

九州大学
前期

医学部
歯学部

平成28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11ページ、解答紙は5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。

[1] 次の英文を読み、設問に答えなさい。(58点)

Mathematics is taught in schools at all levels, four to five times a week. Undoubtedly, most mathematics schoolwork involves problem solving. The term “problem solving” has become a slogan encompassing different views of what education is, of what schooling is, of what mathematics is, and of why we should teach mathematics in general and problem solving in particular.

Although problem solving in mathematics has been taught from the time of the Greeks, the concept of problem solving has changed dramatically in the last decade. In the past, “problem solving” has referred mainly to the application of ready-made *algorithms to the solution of routine exercises and word problems. However, the assessment of mathematics skills for the 21st century should focus on the capacity of students to analyze, reason and communicate effectively as they pose, solve and interpret mathematical problems in a variety of situations involving quantitative, spatial, probabilistic or other mathematical concepts. Students have to be “mathematically literate”⁽¹⁾—they have to possess mathematical knowledge and understanding, apply the knowledge and skills in key mathematical areas, and activate their mathematical competencies to solve problems they encounter in life.

The term “problem solving” has two components: the type of problem to be solved, and the knowledge and skills needed to solve the problem. The traditional type of mathematical problem includes arithmetic computations, certain equations, geometry problems and “routine” word problems that usually consist of two or three sentences that include the mathematics information, and a question that guides the students in constructing the appropriate equation to solve the problem. In geometry, students are presented with the properties of shapes and *theorems for proofs. Usually, all the information needed is given in the problem, and the students are asked to apply the theorems in what has to be proven.

Clearly, the skills needed to solve these types of problems are limited, and teaching these skills usually consists of demonstrating the appropriate technique followed by a series of similar problems for practice. Most of the problems in mathematics textbooks are these kinds of routine problems, where it is usually obvious what mathematics is required; therefore memorization is the most important skill needed.

In contrast to these traditional mathematics problems, the type of mathematics tasks suitable for the 21st century⁽²⁾ differs not only in the content, construct and contexts in which the problems are posed, but also in the processes needed to solve the problems. The content brings up the mathematical big ideas, the context often relates to authentic real-life situations ranging from personal to public and scientific situations, and the constructs are more complex than in traditional problems. Problems may include mathematical information that is not always presented in an explicit form, and may also have multiple correct answers. These problems for tomorrow's world may consist of a full paragraph of text in which the mathematics information is embedded. Students are asked to make decisions based on their mathematical knowledge and the processes they carried out. Quite often, the problems include different kinds of representations, and sometimes also require students to search for additional information either using computers or other sources. Computational problems may also differ from the traditional ones in asking students not only to carry out the computations but also to explain their reasoning and how they solved them.⁽³⁾ Often, students are asked to solve the given problem in different ways, to suggest creative solution processes, and to reflect on and criticize their own solution and that of others. This is not to say that routine exercises and problems are to be excluded from the curriculum. (4), routine problem solving is necessary for practicing, attaining mastery and being able to respond automatically. But mathematics education has to go beyond routine problems

to include innovative problems that are complex, unfamiliar and non-routine.

Another characteristic of mathematics problems suitable for the 21st century is that there could be multiple correct solutions. Innovative problems such as those described above are authentic and presented in real-life contexts that often pose questions to which there is more than one correct answer. The solution of problems which may have multiple correct answers depends on the basic assumptions that the solver adopts. On the basis of these assumptions, the solver constructs a flowchart with multiple routes. Working in groups may ⁽⁵⁾ expose the solver to other sets of assumptions for which there are different solutions, and/or different strategies for solution. Under these circumstances, it is essential for learners to reflect on the outcome and the processes used.

In summary, new types of mathematics problems that go beyond ⁽⁶⁾ traditional problem solving are likely to be better adapted to preparing students for a real-life use of mathematics. These types of problems refer to formal as well as to authentic situations, involve coordination of previous knowledge and experiences, include various representations and patterns of inferences, have one or multiple correct solutions, and prompt reflection on all stages of problem solving.

Notes:

*algorithm: a process or set of rules to be followed in calculations or other problem-solving operations

*theorem: a rule or principle, especially in mathematics, that can be proved to be true

問 1. 下線部(1)の“mathematically literate”とはどういうことか。本文の内容に即して日本語で説明しなさい。

問 2. 下線部(2)の the type of mathematics tasks suitable for the 21st century の趣旨に合わないものを A～Dの中から一つ選び、記号で答えなさい。

- A. Students may have to use outside sources to find necessary information to solve the problem.
- B. Students are guided in using certain equations for solving the problem.
- C. Students are expected to employ a creative solution process.
- D. Students are asked to solve complex problems that are associated with their everyday life.

問 3. 下線部(3)を日本語に訳しなさい。

問 4. 空所(4)に入る最も適切な語句を以下の A～Dの中から一つ選び、記号で答えなさい。

- A. However
- B. By the way
- C. On the contrary
- D. In addition

問 5. 筆者によると、下線部(5)の Working in groups にはどのような利点があるか。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. Collaboration with others is the key to academic success in the 21st century.
- B. Working with others helps students to learn a number of possible solutions.
- C. Collaborative learning helps students to reach the outcomes they want quickly.
- D. Working in teams reflects the way science is practiced in the real world.

問 6. 下線部(6)を日本語に訳しなさい。

〔2〕 次の英文を読み、設問に答えなさい。(50点)

There's nothing better than going out with friends for a meal, but even
(1) though you may all get on well, you also have a natural tendency to want to
stand out from the crowd and not to seem to be following the herd. Studies
have shown that when people make a choice from a menu, whether it's for food
or drink, and hear what other people have chosen first, they are much more
likely to go for something different to the others. This even extends to
ordering something they don't really want — or certainly don't want as much
as a popular choice — if it prevents them from looking like a sheepish follower.

It might seem that this is because the group around the table is going to
share each other's choices, so they want a more varied selection — but outside
of particular cuisines where this is the norm, there is no evidence of this
happening; people just grimly eat their substandard choice.
(2)

(3) There is a simple way to avoid this. When selecting from a menu with a
group, make sure you choose what you want before any discussion of what
people are going to order — and once you make your choice, stick with it.
Avoid the temptation to switch away from what you really wanted in order to
maintain a difference and you'll have a more enjoyable meal. Sometimes
psychology means a degree of tricking yourself to get what's best.
(4)

In recent years we have had a whole new opportunity to study human
attempts to stand out from the crowd in the way we use social media. There
have been some studies of the way that celebrities use Twitter in particular to
share personal information to reinforce their celebrity status. This practice
seems to have encouraged others, who don't have a natural group of followers,
to aggressively attack others on social media to make themselves stand out,
generating a form of artificial celebrity. As yet there has been relatively little
work done on the psychology of those who misuse social media, but it seems
that, as in the real world, the best way to gain attention in social media is not
(5)

to create artificial celebrity, but rather to achieve something of value in its own right that will bring with it personal distinction.

問 1. 下線部(1)を日本語に訳しなさい。

問 2. 下線部(2)の this が指す内容を日本語で述べなさい。

問 3. 下線部(3)が表す状況として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. willingly share various dishes with other people at the same table
- B. disappointedly eat what others recommended as the best
- C. seemingly enjoy being different from others in their choices
- D. reluctantly eat something that is not what they really wanted

問 4. 下線部(4)は食事の注文の際にどのような行動をとることを意味しているか。本文の内容に即して日本語で具体的に説明しなさい。

問 5. 下線部(5)を日本語に訳しなさい。

[3] Read the following passage and answer the questions below. (70 点)

Much recent debate has focused on the fact that scientific and technical careers are still dominated by men. Although many women begin their studies in these fields, their numbers drop at every stage of educational and professional advancement. At the undergraduate level in the U.S., about half of all students are women. Yet in the field of science, technology, engineering and math—STEM for short—women account for only 39 percent of bachelor's degrees and 35 percent of ⁽ⁱ⁾ Ph.D.s. At the end of this leaky educational pipeline, only 27 percent of the people working in STEM-related occupations are women.

Educators and policy makers have developed various strategies to encourage women to stay in STEM careers, but the effectiveness of these ⁽¹⁾ campaigns could be improved. Measures to increase the number of women in these careers typically center on the barriers, biases and stereotypes that discourage them—a so-called prevention focus. The obstacles can be discouraging, but emphasizing only the negatives can cause women to lose confidence. Psychological studies find that when students feel that life events are out of their control, their performance suffers. Similarly, teaching women about the psychological burden of stereotypes without giving them tools to overcome these challenges can be counterproductive.

⁽ⁱⁱ⁾ In contrast, recent research in behavioral science suggests that acknowledging burdens and barriers while emphasizing the potential benefits of pursuing a scientific career—a promotion focus—can help women develop effective strategies to cope with the challenges they face in STEM fields. A promotion focus encourages a new type of flexible thinking that can change the way women perceive their own careers. This thought process also stimulates creativity, which ultimately ⁽ⁱⁱⁱ⁾ will help them flourish in scientific and technical careers. What is more, the evidence from these studies and those of other investigators shows that a diverse workforce will foster innovative ideas

from (2).

Research in social cognition reveals that focusing on the benefits of a career can counteract a well-known effect of bias: the psychological phenomenon of stereotype threat. Even brief reminders of a commonly held stereotype — in this case, the idea that women are inherently less talented in math and science — can actually degrade performance.^(iv)

In a 2012 study at a university in the Netherlands, psychologists told female students that they would be doing a task that tested gender differences in math skills, an instruction designed to artificially create stereotype threat. Before turning to the task, the students were asked to participate in an experiment. They were given a piece of paper which contained a maze and a cartoon mouse. If the participants were told the mouse was at risk of being captured by an owl — that is, encouraged to enter into a prevention-focused mind-set — their performance in the math test conducted after the maze task suffered. On the other hand, if they were encouraged to help the mouse reach a piece of cheese — that is, a promotion-focused mind-set — the stereotype threat had no impact on their math performance later on.

These insights from the above findings could inspire a wave of promotion-focused campaigns to improve the retention of women in STEM fields. Encouraging a promotion-focused approach could motivate women to choose career paths without being influenced by stereotypes.⁽³⁾

- Q 1. What does the phrase “these campaigns” refer to? Explain in Japanese.
(1)
- Q 2. Choose the most appropriate expression to fill in the blank (2) based on the information given in this passage. Write the correct letter (A, B, C or D) on your answer sheet.
- A. men rather than women
 - B. specialists in particular
 - C. men and women alike
 - D. researchers in behavioral science
- Q 3. According to the information given in this passage, what is “a promotion-focused approach”? Explain in Japanese.
(3)
- Q 4. Choose the most appropriate meaning for questions (i)–(iv). Write the correct letter (A, B, C or D) on your answer sheet.
- (i) account for
- A. possess
 - B. constitute
 - C. contribute
 - D. consist
- (ii) counterproductive
- A. harming their performance
 - B. enhancing their performance
 - C. transforming their performance
 - D. lasting their performance

(iii) ultimately

- A. by and large
- B. to some extent
- C. after all
- D. from time to time

(iv) inherently

- A. hardly
- B. generally
- C. unfortunately
- D. naturally

Q 5. In your opinion, what are some advantages if men and women can choose their career paths without being influenced by gender stereotypes?

Write a brief essay in English consisting of around 100 words.

〔4〕 次の文章の下線部(1), (2)を英語で表現しなさい。(22点)

自分だけ鼻があるのがご自慢の鼻卵君—くしゃみで割れた

他の卵たちにはない鼻があるのを誇っていた卵が、ある時くしゃみをして割れてしまった。—この短歌が描いているのは、そのような小さな、空想の物語である。これはまた、環境破壊や核戦争などの危機に直面している人類のたとえである⁽¹⁾ 私たちは地球上で文明を築き上げた唯一の生き物だが、⁽²⁾ 気をつけないと、まさにその文明が原因で絶滅してしまうかもしれないのである。