava*, forming the Deccan Traps*.

One of these forces drove all dinosaurs except (Y) the birds extinct, and opened the evolutionary door for mammals until, eventually, humans arose. (ア) In the geologic equivalent of a murder mystery, which calamity actually did the deed is a debate that stretches back decades. Now, it seems, the case may finally be cracked. (b)

The meteorite, according to a team of scientists, was the chief perpetrator*, while the volcanism, driving climate change in the background, might have affected life's recovery in the wake of the impact.

"A lot of people have wanted to argue that both the impact and the volcanism mattered in the extinction," said Pincelli Hull, a paleontologist* and geology professor at Yale University who led the research, which was published Thursday in Science. "And what we're seeing is, it doesn't look like it. It's just the impact." (c)

"This is an elegant study that might finally untangle what happened at the end of the Cretaceous, when the dinosaurs died," said Stephen Brusatte, a vertebrate* paleontologist at the University of Edinburgh who was not involved in the research.

The untangling began in 2012 when Dr. Hull set sail aboard the

Joides Resolution, a research vessel, as part of the International Ocean Discovery Program. She and a team of scientists drilled into the seafloor below the North Atlantic and retrieved cores containing ancient ocean sediment*. One of their cores came from sediment coincidentally close to the wreckage* of the Titanic.

Sediment can deposit* as layers, which, like the pages of a novel, can hold clues that tell the story of (Z) the ancient world was like. In this case, it was like flipping to the last chapter of the dinosaurs' story, and finding out whether it was the meteorite or the volcanism that triggered the Cretaceous extinction.

Dr. Hull and her team drilled for layers that deposited around the time of the extinction. They knew those layers can preserve things like fossil plankton, which record information about global temperatures in the chemical makeup of their shells.

Some volcanic eruptions can emit great amounts of carbon dioxide into the atmosphere. This can drive global warming that can fuel a mass extinction.

For years, such volcanic-driven warming seemed like a potential culprit* because large amounts of lava erupted both before and after the extinction. With that idea in mind, Dr. Hull's team says that ancient temperatures should have been relatively high around the time of the crisis.

"We put together a global compilation of temperature change," Dr. Hull said.

The group found that global temperatures were much lower around the time of the extinction than they should have been if volcanoes were expelling large amounts of carbon dioxide. The volcanism, Dr. Hull ^(g) explained, stopped seeping* carbon dioxide into the atmosphere some 200,000 years before the Cretaceous ended and the age of mammals began.

That means any harmful warming caused by carbon dioxide was already over by the time the meteorite hit.

Volcanoes can erupt lava without emitting large amounts of gases, “suggesting carbon dioxide and lava aren’t necessarily coupled,” said Michael Henehan, a geochemist at GFZ Helmholtz Center in Potsdam, Germany, a co-author of the study who led a team last year that discovered that the oceans acidified right after the asteroid* hit.

This volcanism-induced warming, far-removed from the extinction, casts blame squarely on the Chicxulub event. “I’m sure the debate will rage on, because there are entrenched* voices on either side,” Dr. Brusatte said. “But it’s getting harder and harder to fathom* that the asteroid was innocent.”

After the meteorite struck, volcanic eruptions in India continued. On land, mammals proliferated relatively rapidly — on the scale of hundreds of thousands of years, according to recent research. In the oceans, it took about two million years for sea creatures like plankton to fully recover from the destruction.

Dr. Hull suspects the ways in (あ) life (い) on land and in the sea may have something to (う)(え) climate change driven by the volcanism that occurred (お) the extinction. But the precise reason for this isn’t clear.

“I don’t know if it’s the volcanism, or if it’s the internal workings of the ecosystems themselves,” she said.

For now, it’s another mystery to solve about the aftermath* of the Chicxulub impact.

(By Lucas Joel, writing for *The New York Times*, January 28, 2020)

[注] calamities 大災害
 the Cretaceous period 白亜紀
 acidified (acidify 酸性化する)
 the Chicxulub meteorite チクシュループ隕石
 lava 溶岩
 the Deccan Traps デカン・トラップ (インドのデカン高原に広がる階段状の地形)
 chief perpetrator 主な原因
 paleontologist 古生物学者
 vertebrate 脊椎動物の
 sediment 沈殿物
 wreckage 残骸
 deposit 堆積する
 culprit 原因
 seeping (seep 漏らす)
 asteroid 小惑星
 entrenched 確固とした
 fathom 推測する
 aftermath 余波

II - A 空所(Y)と(Z)に入るもっとも適切なものを次の1～4の中からそれぞれ一つ選び、その番号を解答欄に記入しなさい。

(Y)	1	for	2	from	3	in	4	on
(Z)	1	what	2	when	3	where	4	who

II - B 下線部 (a)~(i) の意味・内容にもっとも近いものを次の 1 ~ 4 の中からそれぞれ一つ選び、その番号を解答欄に記入しなさい。

(a) drove

- | | |
|-----------------|--------------|
| 1 brought about | 2 got over |
| 3 ran across | 4 took after |

(b) cracked

- | | |
|-------------|---------------|
| 1 collapsed | 2 complicated |
| 3 expanded | 4 solved |

(c) mattered

- | | |
|-------------------|-------------------|
| 1 were continuous | 2 were crucial |
| 3 were excessive | 4 were irrelevant |

(d) retrieved

- | | |
|-------------|-------------|
| 1 collected | 2 converted |
| 3 dissolved | 4 scanned |

(e) makeup

- | | |
|---------------|----------------|
| 1 compassion | 2 compensation |
| 3 competition | 4 composition |

(f) fuel

- | | |
|--------------|------------|
| 1 accelerate | 2 burst |
| 3 license | 4 suppress |

(g) expelling

- | | |
|-------------|---------------|
| 1 absorbing | 2 discharging |
| 3 gathering | 4 polluting |

(h) coupled

- | | |
|-----------------|-------------|
| 1 distinguished | 2 neglected |
| 3 related | 4 separated |

(i) proliferated

- | | |
|---------------|--------------|
| 1 launched | 2 multiplied |
| 3 transferred | 4 vanished |

II - C 波線部 (ア)~(ウ) の意味・内容をもっとも的確に示すものを次の 1~4 の中からそれぞれ一つ選び、その番号を解答欄に記入しなさい。

(ア) opened the evolutionary door for mammals

- 1 forced mammals to compete with dinosaurs
- 2 left a possibility for mammals to get out
- 3 offered a chance for mammals to develop
- 4 pushed mammals to the edge of extinction

(イ) flipping to the last chapter of the dinosaurs' story

- 1 changing the writings about dinosaurs' prosperity
- 2 spoiling the ending of the novel on dinosaurs
- 3 turning dinosaurs' destiny over
- 4 uncovering the last evidence of dinosaurs

(ウ) casts blame squarely on the Chicxulub event

- 1 argues against the significance of the meteorite
- 2 attributes the extinction to the meteorite
- 3 doubles the effect of the meteorite
- 4 ignores the role of the meteorite

II - D 二重下線部の空所(あ)~(お)に次の 1~7 の中から選んだ語を入れて文を完成させたとき、(あ)と(お)に入る語の番号を解答欄に記入しなさい。同じ語を二度使ってはいけません。選択肢の中には使われないものが二つ含まれています。

Dr. Hull suspects the ways in (あ) life (い) on land and in the sea may have something to (う)(え) climate change driven by the volcanism that occurred (お) the extinction.

- | | | | |
|-------------|---------|--------|--------|
| 1 after | 2 do | 3 how | 4 more |
| 5 recovered | 6 which | 7 with | |

II - E 本文の意味・内容に合致するものを次の1～8の中から三つ選び、その番号を解答欄に記入しなさい。

- 1 For decades, researchers had paid much attention to the two incidents that characterized the end of the Cretaceous period.
- 2 The research result by Pincelli Hull's team was severely criticized by Stephen Brusatte.
- 3 The International Ocean Discovery Program did not make any contribution to the research about dinosaurs.
- 4 The information read from the fossils of marine organisms played an essential role in Dr. Hull and her team's research.
- 5 Dr. Hull's team expected that the temperature would be high enough if the volcanoes triggered the extinction, and their expectation was fulfilled.
- 6 According to Dr. Hull's explanation, destructive global warming due to carbon dioxide had ended long before dinosaurs disappeared.
- 7 Michael Henehan is a member of the team that discovered that the chemical change in the sea attracted the meteorite to the Earth.
- 8 It took sea creatures less time to recover their numbers than it took land mammals.

〔Ⅲ〕 次の会話を読んで設問に答えなさい。(50点)

(Two classmates, Jun and Karen, are talking before class.)

Jun: Hey Karen, can I borrow your notes from last week's class?

Karen: _____ (a) _____ We missed you last week. Were you sick?

Jun: No, not at all. I had a job interview. I like to participate in the discussions during class. They help me tie everything together.

_____ (b) _____

Karen: I actually take notes during the discussions too, so you can read the important parts that you missed. Here you go.

Jun: Oh wow! This is great. I can't believe you type your notes.

_____ (c) _____ Sometimes I can't even read my own handwriting. Are you sure it is OK for me to take these?

Karen: Yeah, it is fine. I can print another copy for myself later. By the way, how did your interview go? _____ (d) _____

Jun: It was stressful but I think it went pretty well. The company said they would contact me in two weeks about their decision.

Karen: It must be difficult to wait. I would not be able to focus on anything else until I heard back.

Jun: Yeah, I am the same way. _____ (e) _____ Like the test we are having next week in this class! I really like this professor, but some of the concepts in this class are too difficult.

Karen: If you want to study together this weekend, let me know. I plan to study all day Sunday.

Jun: That sounds good. It will help me take my mind off the job interview. I will send you a message later so we can set up a time to meet.

Karen: I hate to ask since you are trying to avoid thinking about the

interview, but I haven't had any interviews yet, so I am curious.

_____ (f)

Jun: Well, it was at a large international company and the job is related to increasing sales in North America. I was worried I may make a mistake speaking English which is a requirement for the job.

Karen: You shouldn't worry. _____ (g)

Jun: I appreciate that but I know I make mistakes sometimes. Anyway, they used a lot of difficult terms about international trade.

Karen: Yeah, I can see why that would be stressful. I wouldn't know what to say in that situation.

Jun: Last year, I took a class on international economics, so [面接の中で挙げられたいくつかの話題には、私はなじみがあった。] I also had an internship over the summer at the US Embassy where I worked on trade promotion. I think I did a pretty good job responding to their questions, but a couple of times I was not sure what to say.

Karen: I am sure that is OK. After all, if it is a position for recent graduates, you are not expected to know everything already.

Jun: Let's hope so! It looks like class is starting. _____ (h)

Thanks for the notes. I will see you on Sunday.

Ⅲ - A 空所 (a)~(h) に入るもっとも適切なものを次の 1~10の中からそれぞれ一つ選び、その番号を解答欄に記入しなさい。同じ選択肢を二度使ってはいけません。選択肢の中には使われないものが二つ含まれています。

- 1 Do you think you will get the job?
- 2 Fortunately, I have a lot of free time this week.
- 3 I usually just use a spare sheet of paper.
- 4 Let's go to lunch.
- 5 Luckily, there are a lot of things to occupy my mind this week.
- 6 So, I hated to miss this class.
- 7 Sure, I happen to have a copy in my bag.
- 8 We should go to our seats.
- 9 Why was the interview stressful?
- 10 Your English is amazing!

Ⅲ - B 本文中の [] 内の日本語を英語で表現しなさい。

面接の中で挙げられたいくつかの話題には、私はなじみがあった。

以下余白

