2025 M

# 英　　語

〔注　意　事　項〕

1. 監督者の指示があるまでは，この問題冊子を開かないこと。
2. 解答用紙は，コンピュータで処理するので，折り曲げたり汚したりしないこと。
3. 解答用紙に，**氏名・受験番号を記入し，受験番号をマークする。**マークがない場合や誤って記入した場合の答案は無効となる。

受験番号のマーク例(13015の場合)

| 受 | 験 | 番 | 号 | |
|---|---|---|---|---|
| 1 | 3 | 0 | 1 | 5 |
| 万位 | 千位 | 百位 | 十位 | 一位 |
| | ⓪ | ● | ⓪ | ⓪ |
| ● | ① | ① | ● | ① |
| ② | ② | ② | ② | ② |
| ③ | ● | ③ | ③ | ③ |
| ④ | ④ | ④ | ④ | ④ |
| ⑤ | ⑤ | ⑤ | ⑤ | ● |
| ⑥ | ⑥ | ⑥ | ⑥ | ⑥ |
| ⑦ | ⑦ | ⑦ | ⑦ | ⑦ |
| ⑧ | ⑧ | ⑧ | ⑧ | ⑧ |
| ⑨ | ⑨ | ⑨ | ⑨ | ⑨ |

4. 解答用紙にマークするときは，HBまたはBの黒鉛筆を用いること。**誤ってマークした場合には，消しゴムで丁寧(ていねい)に消し，消しくずを完全に取り除いたうえで，新たにマークし直す**こと。
5. 下記の例に従い，**正しくマークする**こと。

（例えば3と答えたいとき）

正しいマーク例

① ② ● ④ ⑤ ⑥ ⑦

誤ったマーク例

| | |
|---|---|
| ① ② ③ ④ ⑤ ⑥ ⑦ | マークが薄い |
| ① ② ● ④ ⑤ ⑥ ⑦ | マークが不完全 |
| ① ② ⑧ ④ ⑤ ⑥ ⑦ | マークが○印 |
| ① ② ✓ ④ ⑤ ⑥ ⑦ | マークがV印 |

6. 解答は，すべて解答用紙の所定の位置に記入すること。
7. 最後の問題 V に自由英作文があるので，時間配分に注意すること。

**I** 次のインタビュー記事を読み，以下の設問に答えなさい。

***Interviewer*:** Born in Aldershot in 1959, Russell Foster is a professor of circadian neuroscience at Oxford and the director of the Nuffield Laboratory of Ophthalmology. （途中略） So, what is circadian neuroscience?

***Russell Foster*:** It's the fundamental understanding of how our biology ticks[(a)] on a 24-hour basis. But also it's bigger than that — it's an understanding of how different structures interact within the brain and how different genes and their protein products generate a complex behaviour. And that is then embedded throughout our entire biology. （途中略）

***Interviewer*:** How did you first get interested in circadian research?

***Russell Foster*:** It was largely through photoreceptors[注1]. During my second year as an undergraduate — I did zoology at Bristol — I was reading the extraordinary *The Life of Vertebrates* by JZ Young and I came across a bit about lampreys[注2]. They have a parietal third eye, which mammals[注3] don't have; we only have ocular[注4] photoreceptors, whereas fish, reptiles, birds, all have multiple photoreceptors. And I just thought: wow, this is so cool. For my PhD, I was trying to understand how light is detected and measured to regulate the seasonal biology of birds. Then I started to address what seemed a simple question: how are the clocks of mammals regulated[(b)]? We don't have weird photoreceptors, we have visual cells that grab light in a fraction of a second and then forget it. So how can that light sensory system also be used to gather light information over long periods of time? Dawn-dusk detectors? Way back in the early 1990s, we suggested that there was [an undiscovered photoreceptor] in the eye and there was a huge outcry[注5].

***Interviewer*:** It wasn't well received among your peers.

***Russell Foster*:** No! But we just kept on kicking the door until they paid some attention. I think the really lucky thing for me has been doing zoology, because it's looking at different evolutionary responses to similar problems, so you can draw parallels. Since I knew that there were weird photoreceptors in birds and fish, making the conceptual leap to saying: "Maybe there's another photoreceptor within the mammalian eye" wasn't so big for me. （途中略）

***Interviewer*:** The modern world has wreaked havoc[注6] on our body clocks. Has it been all for the bad?

***Russell Foster*:** Being able to invade the night and do whatever you want because of cheap electric light has had a big impact upon the development of human societies, social

interactions and behaviour. It's also been quite democratising, but as always with humans, we take things a bit too far. We think we're unfettered[(c)] by our biology and of course we're not. With this 24-hour biology, you can nudge[(d)] it a bit one way or the other, but you do need to respect it or you run into problems.

***Interviewer*:** What are some of those problems?

***Russell Foster*:** Nightshift work, for example, has a massive baggage of problems associated with it — 97% of shift workers do not adapt. And what are the consequences of that? High levels of coronary heart disease, cancer, immune suppression, metabolic syndrome, type 2 diabetes, obesity — all of those things are more prevalent[注7] because we're pushing our biology outside its normal range. That isn't to say we've got to put the 24/7 society back in its bottle. It's here to stay, but we've got to be aware of ways of mitigating[注8] it, and employers, I think, should develop much more of a duty-of-care attitude.

***Interviewer*:** Are there such things as larks and owls, from a biological point of view?

***Russell Foster*:** Absolutely. There's a genetic predisposition[注9] to subtle changes in some of these clock genes that will speed the clock or slow it down. But it's more than that. It changes through development and so from age 10 there's a tendency to want to go to bed later and later. Women peak earliest, at 19-and-a-half, men peak at 21, and men tend to get later than women. As we grow older, we tend to become more morning again. So in our late 50s and early 60s, we're getting up and going to bed at about the same times as when we were 10.

It's also to do with when you see light. Seeing dusk light delays the clock, making you get up later, while morning light advances the clock. All these things define whether you're a morning type or not — and that's really powerful information, because if you're struggling, you can go outside in the morning or sit in front of a light box and that will help advance the clock. You won't be able to negate[(e)] it completely, particularly if you're an owl, as I was, but you can at least shift in the right direction.

***Interviewer*:** You write that decision-making skills can vary depending on the time of day.

***Russell Foster*:** Yeah, that's interesting. A study from Australia compared the level of cognitive impairment[注10] with alcohol versus cognitive impairment at 4 AM. The level of impairment with time of day was actually greater. So if you're driving your car in the early hours of the morning, your ability to drive is worse in terms of cognition than if you were legally drunk.

I think this is really interesting, but what has our education system done? Well, we put all the so-called demanding subjects — maths, science and so on — first

thing in the morning. And of course the kids are asleep during these critical morning windows and then bouncing off the walls in the afternoon. On the basis of the data, we might think it sensible to move some of those demanding classes to the afternoon and put sport in the morning. (途中略)

***Interviewer*:** What are three simple things we can all do to improve our sleep?

***Russell Foster*:** The overarching thing is that stress and anxiety are the enemies of sleep, so at the end of the day you've got to find ways of destressing. As a mechanistic cellular biologist, I always thought mindfulness is a bit like crystal-waving. But it's not. The evidence is very clear that it really helps you take possession and destress.

We've talked about getting morning light to set the clock. It also helps really making the bedroom a haven for sleep. Of course, it depends on one's individual economic circumstances, because the bedroom is often the office, particularly during lockdown, but ideally, get rid of all that stuff that will distract you, make sure that the bedroom is dark and cool and invest in a decent mattress and pillows.

注1：photoreceptor　光受容体　　注2：lamprey　ヤツメウナギ

注3：mammal　哺乳類　　注4：ocular　視覚の

注5：outcry　抗議　　注6：wreak havoc　大混乱に陥いる

注7：prevalent　罹患者が増える　　注8：mitigate　軽減させる

注9：predisposition　性質　　注10：cognitive impairment　認知障害

出典：The Guardian. (June 25, 2022). *Sleep scientist Russell Foster: 'I want to take the anxiety around sleep away*. Retrieved from https://www.theguardian.com/science/2022/

なお分かりやすさのために，語・語句を削除するなど訂正した箇所がある。

**問 1** 英文の内容に合うように，(1)～(5)の各文の空所を補うものとして最も適したものを，それぞれ選択肢１～４の中から一つ選びなさい。

(1) The word ticks[(a)] is closest in meaning to _____.

1. sounds　2. decays　3. expands　4. works

(2) The word regulated[(b)] is closest in meaning to _____.

1. contained　2. controlled　3. conflicted　4. confused

(3) The word unfettered[(c)] is closest in meaning to _____.

1. unspoken　2. undone　3. unbound　4. unmasked

(4) The word nudge[(d)] is closest in meaning to _____.

1. adjust　2. delete　3. save　4. explain

(5) The word negate[(e)] is closest in meaning to _____.

1. trap　2. open　3. erase　4. understand

**問 2** 英文の内容に合うように，(1)～(5)の質問に対する答えとして最も適したものを，それぞれ選択肢１～４の中から一つ選びなさい。

(1) According to Foster, what is the primary focus of circadian neuroscience?

1. understanding structural changes in an aging brain
2. studying the process of the 24-hour biological cycle
3. investigating how genes influence protein behaviour
4. researching the complex behaviour of various species

(2) What initially sparked Russell Foster's interest in circadian research?

1. He wanted to know about how photoreceptors work in the day and evening.
2. His interest sparked after observing the movement of mammals and birds.
3. He became interested after taking a biology course at the University of Bristol.
4. It developed from his interest in how photoreceptors differ between animals.

(3) According to Foster, what factors influence whether someone has a tendency to be a "lark" or an "owl"?

1. genetics and timing of exposure
2. health and gender
3. season and temperature
4. food and age

(4) According to Foster, why is being awake early in the morning sometimes worse than being drunk?

1. It is more difficult to see when driving in the morning.
2. People tend to be more impatient in the morning versus the evening.
3. Our ability to think is weaker early in the morning.
4. There is not enough education about waking up in the morning.

(5) According to Foster, what are the three simple things that can improve sleep?

1. reduce food, exercise more, read some interesting books
2. reduce stress, get morning light, create a comfortable space
3. decrease caffeine, wave crystals, stay indoors during the night
4. sleep during the day, avoid light, use electronic devices

**Ⅱ** 次の英文を読み，下記の設問に答えなさい。①～⑧は段落番号を表す。

① Human teenagers aren't exactly known for their restraint[注1]. An incompletely developed region of the brain called the ventromedial prefrontal cortex (vmPFC), which acts a bit like a parking brake, can make adolescents more likely to engage in[(a)] risky behaviors including reckless[注2] driving, substance abuse, and risky sexual behavior. It turns out, the same can be said for adolescent chimpanzees, except reckless behaviors for them may look more like increased aggression[注3].

② A study published January 23 by the *Journal of Experimental Psychology: General* from the American Psychological Association finds that while adolescent chimps and teens share these risk-taking behaviors, the chimpanzees may be less impulsive[注4].

③ "Adolescent chimpanzees are in some sense facing the same psychological tempest[注5] that human teens are," said co-author Alexandra Rosati, an associate professor of psychology and anthropology at the University of Michigan, in a statement. "Our findings show that several key features of human adolescent psychology are also seen in our closest primate[注6] relatives." Chimpanzees can live up to age 50, and their adolescence occurs from around age eight up to 15. Chimpanzees show rapid changes in hormone levels during adolescence, form new bonds with their peers, demonstrate some increases in aggression, and compete for social status just like their human counterparts[(b)].

④ In the study, the team of researchers performed two tests using food rewards on 40 wild-born chimpanzees at Tchimpounga Chimpanzee Sanctuary in the Republic of Congo in central Africa. It included 21 males and 19 females from six to 25 years old with an average age of 15.

⑤ During test number one, adults and adolescent chimpanzees performed a gambling task and could choose between two containers. One of the containers always had peanuts, which chimpanzees somewhat like. The other had either a disliked snack (a cucumber slice) or their favorite, a banana slice. They had a choice between playing it safe and getting some of the somewhat delicious peanuts or taking a chance at getting the coveted[(c)] banana with the risk of getting a yucky cucumber. The team recorded the chimpanzees' vocalizations and emotional reactions, including moans, screams, whimpers, banging on the table, or scratching themselves. To track hormone levels, they also collected saliva[注7] samples. Adolescent chimpanzees took the risky option more often than the adults, but both expressed negative reactions if they got the cucumber.

⑥ Test number two was modeled after the famous Stanford marshmallow experiment performed on human children to examine delayed gratification[注8]. The chimpanzees could either get one banana slice immediately or wait for 60 seconds to receive three tasty banana slices.

Adult and adolescent chimpanzees both chose to delay gratification at a similar rate. In this situation, human teens tend to be more impulsive than adults and would more likely choose the instant gratification.

⑦ "Prior(d) research indicates that chimpanzees are quite patient compared with other animals, and our study shows that their ability to delay gratification is already mature at a fairly young age, unlike in humans," said Rosati. What did separate the adolescent chimpanzees from the adults is that they threw more tantrums[注9] during the delay than the adults did.

⑧ According to Rosati, risk-taking behavior in both adolescent humans and chimpanzees appears to be biologically ingrained[注10], but also certain increases in impulsive behavior may be more of a human thing. Additionally, future studies could look into differences in impulsive behaviors in male and female chimpanzees. "We are currently looking at the development of several other cognitive abilities in chimpanzees, including capacities(e) for self-regulation and the emergence of social skills that help chimpanzees form and maintain relationships," Rosati told *Popular Science* in an email.

注１：restraint　抑制　　注２：reckless　向こう見ずな

注３：aggression　攻撃性　　注４：impulsive　衝動的

注５：tempest　動揺　　注６：primate　霊長類の

注７：saliva　唾液　　注８：gratification　満足感

注９：throw tantrums　癇癪(かんしゃく)を起こす

注10：ingrained　刷り込まれた

出典：Baisas, L. (January 23, 2023). *Popular Science*. Retrieved from https://www.popsci.com/environment/chimpanzee-teens-behavior/

なお分かりやすさのために，語・語句を削除するなど訂正した箇所がある。

**問 1** 英文の内容に合うように，(1)～(5)の各文の空所を補うものとして最も適したものを，それぞれ選択肢１～４の中から一つ選びなさい。

(1) The phrase engage in[(a)] in paragraph ① is closest in meaning to _____.

1. promote　2. avoid　3. undertake　4. marry

(2) The word counterparts[(b)] in paragraph ③ is closest in meaning to _____.

1. enemies　2. equivalents　3. champions　4. children

(3) The word coveted[(c)] in paragraph ⑤ is closest in meaning to _____.

1. desired　2. unrealistic　3. dangerous　4. unfamiliar

(4) The word prior[(d)] in paragraph ⑦ is closest in meaning to _____.

1. supporting　2. solid　3. previous　4. practical

(5) The word capacities[(e)] in paragraph ⑧ is closest in meaning to _____.

1. rules　2. mood　3. volumes　4. potential

**問 2** 英文の内容に合うように，(1)～(5)の質問に対する答えとして最も適したものを，それぞれ選択肢１～４の中から一つ選びなさい。

(1) What is implied about adolescent chimpanzees in paragraph ①?

1. They are more likely to perform risky behaviors than human teenagers.
2. They perform the same kinds of reckless behaviors as human teenagers.
3. The vmPFC region of their brain acts to increase aggressive behaviors.
4. The part of their brain that suppresses risky behavior is not fully developed.

(2) According to paragraph ③, how are adolescent chimpanzees psychologically similar to adolescent humans?

1. They exhibit a rise in levels of aggression.
2. They live the same total number of years.
3. They have hormones that are fairly stable.
4. They find it difficult to form relationships.

(3) What can be inferred about adult chimpanzees compared to adolescent chimpanzees from paragraph ⑤?

1. They are less likely to consider bananas to be their favorite food choice.
2. They are more likely to choose the safe option when performing a gambling task.
3. They are less likely to make sounds when they receive the food they want.
4. They are more likely to express negative reactions when receiving a cucumber.

(4) What did test number two reveal about adolescent chimpanzees' ability to delay gratification?

1. It improves steadily as chimpanzees age.
2. It is less developed than in adolescent humans.
3. It varies significantly among chimpanzees.
4. It is already quite developed in adolescent chimps.

(5) According to paragraph ⑧, which of the following is true about adolescent chimpanzees?

1. Their impulsive behaviors are more common in males.
2. Their social skills are developed from their environment.
3. Their risk-taking behaviors seem to be genetically rooted.
4. Their ability to control their impulses is less than humans.

**Ⅲ** 次の英文を読み，下記の設問に答えなさい。①～⑧は段落番号を表す。

① Handwriting notes in class might seem anachronistic[注1] as digital technology subsumes[注2] nearly every aspect of learning. But a steady stream of research suggests that taking notes with pen and paper — or even stylus and tablet — is still the best way to learn, especially for young children. And scientists are zeroing in on[注3] why.

② For a study published recently in *Frontiers in Psychology*, scientists monitored brain activity in students taking notes and found that those writing by hand had higher levels of electrical activity across many interconnected brain regions. The findings add to a body of evidence that demonstrates the importance of teaching children to handwrite words and draw their own pictures.

③ The new research builds on a foundational 2014 study that suggested people may type notes quickly, without thinking much about what they're writing — but transcribing in longhand[注4] is slower and makes them actively pay attention to and process the incoming information. This conscious action of building on existing knowledge can make it easier for students to stay engaged and grasp[(a)] new concepts.

④ To understand specific brain-activity differences during the two note-taking approaches, the authors of the new study sewed[注5] 256 electrodes[注6] into a hairnet. These sensors let the scientists record 36 students' brain activity as they wrote or typed words displayed on a screen. When students wrote by hand, the sensors picked up widespread brain connectivity spanning[(b)] visual regions, regions that receive and process sensory information, and the motor cortex[注7]. This last area handles body movement and sensorimotor integration[注8], which helps the brain use environmental inputs to inform a person's next action. Typing, however, resulted in minimal activity in these brain regions.

⑤ "When you are typing, the same simple movement of your fingers is involved in producing every letter, whereas when you're writing by hand, you immediately feel that the bodily feeling of producing an A is entirely different from producing a B," says study co-author Audrey van der Meer, a neuropsychologist[注9] at the Norwegian University of Science and Technology. She notes that children who have learned to read and write by tapping on a digital tablet "often have difficulty distinguishing letters that look a lot like each other or that are (　A　) of each other, like the 'b' and the 'd'."

⑥ Across many contexts, studies have shown that kids appear to learn better when they're asked to produce letters or other visual items using their fingers and hands in a coordinated way. Vanderbilt University educational neuroscientist Sophia Vinci-Booher says the recent study highlights the clear tie between motor action and conceptual recognition[注10]: "As you're drawing a

letter or writing a word, you're taking this perceptual understanding of something and using your motor system to create it." That creation is then fed back into the (　　B　　) where it's processed again — strengthening the connection between an action and the images or words associated with it.

⑦ Vinci-Booher notes that the new findings don't mean technology is always a disadvantage in the classroom. Laptops, smartphones, and other such devices can be more efficient for writing essays or conducting research and can offer more equitable access to educational resources. But people are increasingly "off-loading"(c) cognitive tasks onto digital devices, such as by taking a photograph instead of committing information to memory, says Yadurshana Sivashankar, who studies movement and memory at the University of Waterloo in Ontario. "If we're not actively using these areas, then they are going to deteriorate(d) over time, whether it's memory or motor skills."

⑧ Ultimately,(e) Vinci-Booher says, "I think there's a very strong case for engaging children in drawing and handwriting activities, especially in preschool and kindergarten when they're first learning about letters. There's something about engaging the fine-motor system and production activities that really impacts learning."

注１：anachronistic　時代錯誤の　　注２：subsume　包含する
注３：zero in on　的を絞る　　注４：transcribe in longhand　手書きをする
注５：sew　縫い付ける　　注６：electrode　電極
注７：motor cortex　運動皮質　　注８：sensorimotor integration　感覚運動統合
注９：neuropsychologist　神経心理学者　　注10：conceptual recognition　概念認識

出典：Hu, C.（2024）. *Scientific American*. Vol. 330. No 5. Page 13. May 24, 2024.
なおわかりやすさのために，語・語句を削除するなど訂正した箇所がある。

**問 1** 英文の内容に合うように，(1)～(5)の各文の空所を補うものとして最も適したものを，それぞれ選択肢１～４の中から一つ選びなさい。

(1) The word grasp (a) in paragraph ③ is closest in meaning to _____.

1. understand　2. grant　3. govern　4. underestimate

(2) The word spanning (b) in paragraph ④ is closest in meaning to _____.

1. spinning　2. spending　3. including　4. intending

(3) The word off-loading (c) in paragraph ⑦ is closest in meaning to _____.

1. eliminating　2. delegating　3. subscribing　4. operating

(4) The word deteriorate (d) in paragraph ⑦ is closest in meaning to _____.

1. prevent　2. deepen　3. repair　4. worsen

(5) The word ultimately (e) in paragraph ⑧ is closest in meaning to _____.

1. finally　2. similarly　3. fortunately　4. currently

**問 2** 英文の内容に合うように，(1)～(3)の質問に対する答えとして最も適したものを，それぞれ選択肢１～４の中から一つ選びなさい。

(1) According to paragraph ④, which of the following statements is true?

1. Writing by hand involves two different note taking styles.
2. Typing results in more electrical activity in the brain than writing by hand.
3. Reducing body movement increases brain functionality.
4. Writing by hand stimulates motor and visual brain areas more than typing.

(2) According to paragraph ⑦ and ⑧, which of the following can be implied?

1. The use of technology should be increased in preschool and kindergarten.
2. Overly depending on technology can be harmful to learning.
3. Drawing and writing on a tablet screen are better than doing so on paper.
4. Students who use technology at school have an unfair advantage.

(3) What is the best title of the passage?

1. Writing by hand comes with learning benefits
2. To improve drawing skills, learn how to write
3. Words and pictures are connected to each other
4. Young learners take notes with stylus and tablet

**問 3** 英文の内容に合うように，（　A　）と（　B　）にあてはまる語句として最も適したものを，それぞれ選択肢１～４の中から選びなさい。

(1) （　A　）

1. mirror images
2. upside-down letters
3. sensory images
4. manual letters

(2) （　B　）

1. motor system
2. electrode hairnet
3. digital device
4. visual system

**Ⅳ** 次の英文を読み，下記の設問に答えなさい。①～⑧は段落番号を表す。

① Eating a wide variety of foods all in moderation is recommended in nearly all traditional cultures. In Japan, nutritional guidelines have recommended eating 30 different food items a day. Might this teaching help explain why Japan boasts one of the highest life expectancies in the world? While the number 30 itself is a somewhat arbitrary(a) compromise between the practical and the ideal, the emphasis on food variety accords well with what is known — and not known — about nutrition and biochemistry.

② We can divide up the nutrients[注1] we take in as "macronutrients" and "micronutrients." Roughly speaking, the former satisfy our calorie needs, while the latter include minerals and vitamins that we need in tiny amounts. In fact, some can even be harmful in larger amounts. Nevertheless without them, especially the organic compounds known as "vitamins," the cells in our bodies can't perform the chemical reactions we need to grow and remain healthy.

③ Today every drug store carries(b) a wide variety of vitamins, but how did these come to be recognized as vitamins? Well, in the words of the 1960s folk singer Joni Mitchell, "you don't know what you've got until it's gone." Without exception, vitamins were discovered based on serious medical issues(c) that developed when vitamin intake was too low. For example, many sailors would lose their teeth and develop large bruises[注2] on their bodies two to three months into their voyages, despite having sufficient food and water. The fatal condition was known simply as "scurvy." Aside from sailors on long voyages, scurvy also affected large armies and cities under siege[注3] in northern Europe, especially during the winter months.

④ The discovery that a small amount of citrus fruit could prevent scurvy led to the inclusion of lemons or oranges in British sailors' daily rations from 1795 onwards. The later substitution of limes earned British sailors the nickname "limeys." Eventually, the active substance was identified as L-ascorbic acid in the early 1900s, and subsequently given the name "vitamin C." In fact, we didn't know how plants make it until a mutant plant was found that spontaneously[注4] developed what could be described as big bruises. It turned out that the mutation prevented the plants from making vitamin C, the first clue that ultimately led scientists to work out how plants produce it.

⑤ To call something a "vitamin" means not only that our cells require it, but that our bodies can't make it. In fact, vitamin C is not even a vitamin in most animals because their own cells can produce it. As a result of an evolutionary[注5] accident, humans cannot, making it a vitamin for us. Although our cells together with the microbiome (all the microorganisms[注6] living in our digestive tracts[注7]) can produce almost all the substances we need, vitamins are the exception because they cannot be produced by either. But biology being biology, even this exception has

an exception.

⑥ The last vitamin discovered, $B_{12}$ in 1948, is produced by certain microorganisms, and only by microorganisms. Plants don't need it and don't make it, but all animals need it. Thus, animals that don't eat other animals need the microorganisms that can make it. We even have at least one of these in our own bodies. Unfortunately for us, it is produced at the tail end of our digestive tracts, well beyond the small intestine that houses the elaborate machinery needed for $B_{12}$ uptake[注8]. In essence, our digestive tracts are arranged backwards, but our distant ancestors had no problem with this arrangement because, it is thought, they ate insects, providing all the $B_{12}$ needed. Furthermore, we need only tiny amounts of this vitamin. The liver of a healthy young adult stores roughly a five-year supply, and so a switch to eating strictly vegetables without vitamin supplements would take a very long time to result in health issues.

⑦ Although we discovered the known vitamins through the ill effects of their deficiencies[注9], could we have missed any? U.S. National Academy of Sciences member Bruce Ames, himself over 90, argues for this possibility. In a 2018 review in the Academy's Proceedings, he proposed a class of substances he dubbed(d) longevity vitamins, compounds not absolutely required for short-term survival and having children, but without which the body ages more rapidly. Is it possible that some of the problems we blame on aging are actually vitamin deficiencies disguised as aging? Among the ten compounds he proposed for longevity vitamin status, one has received a lot of attention recently. Ergothioneine, a substance made only by mushrooms and other fungi, gets into and out of our cells with the help of a specialized transporter our bodies make, and associates tightly with a specific enzyme[注10] in our cells, similar to the way most known vitamins act. Moreover, its levels in blood decrease sharply after age 80, a pattern also seen for vitamin $B_{12}$.

⑧ Regardless whether any of Ames's ten candidates end up recognized as genuine vitamins, the Japanese emphasis on 30 foods a day is a healthy one. It helps maintain a vigorous(e) microbiome. Even if some yet-to-be-discovered vitamin is out there, it increases the chances we are already getting it.

注1：nutrient　栄養素
注2：bruise　あざ
注3：under siege　包囲されている
注4：spontaneously　自然発生的に
注5：evolutionary　進化的な
注6：microorganism　微生物
注7：digestive tract　消化管
注8：uptake　吸収
注9：deficiency　不足
注10：enzyme　酵素

出典：Robert F. Whittier, Ph.D., Professor, Juntendo University Faculty of Medicine

**問 1** 英文の内容に合うように，(1)～(5)の各文の空所を補うものとして最も適したものを，それぞれ選択肢１～４の中から一つ選びなさい。

(1) The word arbitrary (a) in paragraph ① is closest in meaning to _____.

1. precise　2. scary　3. random　4. improbable

(2) The word carries (b) in paragraph ③ is closest in meaning to _____.

1. stocks　2. supports　3. conveys　4. covers

(3) The word issues (c) in paragraph ③ is closest in meaning to _____.

1. problems　2. editions　3. controversies　4. questions

(4) The word dubbed (d) in paragraph ⑦ is closest in meaning to _____.

1. translated　2. combined　3. named　4. painted

(5) The word vigorous (e) in paragraph ⑧ is closest in meaning to _____.

1. shallow　2. safe　3. surface　4. strong

**問 2** 英文の内容に合うように，(1)～(5)の質問に対する答えとして最も適したものを，それぞれ選択肢１～４の中から一つ選びなさい。

(1) According to paragraph ②, what is the difference between macronutrients and micronutrients?

1. Macronutrients are often smaller than micronutrients.
2. Macronutrients provide energy while micronutrients meet other needs.
3. Macronutrients are more harmful than micronutrients.
4. Macronutrient function is unclear while micronutrient function is clear.

(2) What is indicated in paragraphs ③ and ④?

1. Fruit juice is the active substance preventing scurvy.
2. Health concerns prompted the discovery of vitamins.
3. Ship officers received better food than the general crew.
4. A sailor short on vitamin C won't bruise unless injured.

(3) What can be inferred from paragraphs ⑤ and ⑥?

1. Most animals must consume vitamin C to survive.
2. $B_{12}$ present in animal droppings could help plants grow.
3. Humans have a complicated relationship with $B_{12}$.
4. A lack of $B_{12}$ in our food would quickly cause illness.

(4) According to paragraph ⑦, which of the following is true?

1. A lack of "longevity vitamins" will not immediately cause severe problems.
2. Bruce Ames recommends "longevity vitamins" specifically for the elderly.
3. Eating mushrooms rich in ergothioneine might speed up the process of aging.
4. Vitamins act independently and do not bind to enzymes for their effects.

(5) Which of the following would be the best title for this article?

1. Why British sailors were called "limeys"
2. Vitamins: do we have the complete list?
3. Don't forget your vitamins!
4. Vitamins to extend life

## V 自由英作文問題

下記テーマについて，英語で自分の考えを述べなさい。書体は活字体でも筆記体でもよいが，解答は所定の範囲内に収めなさい。

The writing will be evaluated from the viewpoint of both quantity and quality. The evaluation will also consider whether what you write responds to the question.

You are expected to write one complete essay. Your essay should include an introduction, main text, AND conclusion. Please write as if you are writing for someone who has not read the topic question.

Scientists are now able to edit genes, potentially allowing parents to select specific characteristics for their future children. While there may be many benefits, there may also be concerns. If given the choice, do you believe it is acceptable to genetically design a child? Considering the moral, social, and health implications, discuss the potential positive and/or negative outcomes of genetically engineering humans.