

(令 3 前)

外 国 語

英 語

(問題部分 1 ～ 12 ページ)

注意 解答はすべて答案用紙の指定のところに記入しなさい。

外国語 (英 語) 125 点

I 次の文章は、近年のミツバチの減少について書かれたものである。この文章を読んで、問1～4に答えなさい。(配点35点)

The Food and Agriculture Organization of the United Nations (FAO) states that there are 100 crop species that provide 90% of the food around the world and 71 of these are pollinated* by bees. In Europe alone, 84% of the 264 crop species and 4,000 plant varieties exist thanks to pollination by bees.

In Europe, bee populations and honey reserves have declined dramatically since 2015 — by 30% per year in some areas. And the latest statistics from beekeepers in the USA are not much more (A) — according to the Bee Informed Partnership poll, last winter 37% of honeybee colonies* died, 9% more than the usual average for winter deaths. But why are these insects disappearing?

In Oregon 50,000 bees died due to the effects caused by a pesticide; this is an example of how different substances can have an impact. The European Food Safety Agency (EFSA) confirmed that the cause behind the mass death of bees in Europe is specifically the use of a particular type of fertilizer* called neonicotinoids. The mixture of substances (B) with the learning circuits in insects' brains. They make the bees slower to learn or they completely forget basic associations for their survival, such as linking floral aroma and food. The bees die as they are not able to feed themselves.

In 2018, the European Union decided to completely ban outdoor use of three neonicotinoid insecticides* that are frequently used worldwide in corn, cotton and sunflower crops. And the European Parliament has already proposed that (C) usage of these insecticides should become a key objective of the common agricultural policy (CAP) in the future.

The Varroa mite* is one of bees' greatest enemies and one of the biggest causes of their disappearance. It is an external parasite that invades the insect and feeds on its blood and also transmits lethal viruses to the rest of the hive, including deformed wing virus*. This mite has spread across most of the world, except Australia so far.

A group of scientists from the University of Texas at Austin, USA, have developed a

project that is pioneering the use of genetic engineering to improve bee health. The project involves creating genetically modified strains of bacteria* that live in the honeybees' digestive system to protect them from this destructive mite that causes colonies to collapse.

According to the study, bees with genetically modified bacteria are 36.5% more likely to survive deformed wing virus. Mites that feed on these bees are 70% more likely to die than mites that feed on bees that have not received any treatment.

Air pollution also reduces the strength of chemical signals sent out by flowers, causing bees and other insects to find it more difficult to locate them. Climate change makes the situation even worse as it alters flowering and the amount of plants due to rainy seasons, which affects the quantity and quality of nectar*.

In (D) of the above, the disappearance of bees would cause a true food crisis. Around 84% of commercial crops depend on bee pollination. For example, in Andalusia (Spain) in 1987 a good sunflower harvest was expected but this did not occur due to the lack of beehives; this was caused by the loss of bees from the Varroa mite.

As for the elimination of the Varroa mite and the ban of the pesticides, we will have to wait and see how effective the measures are in preventing the loss of bees. We can fight this problem in our everyday life by taking steps to combat climate change and pollution. Even so, we are faced with questions such as: Are we in time to fix it or should we also work on preventing this phenomenon? Are other animals disappearing that at first do not seem to be essential yet without whose activity we could not conceive life?

注 pollinate ～に受粉する； honeybee colonies ミツバチの蜂群
fertilizer 肥料； insecticides 殺虫剤
mite ダニ； deformed wing virus 羽変形病ウイルス
strains of bacteria バクテリアの菌株
nectar 花蜜(ミツバチが集める花の蜜)

問 1 空所(A)～(D)に入る最も適切な語を、それぞれの選択肢から一つ選び、記号で答えなさい。

(A) (ア) depressing (イ) reassuring (ウ) suggestive (エ) trustworthy

(B) (ア) accords (イ) cooperates (ウ) copes (エ) interferes

(C) (ア) assuring (イ) developing (ウ) reducing (エ) supporting

(D) (ア) advance (イ) light (ウ) order (エ) spite

問 2 下線部(1) the study とはどのようなものか、その目的と方法が具体的に分かるように、35 字以内の日本語で説明しなさい(ただし、句読点も 1 字に数えます)。

問 3 ミツバチの減少に対してとられているさまざまな方策について、筆者はどのような態度を示しているか、25 字以内の日本語で説明しなさい(ただし、句読点も 1 字に数えます)。

問 4 下線部(2)を日本語に訳しなさい。

II 次の文章は、「STEM 教育」について書かれたものである。この文章を読んで、問 1～5 に答えなさい。(配点 35 点)

Women and girls are underrepresented in science, technology, engineering, and mathematics (STEM) education and careers. One prevalent explanation for women's underrepresentation in STEM is the gender gap in math performance favoring males, particularly spatial skills. Research suggests that gender gaps in math performance emerge in middle school or high school; however, meta-analyses* indicate this gap has disappeared.

Given the evidence from meta-analyses, an ability explanation for women's underrepresentation in STEM is less plausible; many other explanations, including broad contextual factors (societal expectations, parental and peer influence, and climate within STEM majors and organizations) and women's motivations, math ability self-assessment, and choices, are well-supported. From a sociocultural perspective, research has documented how environments dominated by males can be threatening to women and girls and can elicit stereotype threat, which can lower their sense of belonging, increase feelings of exclusion and isolation, and lead to disengagement from the domain.

Stereotype threat is the phenomenon in which members of a stereotyped group worry that their performance on an evaluative task will be judged according to a negative group stereotype indicating inferiority in the domain. The stereotype relevant to STEM education is that women and girls are not as competent in math as men and boys. Thus, when women and girls take math tests, they may worry that their performance will be judged according to this stereotype and they may fear confirming the stereotype if they perform poorly. This threat can lead to negative outcomes such as poor test performance and disengagement from the domain.

Arguably, the most widely studied academic performance outcome for women in the stereotype threat literature is math test performance; other less frequently studied outcomes include more negative attitudes toward the domain and lower intentions to

pursue education and careers in the domain. For example, it was found that women taking a math test had poorer performance when they were told the test was diagnostic of math ability than when they were told the test was not diagnostic. In a diagnostic testing situation, women performed poorly because they feared confirming the stereotype that “women are not as good at math as men” ; when women were told that no gender differences have been found on a math test, the women performed better than when no such information was given. Thus, stereotype threat is one factor in women’s underperformance in math. If women are worried about validating gender stereotypes regarding women’s math ability, this additional cognitive burden may lead to (A) performance, feeling a (B) of belonging in the field of mathematics,⁽²⁾ and (C) the domain.

As shown by these results, one important variable examined in stereotype threat research is gender identity, or the centrality and importance a person places on gender as part of one’s larger self-concept. Research on gender identity among adults has shown that women who strongly identify with their gender are more vulnerable to the^(c) negative effects of stereotype threat, presumably because they care more about confirming stereotypes that reflect poorly on their gender group. Performance pressure, not wanting to make the group look bad, or group-level stereotype threat, leads to underperformance for women who are highly gender identified.

However, a recent study showed that because stereotype threat is triggered within⁽³⁾ educational contexts, it can be reduced through interventions to promote mathematics and science education, thus improving the educational pipeline leading to good careers in STEM. Educators, parents, practitioners, and policy makers can learn more about stereotype threat through many publicly accessible resources and partner with social scientists to carry out these interventions on a large scale.

注 meta-analyses メタ分析(複数の研究結果を統合し、より高次の見地から行う分析)

問 1 下線部(a)~(c)の単語または語句について、本文中における意味に最も近いものを、それぞれの選択肢から一つ選び、記号で答えなさい。

(a) prevalent

- (あ) common
- (い) exclusive
- (う) immediate
- (え) possible

(b) elicit

- (あ) get rid of
- (い) give rise to
- (う) put up with
- (え) be concerned about

(c) vulnerable to

- (あ) highly resistant to
- (い) easily influenced by
- (う) relatively indifferent to
- (え) strongly encouraged by

問 2 次の文は、下線部(1)This threat の内容を説明したものである。本文の内容に即して、空所 [イ] と [ロ] に入る適切な日本語の文を書きなさい。

[イ] というステレオタイプの影響によって、[ロ] のではないかという脅威
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問 3 下線部(2)の空所(A)～(C)に入る最も適切な単語の組み合わせはどれか。選択肢(あ)～(え)から一つ選び、記号で答えなさい。

	(A)	(B)	(C)
(あ)	different	state	improving
(い)	improved	sense	entering
(う)	inferior	fail	rejecting
(え)	lower	lack	leaving

問 4 下線部(3)を日本語に訳しなさい。

問 5 本文の内容と合致する文を選択肢から二つ選び、記号で答えなさい。

- (あ) Educational interventions can pave the way for women to pursue rewarding careers in STEM fields.
- (い) The possible factors that explain women's underrepresentation in STEM are relatively predictable.
- (う) Gender gaps in math performance which emerge in early childhood education tend to increase over time.
- (え) Male-dominated environments can lead to stereotype threat, resulting in lower math performance of women.
- (お) Decreasing a feeling of exclusion is pivotal in building women's negative attitudes toward STEM majors and careers.
- (か) Women are more likely to perform well on math tests when they are informed that their math ability is being assessed.

Ⅲ 次の文章は、アメリカのある経営学大学院での“Digital Transformation”という授業における議論の一部である。この文章を読んで、問1～4に答えなさい。(配点30点)

Student A: Artificial intelligence, or AI is a powerful technology. If humankind can find a way to regulate and use AI ethically, I truly believe this technology will bring unparalleled advancement and benefits to our way of living.

Professor: There is a problem, and it comes with the use of that one single word: ethically. AI may have amazing potential, but the fast-moving technology needs to be employed carefully and thoughtfully.

Student A: If AI is not regulated, a lot of harm can be done.

Professor: For some three decades, digital technology has continued its never-⁽¹⁾ending march of progress, remaking and disrupting a wide range of industries. Looking at the efforts of organizations to transform themselves digitally today, we are going to examine some cases that investigated AI ethics.

Assistant Professor: It's a timely topic. I think the public is becoming more aware of the effect of algorithms* and AI. Digital transformation should be responsive to not only customer needs, but also to the consequences it has for society.

Student B: I think AI is going to drastically change the way businesses operate in the very near future. I hope that the major corporations, and citizens of the globe, will ensure it is rolled out responsibly.

Assistant Professor: We are in a reflection phase. There is a movement. Companies are starting to realize they have to be responsible in how they use this technology. Let me liken this movement to sustainability. About 20 years ago, companies began thinking about their environmental impacts because of the increasing concerns of their customers. Companies had to look at sustainability. It became a part of how they presented themselves. I think we're seeing a similar shift in technology.⁽²⁾

Professor: Still, there are concerns. Biases, for one, can creep into algorithms. The technology behind self-driving cars can more easily identify white pedestrians than nonwhite ones, which makes them a higher risk for being struck. Discrimination can be baked into banking algorithms, making it harder for people of color to obtain loans.

Assistant Professor: The autonomy built into these systems is raising the stakes. It has to be built with some sort of ethical framework. ^(b)

Professor: Because the technology is advancing at such a rapid pace, reigning it in may be difficult.

Student B: The optimistic part of me thinks that most companies understand there is significant value to their consumers by utilizing technology responsibly, but there is no way legislation is going to be able to keep up. ^(c)

Assistant Professor: This discussion went very well. I believe that our students, who are well versed in social responsibility and business model design, are uniquely positioned to consider these issues that emerge in the future.

Student A: I am full of excitement and am optimistic that we can use AI for good. However, any technology is nothing more than a tool. It's a double-edged sword that has the ability to enslave or empower humanity.

注 algorithms アルゴリズム(コンピューターなどで演算手続きを指示する規則)

問 1 下線部(1)を日本語に訳しなさい。

問 2 下線部(2)を 40 字以内の日本語で説明しなさい(ただし、句読点も 1 字に数えます)。

問 3 下線部(a)~(c)の意味と最も近い単語を、それぞれの選択肢から一つ選び、記号で答えなさい。

(a) unparalleled

- (あ) comparable
- (い) exceptional
- (う) expected
- (え) explanatory

(b) stakes

- (あ) charges
- (い) interests
- (う) profits
- (え) risks

(c) legislation

- (あ) court
- (い) government
- (う) justice
- (え) law

問 4 本文の内容と合致するものを以下の選択肢の中から二つ選び、記号で答えなさい。

- (あ) It is necessary for humans to be optimistic about the future of AI technology.
- (い) Governments should be more cautious in enacting rules that regulate AI technology.
- (う) Humans should not fail to be aware of the ethics in using AI technology properly.
- (え) AI technology is supposed to contribute to solving various issues of racial discrimination.
- (お) Companies' efforts to utilize AI technology result in facilitating environmental consciousness.
- (か) AI technology has advantages as well as disadvantages in terms of its impact on human society.

IV The following is an excerpt from the article posted on a website. Read the passage and answer the following questions in English. (配点 25 点)

In comparison to students of neighboring countries such as China and Korea, Japanese students show less interest in study abroad. According to the UNESCO database, Japan was ranked 23rd, with 33,494 post-secondary students studying abroad in 2012. In this same year, there were 698,395 students and 121,437 students studying abroad from China and Korea, respectively. Many experts have attributed the decline in the number of young Japanese studying abroad to their deep-seated “inward-oriented tendency” (*uchimukishikou* in Japanese). Although some scholars argue that this characteristic is not solely confined to Japanese youth, there is great interest among Japanese scholars and politicians in understanding this tendency among Japanese youth.

- (1) Explain “inward-oriented tendency (*uchimukishikou*)” among Japanese youth with some example (s) other than studying abroad, using around 40 words.
- (2) What do you think about the idea expressed in the underlined sentence? Write your opinion, using around 60 words.