

九州大学
前期

医学部 歯学部

平成29年度入学試験問題

英

語

コミュニケーション
英語 I・II・III
英語表現 I・II

(注意事項)

1. 問題冊子は指示があるまで開かないこと。
2. 問題冊子は15ページ、解答紙は6枚あります。「始め」の合図があったらそれぞれを確認すること。
3. 解答紙それぞれの2箇所に受験番号を記入すること。
4. 解答はすべて解答紙の所定の欄に記入すること。
5. この教科は200点満点です。なお、文学部については150点満点に、経済学部
経済工学科については300点満点に、農学部については250点満点に換算しま
す。

英

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[1] 次の英文を読み、設問に答えなさい。(45点)

Beginning over 40 years ago in the field of medicine, higher education in the United States and Europe has increasingly moved in the direction of boundary-crossing, problem-oriented, interdisciplinary learning and research. Now, over 70% of United States liberal arts universities offer major courses in interdisciplinary studies. In ever increasing numbers, graduate and undergraduate programs worldwide, including in Japan, are looking to discover the many benefits that can be expected when scholars from various disciplines open up and start working and researching together to solve important social and environmental problems. However, the focus that interdisciplinary studies courses place on problem solving causes unique complexities and difficulties.

⁽¹⁾ “Problem Based Learning” (PBL), for example, is one of the most popular methodologies associated with interdisciplinary work. The idea is relatively simple, at least in theory: instead of starting by studying the foundations of already established fields of knowledge such as psychology, economics, physics, and the like, in PBL you begin by identifying real-world problems that need solving. Next, you search for knowledge that can help reach a solution to the problem. Because you are working between disciplines, you can pick and choose from the best ideas that all the traditional areas of study have to offer. Also, and perhaps more importantly, because much of interdisciplinary work is done in groups, you can bounce ideas off your friends and teachers while also learning from their perspectives on the problem at hand. Working creatively and researching collaboratively in this way, PBL advocates assure us, will make possible new kinds of knowledge and new answers to the pressing problems of the 21st century.

But is PBL too good to be true? Beginning in the world of medical education, PBL was found to help students, teachers, doctors, and researchers to work and communicate more effectively as they tried various approaches to

solve actual problems that came up in medical practice. It is certain, however, that these medical students and doctors already shared a considerable amount of background knowledge (anatomy, chemistry, mathematics, etc.) from disciplinary-based studies done prior to entering medical school. Will PBL be as effective a learning tool when students, such as undergraduates, have less shared background knowledge that they can draw on to solve problems? Without the depth provided by the long-established courses of study in traditional majors, isn't it possible that interdisciplinary studies students will be too inexperienced to make deep connections and original discoveries? At this point, we simply do not know how effective PBL will turn out to be in practice.

More importantly, who gets to choose the problems studied in PBL? According to the literature in the field of education, it is not a good idea for teachers to simply tell their students in a top-down manner what problems they are to study. Instead, students and teachers need to collaborate with each other, use their creativity, and come up with "ill formed" problems — fuzzy problems — that can start the research process. As the work and communication continues, it is hoped, the problems with the field will become clearer, as will promising ideas and pathways towards possible solutions. But, one wonders, what happens when the process doesn't work — that is, what happens in PBL when its problems resist all clear solutions? What if group communication doesn't go well, and students get stuck and fail to progress? And how are teachers to grade individual PBL students? For example, how will they differentiate between active group leaders and less positive students who just follow other group members?

While such questions remain unanswered, as interdisciplinary studies programs continue to grow in popularity worldwide it seems likely that many schools will look to combine some of the clarity and structure of the traditional academic disciplines with the creative and open-ended qualities of PBL and other interdisciplinary study techniques. A kind of hybrid education, combining

the best of interdisciplinary studies with the best of disciplinary studies, may often be the most prudent path forward. _____ students and teachers need to be motivated to learn, eager to go outside their comfort zone to find new knowledge, and ready to communicate their ideas in the most effective ways in order to succeed. It is this writer's hope that the new ideas and possibilities of interdisciplinary studies will lead both teachers and students to rethink and more deeply appreciate the meaning of higher education and its many powerful contributions to the world around us.

問 1. 下線部“Problem Based Learning” (PBL) の特質と利点を本文の内容に則して 200 字以内の日本語でまとめなさい。ただし、句読点も字数に含む。また、英文字も 1 字とする。

問 2. 下線部(2)を日本語に訳しなさい。

問 3. 下線部(3)が表すものに最も近いものを、以下の(A)~(D)のうちから一つ選び、記号で答えなさい。

- (A) What should be done if students reject PBL and leave the course?
- (B) What should be done if PBL students reach overly simple conclusions?
- (C) What should be done if PBL doesn't lead students to good answers?
- (D) What should be done if PBL students don't understand their courses?

問 4. 下線部(4)の空所に入る最も適切なものを以下の(A)~(D)の中から一つ選び、記号で答えなさい。

- (A) In this way, top-down PBL has been proven to be the most effective university teaching technique:
- (B) Learning and teaching methods only work for short periods of time, for the following reasons:
- (C) Nevertheless, there are several reasons why PBL has failed to work in American universities:
- (D) No matter what teaching and learning techniques are implemented, some truths about education remain unchanged:

[2] 次の英文を読み、設問に答えなさい。(61点)

At 2 a.m., in the dark morning hours of June 28th, Mark Zuckerberg woke up and got on a plane. He was traveling to an aviation testing facility in Yuma, Arizona, where a small Facebook team had been working on a secret project. Their mission: to design, build, and launch a high-altitude solar-powered plane, in the hopes that one day a fleet of the aircraft would deliver internet access around the world.

Zuckerberg arrived at the Yuma Proving Ground before dawn. A core group of roughly two dozen people work on the drone airplane, named Aquila, in locations from Southern California to the United Kingdom. For months, they had been working in rotations in Yuma, a small desert city known primarily for its brutal summer temperatures. On this day, Aquila would have its first functional test flight: the goal consisted of taking off safely, stabilizing in the air, and flying for at least 30 minutes before landing. "I just felt this is such an important milestone for the company, and for connecting the world, that I have to be there," Zuckerberg says.

As the Sun rose over the desert, a crane lifted Aquila onto the dolly structure that would propel it into the sky. The drone has a tremendous wingspan: 141 feet, compared to a Boeing 737's 113 feet. And yet Facebook engineered Aquila to be as light as possible to permit ultra-long flights. Built of carbon fiber, this latest version of the drone weighs only 408 kilograms. A remote control operator activated the dolly, and Aquila began rumbling down the runway. When it reached sufficient speed, Aquila lifted into the air, where it floated up its test altitude of 2,150 feet and stabilized. On the ground, Facebook's employees were elated; some wiped away tears. "It was this incredibly emotional moment for everyone on the team who's poured their lives into this for two years," Zuckerberg said.

Watching from below, Zuckerberg was struck by Aquila's deliberate, unhurried pace. "It flies really slowly," he said two weeks later, at Facebook's headquarters in Menlo Park, California. "Most times when people are designing planes, they're designing them to get people or things from place to place, so there's no real advantage to moving slowly. But if your goal is to stay in the air for a long period of time, then you want to use as little energy as possible — which means going as slowly as you physically can, while not falling out of the air."

Okay — but why a plane? There are lots of ways to bring the internet to people that don't involve designing your own drone. There are satellites, which are good at delivering internet access to wide geographical areas. But they're only effective in areas with low population density — too many users can consume the bandwidth in a hurry. There are cellular towers, which excel at connecting dense urban populations. But building enough cellular towers to cover the entire Earth is considered too expensive and impractical, even for Facebook.

In 2014, Zuckerberg wrote a paper analyzing various methods of internet delivery. High-altitude drones, he said, could serve a huge audience of people who live in medium-sized cities or on the outskirts of urban areas. They fly closer to the ground than satellites, meaning their signals are stronger and more useful to larger populations. And they fly above regulated airspace, making them easier to deploy. If Facebook could build a drone that gathered most of its power from the Sun, Zuckerberg reasoned, it could fly for 90 days. A laser communications system could deliver high-speed internet to base stations on the ground, connecting everyone within 50 kilometers. If the drones could be built cheaply enough, they would one day dot the skies, and become a critical piece of the global internet infrastructure.

When will a fleet of Aquila drones bring data to the world? Facebook won't say. There are several technical challenges remaining in getting Aquila

(4)

to reliably fly 90-day stretches. The team hasn't yet implemented solar panels on the prototype — the test flight plane ran using batteries only. The team is still working out how to build batteries with a density high enough to sustain lengthy missions. They also “need to develop more efficient on-board power and communication systems; ensure the aircraft are resistant to structural damage to reduce maintenance costs and able to stay aloft for long periods of time to keep fleet numbers low; and minimize the amount of human supervision associated with their operation,” said a project engineer.

The path forward for Aquila isn't totally clear, and it's bound to encounter more bumps along the way. But Zuckerberg is resolute: billions of people who can't access the internet deserve it. A single test flight represents a tiny step toward getting there. But it also gives Facebook a dramatic success to rally around. “I think the future is going to be thousands of solar-powered planes on the outskirts of cities and places where people live, and that's gonna make connectivity both available and cheaper,” Zuckerberg says. “And, I think, that can help play an important role in closing this gap of getting more than a billion people online. This is an early milestone, but it's a big one.” Zuckerberg smiled. “It's not something you necessarily expect Facebook to do — because we're not an aerospace company,” he said. “But I guess we're becoming one.”

問 1. 下線部(1)が表す内容を、具体的に日本語で説明しなさい。

問 2. 本文によると Aquila は普通の飛行機といくつかの点で異なるように設計されている。そのうちの三つを日本語で答えなさい。それぞれを①から③の解答欄に記入すること。

問 3. Aquila のような飛行機が実用化された場合、satellites や cellular towers を用いるより優れている点を本文の内容に則して日本語で説明しなさい。

問 4. 下線部 milestone に最も近い意味を表すものを以下の(A)~(D)の中から選
⁽²⁾
び、記号で答えなさい。

- (A) breakthrough
- (B) deadweight
- (C) density
- (D) objection

問 5. 下線部 elated に最も近い意味を表すものを以下の(A)~(D)の中から選
⁽³⁾
び、記号で答えなさい。

- (A) exhausted
- (B) indifferent
- (C) overjoyed
- (D) regretful

問 6. 下線部 several technical challenges が指す内容のうち三つを日本語で具
⁽⁴⁾
体的に答えなさい。それぞれを①から③の解答欄に記入すること。

問 7. 次の(A)~(G)の中から、本文の内容から正しいと判断できるものを三つ選
び、記号で答えなさい。

- (A) Aquila is currently able to take-off and land by itself.
- (B) Aquila will rapidly replace cellular towers in densely populated areas.
- (C) Facebook headquarters are located in Yuma.
- (D) Mark Zuckerberg spent time flying in Aquila.
- (E) Planes like Aquila can replace some functions of satellites.
- (F) Planes like Aquila will be able to fly both day and night.
- (G) The main project team consists of less than 30 members.

[3] Read the following passage and answer the questions below. (42 点)

Ecological systems are the products of the organisms that inhabit them. All organisms, to greater or lesser degrees, interact continuously with their physical environment and with each other. In some cases, their impact on ecosystems may be disproportionate to their size. Elephants and other grazing animals have made the Serengeti plains what they are, from the characteristics of the grasses on which they tread to the chemical structure of the soil. Billions of years ago, photosynthetic bacteria* created the earliest form of the atmosphere as we know it — and, not coincidentally, sparked the first Ice Age. All organisms have a constant and never-ending impact on their ecosystems.

In the long span of human history, the vast majority of environmental damage has occurred in only the past three centuries. Fueled by industrialization and modernization, humans have generated large volumes of certain gases, altered the acidity of rivers, used up underground water sources, introduced alien species, and impoverished landscapes as they extract and consume resources. Surprising numbers of species have been driven to extinction as human populations have grown worldwide. Human activity has clearly had an enormous effect on the natural environment.

Humans, however, are not unique in their power to reshape environments locally or globally. Burrowing rodents**, for example, maintain vast grasslands rich in their favorite foods by continuously turning the soil and discouraging the growth of forests. Sheep, brought to Mexico with the European settlement, created their own grazing land through the action of their hooves on the soil. Then there are the not-so-humble roles of microbes, worms, and other invertebrates*** in soil formation and rejuvenation. Some plant species have redefined the conditions of natural selection for countless living things and geological processes alike. The lesson is that humans, in their effects on the environment, are on a par with many other organisms.

The key to comprehending environmental history is an understanding of the bonds that have formed between humans and other species, for these have generated co-evolutionary processes with their own logic and drive. In many ecosystems today, humans are the dominant species. But such dominance cannot exist apart from the systems and processes that sustain it. The effects of environmental trauma are real, but they are a product of scale, not human ⁽²⁾exceptionalism. Although the human impact on the planet today is surely the result of human actions and behavior, this should never be confused with intention or control. Nature, much like human society, typically declines to follow the scripts we sometimes choose to write for it.

Notes:

photosynthetic bacteria*: bacteria that use sunlight to produce nutrients

burrowing rodents**: animals with strong sharp front teeth that dig holes,
such as prairie dogs

invertebrates***: living creatures that have no backbone

Q 1. Translate the underlined part (1) into Japanese.

Q 2. According to the first paragraph in this passage, the impact of “elephants and other grazing animals” and “photosynthetic bacteria” on their environments “may be disproportionate.” What does “disproportionate impact” mean in this context? Explain in Japanese.

Q 3. Choose the most appropriate meaning of the underlined words or phrases (i)–(iv). Write the correct letter (A, B, C, or D) on your answer sheet.

(i) not coincidentally

- A. as a result
- B. by chance
- C. randomly
- D. unexpectedly

(ii) impoverished

- A. deleted
- B. improved
- C. increased
- D. weakened

(iii) not-so-humble

- A. arrogant
- B. harmonious
- C. key
- D. minor

(iv) on a par with

- A. distinct from
- B. handicapped by
- C. less than
- D. similar to

- Q 4. Which of the following (A, B, C, or D) best summarizes the meaning of the final paragraph of this passage?
- A. Humans have limited control over nature.
 - B. Humans have to join together with nature.
 - C. Humans must choose how to control natural environments.
 - D. Humans will continue to destroy nature.
- Q 5. The final paragraph includes the underlined part environmental trauma⁽²⁾ to describe negative effects on nature. Which of the following (A, B, C, or D) is NOT used as an example of “environmental trauma” in this passage?
- A. air composition change
 - B. animal extinction
 - C. soil production
 - D. water quality change

[4] Read the passage and follow the instructions below. (30 点)

Tourism is a booming industry in Japan today, and more international tourists than ever are visiting the country and contributing to the Japanese economy. A popular American travel magazine has selected Kyoto as the most attractive tourist destination in the world for two straight years. International visitors are now common in Sapporo, Tokyo, Fukuoka, and other Japanese cities as well.

Instructions: Write a well-developed paragraph in English consisting of around 100 words, answering the following question:

What can people in Japan do to improve the experiences of international tourists?

〔5〕 次の文章の下線部(1), (2)を英語で表現しなさい。(22点)

宇宙というのは、日本やアメリカだけでなく、世界の多くの人たちに、限らない夢を与え続けてくれる創造の空間だと思います。本当に果てしない世界だと思いますし、その価値を共有して、みんなで宇宙を使っていくこと、宇宙に進出していくことで、より豊かな社会、生活が実現できると思います。それと同時に、より平和な世界を築くことにも貢献できるのかなと思います。

ですから、みなさんが実現不可能だと思ふようなことも、これから10年、20年経ってみると、⁽¹⁾実は当然のように形になっていることが多いのではないかと思います。宇宙もその一つで、遠くない将来、本当に身近な存在になるでしょう。私も子供のころは、自分が宇宙飛行士になれるとはまったく思っていませんでした。でも今は、国際宇宙ステーション計画という国際協調の体制の中で、このような仕事をさせてもらっています。

宇宙分野だけではなく世の中には、本当に素晴らしいものがたくさんあります。⁽²⁾若い人たちには自分なりの目標を見つけて、それに向かって真剣に努力していってほしいな、と思います。