読解問題演習 71

次の英文を読んで、設問に答えなさい。

<div align="right">(北海道大 2021)</div>

I love movies, and one of my favorite movies is the American science fiction movie *The Matrix*. The movie is about a man, Neo, who keeps having the feeling that something is wrong with what he thinks is reality. He eventually meets a mysterious stranger called Morpheus who offers him one of two pills. He explains that the blue pill will cause him to fall asleep and wake up in his bed with no memory of the meeting. However, if he takes the red pill, he will be shown reality for what it really is. (1)<u>Neo, of course, takes the red pill and discovers that what he thought was real life was in fact a simulation designed by aliens to control humans.</u>

This movie is a well-known exploration of the idea that we are all living in a simulation, which we can define as the idea that our environment has been artificially created using a computer to look and feel real. We are all familiar with this idea and we have all thought about it at some point in our lives. However, the reason why nobody takes the idea too seriously is because it is impossible to test or find any evidence that it is true.

Nonetheless, this has not stopped philosophers from writing about it. Probably the most influential academic article on this subject was published by Nick Bostrom in 2003 in *The Philosophical Quarterly*. Bostrom, an Oxford University professor, begins by examining how likely it is that an advanced civilization would create a simulation. He examines three possibilities that we can choose: the first being that any advanced civilization would become extinct before they developed the necessary technology to create complex simulations. The second choice is that very advanced civilizations do exist and have the required level of technological capability but choose not to build simulations for ethical or practical reasons. The third choice is that they both exist and have the necessary ability and motivation.

If (ア), then it is logically impossible for us to be living in a simulation. However, if the third choice turns out to be correct, then it becomes quite (a). The reason for this is that if advanced civilizations exist and have built at least one simulation, it is likely they have built many. Artificially intelligent beings within the simulations could also have built their own programs. If there is only one true reality and numerous different simulated realities in the same universe, the chance that we are not in a simulated reality becomes very small.

There are also some arguments against the first two choices. The massive size of the universe and the huge number of planets that have the potential for life make the first possibility fairly (b). It is unfortunately quite (c) that civilizations (ours included) will destroy themselves or be destroyed, but it is also reasonable to imagine that at least a handful of civilizations somewhere in the universe have survived long enough to develop advanced technologies. Some evidence against the second possibility is that our own civilization so far seems very interested in creating simulations that are gradually becoming more advanced. It is also worth noting that areas such as virtual reality are gaining in popularity. It is not difficult to imagine that, if we don't become extinct, we would continue to be interested in making better and better simulations with smarter AI actors in them. If that is the case, then it is possible that it is the same for other civilizations on other planets.

If you agree with the above arguments, the third choice becomes the most likely, which means that it is possible that we are all in a simulation right now. Of course, all these points are just the work of philosophers, and there is never likely to be any hard evidence supporting them. However, it is interesting to imagine how you would feel if it was true. Would it make any difference to your life and eventual death? Would you want to know? To put it another way: if you meet a stranger tonight who offers you two pills, would you take the blue one or the red one?

問1　　下線部(1)を日本語に訳しなさい。

問2　　Nick Bostrom が 2003 年に発表したのは何についての論文か、日本語で 40 字以内で簡潔にまとめなさい。

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問3　　空欄(　ア　)に入る最も適切なものを次の(A)〜(E)から選びなさい。
(A) Bostrom's idea is true
(B) all the choices are possible
(C) the first or second choice is correct
(D) neither the first nor second choice is correct
(E) none of the choices are correct

問4　　空欄(　a　)〜(　c　)に入る語の組み合わせとして最も適切なものを次の(A)〜(E)から 1 つ選びなさい。
(A)　(a) likely　　　　　　(b) likely　　　　　　(c) likely
(B)　(a) likely　　　　　　(b) unlikely　　　　　(c) likely
(C)　(a) likely　　　　　　(b) unlikely　　　　　(c) unlikely
(D)　(a) unlikely　　　　　(b) likely　　　　　　(c) unlikely
(E)　(a) unlikely　　　　　(b) unlikely　　　　　(c) likely

問5　　本文の内容と一致しないものを、次の(A)〜(F)から 2 つ選びなさい。
(A) If Neo had chosen the blue pill, he would even have forgotten that he met Morpheus.
(B) The author guesses that we have all imagined at least once that we are living in a simulation.
(C) Nick Bostrom presents evidence for the fact that we are living in a simulated world.
(D) Bostrom explains that even simulated beings could develop simulations of their own.
(E) The author thinks that Bostrom's third choice is inevitable.
(F) Those who are eager to know the truth would take the red pill.

問6　この文章のタイトルとして最もふさわしいものを、次の(A)～(E)から 1 つ選びなさい。

(A) Are We in a Simulation?
(B) *The Matrix*: An Exciting Movie
(C) Why Are Philosophers Interested in Simulating the World?
(D) Newly Found Evidence for a Simulated Life
(E) How Are We Attracted to a Thought Experiment?

読解問題演習 72
次の英文を読んで、設問に答えなさい。

　Should the government have more control over people's lives? Most people who are advocates of democracy believe emphatically that the government should not. Such people believe that everyone should be free to make their own choices and live their lives as they please and do so uninhibited by higher authorities. Recently, (　ア　) , some economists have argued that the government should play a greater role in people's lives. These economists believe that governments can intervene in ways that greatly benefit society and still protect basic democratic values.

　In 2017, economist Richard Thaler received the Nobel Prize in Economics for his work in the field of "behavioral economics." (1)Thaler and his collaborators argued that traditional economic theories of how people behave are not fully accurate because they fail to account for how people actually behave. They explain that traditional economic theories are based on the belief that people act "rationally" and make all of their decisions on the basis of what is best for them economically. On the contrary, Thaler's research has shown that people do not, in fact, act "rationally" and instead make many choices that are not the best in some aspects of life. For example, despite hundreds of scientific studies showing that smoking cigarettes is unhealthy and dangerous, millions of people continue to smoke. The reason people continue to smoke despite the harmful consequences is because the effects of smoking are far away in the future. People may become sick or die from smoking, but it will happen many years later. The effects are so distant that smokers cannot perceive them now. Thaler's work has shown that if the effects were more immediate, people would be more likely to avoid smoking.

　Many behavioral economists like Thaler believe in an approach called "libertarian paternalism." This means that governments and authorities should allow people to live their lives as they please but that they should also give them incentives to do what is in their best interest. In other words, (2)governments should "nudge" people to make better choices. In fact, Thaler and his colleague Cass Sunstein published a book titled *Nudge: Improving Decisions about Health, Wealth, and Happiness*. In this book, they provide many examples of how governments, universities, and other institutions can "nudge" their members to act in different (i.e. better) ways. For example, one study revealed that people eat different foods depending on the order in which food is displayed to them. If a cafeteria manager places unhealthy food before healthy food, people are more likely to consume the unhealthy food. However, if he or she (3)does the opposite, diners will choose the healthier options. Therefore, it is in the best interest of diners, cafeteria managers, and institutions to place healthy food before unhealthy food.

　Thaler and Sunstein argue that governments and other institutions should be required to adopt these policies in the best interest of society. They advocated for policies based on "libertarian paternalism" to achieve this.

　The organization of food in a cafeteria is not a controversial issue. However, some people have challenged other aspects of "libertarian paternalism" by suggesting that it violates democratic principles of people's rights to choose what is best for themselves. (4)These critics argue that requiring "libertarian paternalism" is unfair because it forces people to do things they would not otherwise do. The fact that such policies would be "paternalistic," meaning that they would require something, violates the "libertarian"

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aspect. For example, New York City politicians proposed a law that would prohibit the sale of soda larger than 0. 47 liters. Since soda is unhealthy (it causes tooth problems, is linked to weight gain, and can cause diabetes, among many other problems), politicians believed prohibiting the sale of large quantities of soda would help make their city population healthier. However, critics proclaimed that this went against democratic principles that declare people should have freedom to buy what they want. They argued, "If I want to buy a big soda, I should have the right to buy a big soda!" The soda policy was ultimately abandoned, but its effect on politics still remains pertinent today.

Should the government adopt "libertarian paternalism" as a policy guideline? There is much ongoing debate concerning this proposal. Proponents believe it will make society better at a minimal cost, while opponents believe that it violates the basic principles of (　イ　). Although the discussion continues, "libertarian paternalism" is definitely worth considering as a possible policy solution to some of today's problems.

問1　空欄(　ア　)に入る最も適切な語句を次の(A)～(E)から選びなさい。
(A) as a result
(B) besides
(C) consequently
(D) however
(E) therefore

問2　下線部(1)を日本語に訳しなさい。

問3　下線部(2)の言い換えとして一番近いものを次の(A)～(E)から１つ選びなさい。
(A) government should lightly influence people to behave in more desirable ways
(B) government should secretly force people to make choices which will improve their lives
(C) government should openly let people choose what they want to choose
(D) government should forbid people to live as they like
(E) government should gently encourage people to act paternally

問4　下線部(3)の具体的な内容を日本語で説明しなさい。

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問**5** 　下線部(4)の理由について最も適切なものを次の(A)〜(F)から１つ選びなさい。

(A) Without "libertarian paternalism," democracy could be harmful to people's right to choose.
(B) "Libertarian paternalism" lacks medical evidence for its plans to improve people's health.
(C) "Libertarian paternalism" does not entirely protect people's freedom of choice.
(D) There is too much freedom in democracy. Therefore, "libertarianism" is necessary.
(E) "Libertarian paternalism" misses the fact that soda is actually unhealthy to some people.
(F) Democratic principles, which include freedom, contradict the "libertarian" aspect in the notion of "libertarian paternalism".

問**6** 　空欄(イ)に入る最も適切な１語を文中から選び、英語で答えなさい。

読解問題演習 73

Answer the following questions based on the text. For the words marked with an asterisk (*), explanatory notes are provided after the text.

(京都工芸繊維大 2019)

Scientists were excited by the discovery, in 2016, of the first bacterium that had naturally evolved to eat plastic, at a garbage site in Japan. They have since determined the detailed structure of the crucial enzyme* produced by the bacterium. The international team of scientists attempted to change the enzyme in order to examine how it had evolved, and then they accidentally created a mutant enzyme* that breaks down plastic soft drink bottles. "What actually turned out was we improved the enzyme, which was a bit of a shock," said Professor John McGeehan, at the University of Portsmouth, UK, who led the research. "It's great and a real finding."

The mutant enzyme takes a few days to start breaking down the plastic — far faster than the centuries it takes in the oceans. The researchers are optimistic that the process of breaking down the plastic can be speeded up even further and be used in large scale industrial operations. "What we are hoping to do is use this enzyme to turn this plastic back into its original components, so we can literally recycle it back to plastic," said McGeehan. "It means we won't need to dig up any more oil and, basically, it should reduce the amount of plastic in the environment." About one million plastic bottles are sold each minute around the globe. Only 14% are recycled, and so many end up in the oceans causing enormous pollution, harming marine life and potentially people who eat seafood. "Plastic is incredibly resistant to degradation*," McGeehan said, "It is one of these amazing materials that has been made a little bit too well."

"Oil is cheap, so making new PET is cheap," said McGeehan. "It is cheaper for manufacturers to generate PET using oil than to recycle it. But I believe there is public interest here: views are changing so much that companies are starting to look at how they can properly recycle PET." In addition, currently even those bottles that are recycled can only be turned into unclear fibers for clothing or carpets. The new enzyme indicates a way to recycle clear plastic bottles back into clear plastic, which could cut the need to produce new plastic.

The new research, published in the journal *Proceedings of the National Academy of Sciences*, began by determining the precise structure of the enzyme produced by the Japanese bacterium. The team used an intense beam of X-rays that can show individual atoms*. The structure of the enzyme looked very similar to one evolved by many bacteria to break down cutin*, which is a natural layer used as a protective coating by plants. But when the team changed the enzyme in their experiments, they accidentally improved its

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ability to eat PET. "It is a small improvement, 20% better, but that is not the point," said McGeehan. "It's incredible because it tells us that the enzyme is not yet working perfectly. It means we can use all the technology created in other enzyme development for years and years and make a super-fast enzyme." Industrial enzymes are widely used in, for example, washing powders and biofuel* production. They have been made to work up to 1,000 times faster in a few years, the same timescale McGeehan sees for the plastic-eating enzyme. One possible improvement being explored is to put the mutant enzyme into an "extremophile bacteria*" that can survive temperatures above 70°C, at which point PET changes from a glassy to a sticky state, making it likely to degrade 10 to 100 times faster.

Other types of plastic could be broken down by bacteria currently evolving in the environment, and McGeehan said, "People are now searching energetically for those." PET sinks in seawater, but some scientists guess that plastic-eating bacteria might one day be sprayed on the huge plastic garbage areas in the oceans to clean them up. "I think the new research is very exciting work, showing there is strong potential to use enzyme technology to help with society's growing waste problem," said Oliver Jones, a chemist at RMIT University in Melbourne, Australia, and not part of the research team. "Enzymes are not poisonous, are naturally degradable and can be produced in large amounts by microorganisms*," he said. "There is still a way to go before you could recycle large amounts of plastic with enzymes, and reducing the amount of plastic produced in the first place might, perhaps, be preferable. But this is certainly a step in a positive direction." Professor Adisa Azapagic, at the University of Manchester in the UK, agreed the enzyme could be useful, but added, "Further research will be needed to make sure that the technology can solve the problem of environmental waste, but not create other problems, for example, increasing greenhouse gas."

【出典】Damian Carrington (2018) "Scientists accidentally create mutant enzyme that eats plastic bottles," *The Guardian* (https://www.theguardian.com/enyironment/2018/apr/16) (一部 改変)

Notes

enzyme:	酵素
mutant enzyme:	変異型酵素
degradation, breaking down:	分解すること
atom:	原子
cutin:	角皮素(表皮細胞や植物の葉・幹の表皮に見出される成分)
biofuel:	生物燃料
extremophile bacteria:	極限環境微生物
microorganisms:	微生物

Answer questions 1 – 5 in English. (You must write the answers in your own words. You can use some words and phrases from the text, but do not copy complete sentences.)

1. How was the mutant enzyme found? Describe the process in 20 words or less in English.

2. How are the scientists hoping to use the mutant enzyme? Describe in 20 words or less in English.

3. What are the two reasons most manufacturers do not recycle plastic bottles? Describe each reason in 15 words or less in English.

4. What is the positive environmental impact of the plastic-eating enzymes in bacteria mentioned in the last paragraph? Describe in 20 words or less in English.

5. What is a potential disadvantage of using enzymes to recycle plastic mentioned in the last paragraph? Describe in 15 words or less in English.

読解問題演習 74
次の英文を読んで、下の問いに答えなさい。

(近畿大・医 2015)

Sensing (1)phantom phone vibrations is a strangely common experience. Around 80 % of us have imagined a phone vibrating in our pockets when it's actually completely still. Almost 30 % of us have also heard non-existent ringing. Are these hallucinations ominous signs of impending madness caused by digital culture ?

(2   ) phantom vibrations and ringing illustrate a fundamental principle in psychology.

Psychologists use a concept called Signal Detection Theory to guide their thinking about the problem of perceptual judgments. Working through the example of phone vibrations, we can see how this theory explains why they are a common and unavoidable part of healthy mental function.

When your phone is in your pocket, the world is in one of two possible states: the phone is either ringing or not. You also have two possible states of mind: the judgment that the phone is ringing, or the judgment that it isn't. Obviously, you'd like to match these states in the correct way. True vibrations should go with "it's ringing", and no vibrations should go with "it's not ringing". Signal detection theory calls these faithful matches a "hit" and a "correct rejection", respectively.

But there are two other possible combinations: you could mismatch true vibrations with "it's not ringing" (a "miss") or mismatch the absence of vibrations with "it's ringing" (a "false alarm"). This second kind of mismatch is what's going on when you imagine a phantom phone vibration.

For situations where easy judgments can be made, such as deciding if someone says your name in a quiet room, you will probably make perfect matches every time. But when judgments are more difficult ― (3   ) ― mismatches will occasionally happen. And these mistakes will be either misses or false alarms.

(4)Signal detection theory tells us that there are two ways of changing the rate of mismatches. The best way is to alter your sensitivity to the thing you are trying to detect. This would mean setting your phone to a stronger vibration, or maybe placing your phone next to a more sensitive part of your body. The second option is to shift your bias so that you are more or less likely to conclude "it's ringing", regardless of whether it really is.

Of course, there's trade-off to be made. If you don't mind making more false alarms, (5   ). In other words, you can make sure that you always notice when you phone is ringing, but only at the cost of experiencing more phantom vibrations.

These two features of a perceiving system — sensitivity and bias — are always present

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and independent of each other. The more sensitive a system is the better, because it is more able to discriminate between true states of the world. But bias doesn't have an obvious (6)<u>optimum</u>. The appropriate level of bias depends on the relative costs and benefits of different matches and mismatches.

What does that mean in terms of your phone? We can assume that people like to notice when their phone is ringing, and that most people hate missing a call. This means their perceptual systems have adjusted their bias to a level that makes misses unlikely. The unavoidable cost is a raised likelihood of false alarms — of phantom phone vibrations. Sure enough, the same study that reported phantom phone vibrations among nearly 80 % of the population also found that these types of mismatches were particularly common among people who scored highest on a novelty-seeking personality test. (7)<u>These people place the highest cost on missing an exciting call</u>.

問1　　下線部(1)の phantom とは異なる意味で使われている文を、(ア)〜(エ)の中から一つ選びなさい。

(ア)The old house is said to be haunted by a phantom.
(イ)I still feel that my phantom limb is attached to my body.
(ウ)I'm not sure if painkillers work for phantom pain.
(エ)What kind of psychological mechanism produces phantom pregnancy?

問2　　空所(2)に入れるのに最も適切なものを、(ア)〜(エ)の中から一つ選びなさい。

(ア)Sure thing. For
(イ)That's right. Hence,
(ウ)Not at all. In fact,
(エ)Truth to be told. Yes,

問3　　空所(3)に入れるのに最も適切なものを、(ア)〜(エ)の中から一つ選びなさい。

(ア)when there is a clear-cut distinction between two judgments
(イ)if you have to decide whether someone says your name in a noisy room
(ウ)if you have to talk with a person whose eating habit is extremely disgusting
(エ)when you put your mobile phone on one of your ears while lying down on the other side

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問4　　前後の文脈も考慮し、下線部(4)の意味として最も適切なものを、(ア)〜(エ)の中から一つ選びなさい。

(ア) The theory claims two possible approaches can affect the number of mismatches.

(イ) Signal detection theory has two ways to decrease the frequency of hits.

(ウ) Signal detection theory is said to be able to change mismatches into faithful matches at an alarming rate.

(エ) The theory argues that the rate of misses and the frequency of false alarms are not exactly the same.

問5　　空所(5)に入れるのに最も適切なものを、(ア)〜(エ)の中から一つ選びなさい。

(ア) the differences between the four types of states will disappear

(イ) you can reduce the number of correct rejections

(ウ) your sensitivity can help you detect false alarms

(エ) you can avoid making so many misses

問6　　下線部(6)の意味として最も適切なものを、(ア)〜(エ)の中から一つ選びなさい。

(ア) the best possible solutions

(イ) the most favorite probability

(ウ) the most efficient level

(エ) the most famous amount

問7　　下線部(7)の意味として最も近いものを、(ア)〜(エ)の中から一つ選びなさい。

(ア) People without the novelty-seeking personality always answer the phone whenever it rings.

(イ) These people manage to pay a cost in order not to miss a call.

(ウ) These people dare to miss a call at the cost of new-found excitement.

(エ) People with the novelty-seeking personality would feel regret if they missed a stimulating call.

問8　　この文章のタイトルを、(ア)～(エ)の中から一つ選びなさい。

(ア) Two possible states and two possible psychological states

(イ) Real or not: Why we are seeing visions

(ウ) Why you think your phone is vibrating when it is not

(エ) False alarm as a system of phantom phone vibration

問9　　本文の内容と<u>合致しないもの</u>を、(ア)～(エ)の中から一つ選びなさい。

(ア) It is not the case that bias is directly related to sensitivity.

(イ) When you think the phone is ringing, there is an actual vibration.

(ウ) Phantom phone vibration is a kind of false alarm.

(エ) Signal Detection Theory can explain the case of phantom phone vibration.

問10　　本文の内容と最も合致するものを、(ア)～(エ)の中から一つ選びなさい。

(ア) You can only tell a miss from a false alarm after you answer the phone.

(イ) The first choice must be to put your phone to a sensitive part of your body when you want to avoid hitting a call.

(ウ) You can notice your phone ringing instead of experiencing more phantom phone vibrations.

(エ) People can adjust their perceptual systems in order not to miss a call.

読解問題演習 75
次の文章を読んで、問 1〜問 3 に答えなさい。

(神戸大 2010)

Anybody who does much reading of today's fiction will know that quite a surprisingly high proportion of it is about children; and, as often as not, such unhappy children too. To be quite fair, they are not (as were the children in Victorian* novels) treated with any great brutality; they are not very often beaten by their parents, or shut up in coal cellars, or told that if they are naughty they will burn perpetually in hell-fire. The adults in the modern novel about children seem hardly robust* enough for this kind of cruelty. They make their children miserable because they are miserable themselves; they are busy quarreling with one another, or worrying about money, or politics, or they are being unhappy in one or other of the subtle ways that modern psychology has discovered for us. That is to say, their distress seems to make them unimaginative and intolerant of the demands that their children make upon them. As a result, they fail to act as shock-absorbers between the big, bad world and the children in their care. The children see and hear far more than the Victorian novelists would have permitted, and they suffer accordingly. It is the old story of innocence arriving most painfully at experience—and never before in literature, surely, has innocence been so defenseless, the blows of fate so heavy, so incomprehensible.

This hasn't always been the case. When children first appeared in fiction, they were very well protected indeed. They were being educated. It was Rousseau*, of course, who reminded the modern world that children were rather special creatures. They were not adults in miniature. They had problems and qualities of their own. As it turned out, people who tried to bring up their children in accordance with Rousseau's theories of education frequently found that, in practice (1)they didn't work. Boys allowed to run wild and learn from the teachings of nature sometimes became so strong-willed when they grew up that they had to be whipped, or sent to the colonies, or to sea. But his influence was all to the good. For the first time, it became respectable to try and understand what the world looked like from the child's point of view. This, it was agreed, was a basic understanding necessary for all would-be educationalists.

I think I am right in saying that, so far as English literature is concerned, the first living and breathing child since Shakespeare made her appearance right at the end of the eighteenth century, in the didactic * tales of Maria Edgeworth*. Her name was Rosamond and we find her walking down the street with her mother and stopping in front of a toyshop. "Oh, mother," she says, "how happy I should be if I had all those pretty things!" "What, all?" exclaims her mother. "Do you wish for them all, Rosamond?" "Yes,

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Mamma," says Rosamond. "All."

There is freshness about Rosamond. But she is something more than a mere child. She is a spiritual traveler, and we see her on her journey, visibly moving from innocence to experience, from ignorance to wisdom. (2)Rosamond's mother soon finds means to show her that it is wrong to want everything in the toyshop window, that it is much more sensible to wish for something useful: a pair of shoes, for example. And Rosamond has to agree. "I am sure," she says. "No, not *quite* sure ― I *hope* I shall be wiser another time."

She is not only a child but she is conscious of being a child; she realizes that childhood is only one stage in her development. And for that reason, her sufferings do not seem quite so terrible.

注　Victorian　(19 世紀イギリスの)ヴィクトリア女王時代の;　robust　たくましい;
　　Rousseau　ルソー(フランスの思想家);　didactic　教訓的な;
　　Maria Edgeworth　マライア・エッジワース(イギリスの小説家)

問1　下線部(1)を、they が表す内容を明らかにしながら、日本語に訳しなさい。

問2　下線部(2)を日本語に訳しなさい。

問3　次の(a)〜(f)の文のそれぞれについて、本文の内容に合致するものには〇、合致しないものには×を解答欄に記入しなさい。

(a) Very few of today's novels are written about children.

(b) In Victorian novels, children are rarely treated with brutality.

(c) The adults in the modern novel about children are miserable because their children make a lot of intolerable demands on them.

(d) According to Rousseau, children and adults basically share the same problems and qualities.

(e) Rosamond in Maria Edgeworth's didactic tales is the first living and breathing child since Shakespeare in the history of English literature.

(f) The author believes that Rosamond's sufferings are not permanent.

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読解問題演習 76
次の文章を読んで、問1～問3に答えなさい。

<div align="right">(神戸大 2010)</div>

For many years, people believed that the brain, like the body, rested during sleep. After all, we are rendered unconscious by sleep. Perhaps, it was thought, the brain just needs to stop thinking for a few hours every day. Wrong. During sleep, our brain — the organ that directs us to sleep — is itself extraordinarily active. And much of that activity helps the brain to learn, to remember and to make connections.

It wasn't so long ago that the sad joke in research circles was that everyone knew sleep had something to do with memory — except for the people who study sleep and the people who study memory. Then, in 1994, Israeli researchers reported that the average performance for a group of people on a memory test improved when the test was repeated after a break of many hours — during which some subjects slept and others did not. In 2000, a Harvard team demonstrated that this improvement occurred only during sleep.

There are several different types of memory and researchers have designed ways to test each of them. In almost every case, whether the test involves remembering pairs of words or tapping numbered keys in a certain order, "sleeping on it" after first learning the task improves performance. It's as if our brains find some extra practice time while we're asleep.

(1)This isn't to say that we can't form memories when we're awake. If someone tells you his name, you don't need to fall asleep to remember it. But sleep will make it more likely that you do. Sleep-deprivation experiments have shown that a tired brain has a difficult time capturing memories of all sorts. (2)Interestingly, sleep deprivation is more likely to cause us to forget information associated with positive emotion than information linked to negative emotion. This could explain, at least in part, why sleep deprivation can trigger depression in some people: memories tainted with negative emotions are more likely than positive ones to "stick" in the sleep-deprived brain.

Sleep also seems to be the time when the brain's two memory systems — the hippocampus* and the neocortex*—"talk" with one other. Experiences that become memories are laid down first in the hippocampus, obliterating whatever is underneath. If a memory is to be retained, it must be shipped from the hippocampus to a place where it will (A) — the neocortex, the wrinkled outer layer of the brain where higher thinking takes place. Unlike the hippocampus, the neocortex is a master at weaving the old with the new. And partly because it rejects incoming information, sleep is the best time for the hippocampus to shuttle memories to the neocortex, and for the neocortex to (B) them to related memories.

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How sleep helps us consolidate memories is still largely a mystery. A recent study from the University of Lubeck, in Germany, offers one clue. Subjects were given a list of 46 word pairs to (　C　), just before sleep. Shortly after they fell asleep, as they reached the deepest stage of sleep, electrical currents were sent through electrodes* on their heads to induce very slow brainwaves. Such slow waves were induced at random in the brains of one group of subjects, but not another. The next morning, the slow-wave group had better recall of the words. Other types of memory were not improved, and inducing the slow waves later in the night did not have the same effect. Why and how the slow waves improved memory is not yet (　D　), but they are thought to alter the strengths of chemical connections, or synapses*, between specific pairs of nerve cells in the brain. Memories are "stored" in these synapses: changing the strength of the synapses (　E　) the strength of the memories they store.

注 hippocampus　海馬(大脳の部位);　neocortex　(大脳の)新皮質;
　　electrode(s)　電極;　synapse(s)　シナプス(神経細胞接合部)

問1　　第2パラグラフの内容に基づき、イスラエルとハーバードの両研究チームの実験が明らかにしたことを、それぞれ35字以内で書きなさい。ただし、句読点も1字に数えます。

イスラエルの研究チームの実験が明らかにしたこと

				35				

ハーバードの研究チームの実験が明らかにしたこと

				35				

問2　　下線部(1)、(2)を日本語に訳しなさい。

問3　　空所(　A　)〜(　E　)に入る最も適切な動詞を下から選び、必要があれば適当なかたちにして記入しなさい。ただし、それぞれの語は一度しか使えません。

endure　　　　　　　　increase　　　　　　　　link
memorize　　　　　　　understand

読解問題演習 77
次の文章を読んで、設問に答えなさい。

(同志社大 2021 年 2 月 8 日実施分)

At its peak in the 1500s, the Ottoman Empire was one of the biggest military and economic powers in the world, controlling an expanse that included not just its base in Asia Minor* but also much of southeastern Europe, the Middle East and North Africa. The Empire* controlled territory that (a)stretched from the Danube to the Nile*, with a powerful military, lucrative* commerce, and impressive achievements in fields ranging (X) architecture to astronomy.

But it didn't last. Though the Ottoman Empire persisted for 600 years, it succumbed* to what most historians describe as a long, slow decline, despite efforts to modernize. Finally, after fighting on the side of Germany in World War I and suffering defeat, the Empire was dismantled* by (b)treaty and came to an end in 1922, when the last Ottoman Sultan, Mehmed VI, was deposed* and left the capital of Constantinople (now Istanbul) in a British warship. From Ottoman Empire's remains arose the modern nation of Turkey.

What caused the once (c)awe-inspiring Ottoman Empire collapse? (ア)Historians aren't in complete agreement, but below are some factors.

It was too agrarian*.

While the industrial revolution (d)swept through Europe in the 1700s and 1800s, the Ottoman economy remained dependent (Y) farming. The (あ) (い) the (う) and mills (え) (お) (か) (き) Great Britain, France and even Russia, according to Michael Reynolds, an associate professor of Near Eastern Studies at Princeton University. As a result, the Empire's economic growth was weak, and what agricultural (e)surplus it generated went to pay loans to European creditors. When it came time to fight in World War I, the Ottoman Empire didn't have the industrial might to produce heavy weaponry, munitions* and iron and steel needed to build railroads to support the war effort.

It wasn't cohesive* enough.

At its apex*, the Ottoman Empire included Bulgaria, Egypt, Greece, Hungary, Jordan, Lebanon, Israel and Palestinian territories, Macedonia, Romania, Syria, parts of Arabia and the north coast of Africa. Even if outside powers hadn't eventually undermined the Empire, Reynolds doesn't think that it could have remained intact and evolved into a modern democratic nation. "The odds probably would have been against it, because of

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the Empire's tremendous diversity in terms of ethnicity, language, economics, and geography," he says. (中略)

The various peoples who were part of the Empire grew more and more (f)rebellious, and by the 1870s, the Empire had to allow Bulgaria and other countries to become independent, and ceded* more and more territory. After losing the 1912-1913 Balkan Wars to a coalition that included some of its former imperial possessions, the Empire was forced to give up its remaining European territory.

_____ (A) _____

Despite efforts to improve education in the 1800s, the Ottoman Empire lagged far behind its European competitors in literacy, so by 1914, it's estimated that only between 5 and 10 percent of its (g)inhabitants could read. "The human resources of the Ottoman Empire, like the natural resources, were comparatively undeveloped," Reynolds notes. That meant the Empire had a shortage of well-trained military officers, engineers, clerks, doctors and other professions.

_____ (B) _____

The ambition of European powers also helped to hasten the Ottoman Empire's demise*, explains Eugene Rogan, director of the Middle Eastern Centre at St. Anthony's College. Russia and Austria both supported rebellious nationalists in the Balkans to further their own influence. And the British and the French were eager to (h)carve away territory controlled by the Ottoman Empire in the Middle East and North Africa.

_____ (C) _____

Neighboring Czarist Russia*, whose sprawling realm* included Muslims as well, developed into an increasingly bitter rival. "The Russian Empire was the single greatest threat to the Ottoman Empire, and it was a truly existential threat," Reynolds says. When the two Empires took opposite sides in World War I, though, the Russians ended up collapsing first, in part because of the Ottoman forces prevented Russia from getting supplies from Europe via the Black Sea. Tzar Nicholas II* and his foreign minister, Sergei Sazanov, resisted the idea of negotiating a separate peace with the Empire, which might have saved Russia.

_____ (D) _____

Siding (Z) Germany in World War I may have been the most significant reason for the Ottoman Empire's demise. Before the war, the Ottoman Empire had signed a secret

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treaty with Germany, which (イ)<u>turned out to be a very bad choice</u>. In the conflict that followed, the Empire's army fought a brutal, bloody campaign on the Gallipoli peninsula* to protect Constantinople from invading Allied forces* in 1915 and 1916. Ultimately, the Empire lost nearly a half a million soldiers, most of them to disease, plus about 3.8 million more who were injured or became ill. In October 1918, the Empire signed an armistice* with Great Britain, and quit the war.

If it weren't for its fateful role in World War I, some even argue that the Empire might have survived. Mostafa Minawi, a historian at Cornell University, believes the Ottoman Empire (ウ)<u>had the potential to evolve into</u> a modern multi-ethnic, multi-lingual federal state. Instead, he argues, World War I (i)<u>triggered</u> the Empire's disintegration. "The Ottoman Empire joined the losing side," he says. As a result, when the war ended, "The division of territories of the Ottoman Empire was decided by the victors."

<div align="right">(By Patrick J. Kiger, writing for History.com, January 10, 2020)</div>

[注]		
	Asia Minor	小アジア(主に現在のトルコが位置する半島)
	Empire	(原文では小文字で empire と表記している箇所がここを含め複数あるが、本問題ではすべて Empire と表記する)
	from the Danube to the Nile	ドナウ川からナイル川まで
	lucrative	繁栄した
	succumbed	(succumb　屈する)
	dismantled	(dismantle　解体する)
	deposed	(depose　退位させる)
	agrarian	農業中心的な
	munitions	軍需品
	cohesive	結合力がある
	apex	頂点
	ceded	(cede　所有権を譲渡する)
	demise	終焉
	Czarist Russia	帝政ロシア
	sprawling realm	広がる領域
	Tzar Nicholas II	皇帝ニコライ二世
	Gallipoli peninsula	ガリポリ半島(トルコ北西部にある)
	Allied forces	連合国軍
	armistice	停戦

I-A 空所(X)、(Y)、(Z)に入るもっとも適切なものを次の 1〜8 の中から一つ選び
なさい。同じ語を二度使ってはいけません。

1 about	2 by	3 for	4 from
5 into	6 over	7 upon	8 with

I-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
れ一つ選びなさい。

(a) stretched

1 abandoned	2 extended	3 modified	4 struggled

(b) treaty

1 diplomatic agreement	2 economic development
3 medical treatment	4 physical enhancement

(c) awe-inspiring

1 admired	2 criticized	3 humanized	4 transported

(d) swept through

1 cleaned up	2 expanded across
3 left behind	4 wrote about

(e) surplus

1 excess	2 machinery	3 principle	4 scarcity

(f) rebellious

1 accommodating	2 disobedient
3 harmonious	4 universal

(g) inhabitants

1 accountants	2 infants	3 residents	4 servants

(h) carve away

1 assist and fund	2 divide and occupy
3 experience and document	4 promote and respect

(i) triggered

1 induced	2 interrupted
3 mourned	4 terminated

I-C 破線部(ア)～(ウ)の意味・内容をもっとも的確に示すものを、次の中からそれぞれ一つ選びなさい。

(ア) Historians aren't in complete agreement

1. Historians agree to a unified conclusion
2. Historians are looking for incomplete answers
3. Historians are refusing to accept the agreement
4. Historians have different answers to the question

(イ) turned out to be a very bad choice

1. transformed a notorious partner
2. turned the choice upside down
3. unintendedly resulted in a poor outcome
4. was a rewarding alternative

(ウ) had the potential to evolve into

1. had the guarantee to grow into
2. had the possibility of transforming into
3. had the specific plan of changing into
4. had the temporal break down into

I-D 二重下線部の空所(あ)～(き)に次の1～8の中から選んだ語を入れて文を完成させたとき、(い)と(か)に入る語の番号を記しなさい。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一つ含まれています。

The (あ) (い) the (う) and mills (え) (お) (か) (き) Great Britain, France and even Russia

| 1 Empire | 2 factories | 3 keep | 4 lacked |
| 5 to | 6 up | 7 where | 8 with |

I-E 空所(A)〜(D)に入るもっとも適切な小見出しを次の 1〜6 の中からそれぞれ
選びなさい。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. It faced a destructive rivalry with Russia.

2. It ignored the power of union protests.

3. It picked the wrong side in World War I.

4. Its population was under-educated.

5. Other countries' cultures influenced peacekeeping.

6. Other countries deliberately weakened it.

I-F 本文の意味・内容に合致するものを次の 1〜6 の中から二つ選びなさい。

1. The Ottoman Empire reached the height of its prosperity in the 15th century but spent the next 600 years in slow decline before it was finally broken down in the end.

2. Since the Ottoman Empire substantially relied on agriculture for its economy in the 18th and 19th centuries, it did not have the fundamental basis for infrastructural development and manufacturing.

3. Even though the Ottoman Empire had a vast territory from Romania in Eastern Europe to Egypt in northern Africa, it was governed by strong political leadership and people spoke English as a single official language.

4. Because education and training developed rapidly in the Ottoman Empire compared with European countries in the 19th century, the number of people suited to highly skilled occupations grew substantially.

5. Russia was a rival to the Ottoman Empire for years, and eventually these two countries developed a hostile relationship during World War I.

6. The support of Allied forces such as Great Britain contributed to building Turkey as a modern multi-ethnic state by protecting lands that the Ottoman Empire once had.

I-G 本文中の太い下線部を日本語に訳しなさい。Reynolds は「レイノルズ」と表
記してください。

Even if outside powers hadn't eventually undermined the Empire, Reynolds doesn't think that it could have remained intact

読解問題演習 78
次の文章を読んで、答えを書きなさい

(成蹊大 2021 年 2 月 10 日実施分)

In a small town in the north of England there was a big library with a lot of interesting books in it. People in the town could take the books home for four weeks and read them. They could have as many as four books each time — different books about animals, boats, cooking and holidays or love stories, and then they had to take them back to the library.

Every year the library bought more and more books and soon the building was too small for all the books. One morning in early autumn the boss said, 'November 28th is a big day for us — we're going to move to a new library building. It's a much bigger and better building but there's one difficult problem... it's going to be very expensive to move all our books to the new building. Where are we going to find the money and the time?' the boss asked.

The people in the library thought about this problem. One evening five weeks before November 28th, a young woman thought of a good plan. She went and talked to the boss about it. He was very interested and together they planned it all carefully. Two weeks later, the boss told the people about the plan: 'Between now and November 28th, everybody can take six books home, not four books as usual... and they can have the books for six weeks, not four.'

Everybody in the town was very happy and they took five or six books home. After two weeks, most of the books were out of the library. On November 28th the big day arrived, and they moved to the new building. It was quite easy because they had only a small number of books to move there. In the month after the move everybody took their books to the new library. The boss was very happy because it was quite cheap to move and it was quick and easy, too.

[Adapted from 'Cheap and Easy' in *Stranger than Fiction: Urban Myths*, Phil Healey and Rick Glanvill, Penguin Readers, Pearson, 2008]

1. 上の story に登場するイングランド北部の図書館が直面した問題は何だったか。簡潔な日本語で説明しなさい。

2. 同図書館は、どういう妙案によって上記の問題を解決したか。必要十分と思う要素を入れて簡潔な日本語で説明しなさい。

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読解問題演習 79

Read the following passage and write the answers to the questions.

(東京慈恵会医科大・医 2021)

When learning something new, there are (　A　) where trial and error helps rather than hinders, according to recent findings by Baycrest researchers. Contrary to (　B　), when a person makes a mistake while learning, it improves their memory for the right information, but only if the error is close to the correct answer, according to a study published in the journal, *Memory*.

"Our research found (1)<u>evidence</u> that mistakes that are a 'near miss' can help a person learn the information better than if no errors were made at all," says Dr. Nicole Anderson, senior author on the paper and senior scientist at Baycrest's Rotman Research Institute. "These types of errors can serve as stepping stones to remembering the right answer. But if the error made is a wild guess and out in left field, then a person does not learn the correct information as easily."

These findings could (　C　) improving education for not only younger adults, but also late-life learners. In one of the studies reported in the paper, researchers recruited 32 young adults with no Spanish (　D　) to guess the English definition of certain Spanish words. The Spanish words selected either resembled an English word with a similar meaning (such as careera, which means degree) or the word looked like an English word, but meant something different (such as carpeta, which resembles carpet, but means folder).

Participants were shown the Spanish words and asked to guess its meaning. Then, they were briefly shown the correct translation, before being shown another Spanish word. After repeating this process with 16 Spanish words, participants had a short break before their memory for the translations was tested.

Researchers found that people were better able to remember the correct translations for Spanish words that were similar to the English word. They had greater difficulty recalling the meaning for words that looked (2)<u>misleading</u>.

"Based on these findings, someone studying for an exam should only take practice quizzes after reviewing the material," says Dr. Anderson, who is also an associate professor of psychology and psychiatry at the University of Toronto. "If a person takes a practice test and is (3)<u>unfamiliar</u> with the content, they risk making guesses that are nowhere near the right answer. This could make it harder for them to learn the correct information later." Even if a person makes a mistake while testing themselves, as long as their error is close to the right answer, they're more likely to remember the right information, adds Dr. Anderson.

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As next steps, the team is studying the brain activity of people when they make "near miss" and "out in left field" types of errors during learning. Their work (4)<u>strives</u> to uncover how these different mistakes impact a person's brain function when they try to remember the correct information.

[Adapted from: Baycrest Centre for Geriatric Care. "Making mistakes while studying actually helps you learn better." ScienceDaily, 11 June 2018.
<www.sciencedaily.com/releases/2018/06/180611133437.htm>]

1. Choose the correct choice from the list to fill in blanks (A)～(D).

(A)	1. patterns	2. samples	3. instances	4. arguments
(B)	1. conflicting ideas	2. proven fact	3. trusted statistics	4. popular belief
(C)	1. help with	2. benefit for	3. assist to	4. develop in
(D)	1. culture	2. setting	3. background	4. upbringing

2. Choose the best meaning for the underlined words (1)～(4).

(1)	1. approval	2. traces	3. indications	4. authentication
(2)	1. distorted	2. false	3. deceptive	4. ambiguous
(3)	1. ignorant	2. untested	3. oblivious	4. inexperienced
(4)	1. continues	2. supports	3. simulates	4. attempts

3. According to the text, what is the most useful point for remembering new knowledge?
    1. Making both close and wild mistakes so you have to look up the correct answers
    2. Making a mistake that is unrelated to the correct answer
    3. Making mistakes with every answer so that you must review more often
    4. Making a mistake that is almost the correct answer

4. Who will benefit the most from this research?
    1. Anyone who is trying to learn something new will find it worthwhile.
    2. Young learners will best be able to take advantage of this information.
    3. This technique will help older learners more than others.
    4. People who are cramming for tests will be able to analyze better using this method.

5. What were the participants in the study first asked to do?
    1. Try to understand the meaning of Spanish words by comparing them to English words
    2. Remember the translations of Spanish words that resembled English words but had unrelated meanings
    3. Guess the definition of some Spanish words that resembled English
    4. Learn the definitions of Spanish words that looked both similar to and different from English words

6. What was the conclusion of the study?
    1. Participants had an easier time remembering the meanings of words that sounded like English words.
    2. Participants found it harder to remember the meanings of words if they guessed the wrong meanings at first.
    3. Participants were less able to remember the meanings of words if they made wild guesses.
    4. Participants were better able to remember the meanings of words if they got the correct answer when they guessed at the beginning.

読解問題演習 80
次の文章を読んで、設問に答えなさい。

（東京慈恵会医科大・看護 2018）

There are at least two senses of the word "unconscious." One means totally (1)<u>devoid of</u> mind, experience and feeling, and this is what materialists mean when they say matter is unconscious. Physicists and chemists treat the systems they study as unconscious in this absolute sense. But a very different meaning of "unconscious" is implied by the phrase "unconscious mind." Most of our own mental processes are unconscious, including most of our habits. When driving a car we can (a) on a conversation while our perceptions of the road and other vehicles affect our responses, without our being consciously aware of all our movements and choices. When I come to a familiar road junction, I may (b) right automatically, because this is my habitual route. I am choosing among possibilities, but choosing on the basis of habit. [X], if I am driving in an unfamiliar town and trying to find my way with the help of a map, my choice when I come to a junction depends on conscious deliberation. But only a small minority of our choices are conscious. Most of our behavior is habitual, and habits by their very nature work unconsciously.

[Y], animals are largely creatures of habit. Yet the fact that they are not conscious of most of their actions — as we are not conscious of most of our own — does not (c) they are mindless machines. They have a mental aspect as well as a physical aspect, and their mental aspect is shaped by their habits, feelings and potentialities, among which they choose, unconsciously or consciously.

It may not (d) much sense to suggest that electrons, atoms and molecules make conscious choices, but they may make unconscious choices on the basis of habits, just as we do and animals do. According to quantum theory, even elementary particles like electrons have many alternative future possibilities. The calculation of their behavior by physicists involves taking all their possible futures into account. Electrons are physical in that they reenact elements of their past; but they also have a mental pole in that they relate this reenactment of the past to their future potentialities, which in some sense work backward in time.

But can we meaningfully say that electrons have experiences, feelings and motivations? Can they be attracted toward one possible future, or repelled by another? The answer is yes. [Z], they are electrically charged; they "feel" the electric field around them; they are attracted toward positively charged bodies, and repelled by those with negative charges. Physicists model their behavior mathematically without supposing that their feelings, attractions and (e) are anything other than physical forces, or that

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their individually unpredictable behavior is governed by anything other than chance and probability. Materialists would say that only by fanciful metaphors can they be seen to have feelings or experience. But some physicists think differently, like David Bohm and Freeman Dyson. Bohm observed, "(2)<u>The question is whether matter is rather crude and mechanical or whether it gets more and more subtle and becomes indistinguishable from what people have called mind</u>."

[Sheldrake, Rupert. *Science Set Free* (2012)]

注　quantum theory　　　　　　「量子(理)論」

問1　（ a ）～（ d ）に入る最も適切な語を 1～4 の中から選びなさい。ただし、それぞれの語は 1 回ずつしか使えません。
 1. carry　　　　　　　2. make　　　　　　　3. mean　　　　　　　4. turn

問2　下線部(1)の語句の本文中の意味と最も近い意味を持つ語を、1～4 の中から 1 つ選びなさい。
 (1) devoid of　　1. forgiving　　2. lacking　　3. mocking　　4. obliging

問3　前後関係から考えて（ e ）に入る最も適切な語を 1～4 の中から 1 つ選びなさい。
 1. compulsions　　2. contradictions　　3. repulsions　　4. retractions

問4　前後関係から考えて[X]～[Z]に入る最も適切な語句を 1～3 の中から選びなさい。ただし、それぞれの語句は 1 回ずつしか使えません。
 1. By contrast　　　　　　2. For a start　　　　　　3. Like humans

問5　本文の趣旨と最も合う内容を持つ文を 1～5 の中から 1 つ選びなさい。
1.　In physiology and chemistry there are two meanings of "unconscious."
2.　We converse with a friend unconsciously while we ride a bus.
3.　Driving in an unfamiliar place, we try to find our way on the basis of habit.
4.　Neither humans nor animals are conscious of most of their actions.
5.　All physicists deny that electrons have experiences, feelings and motivations.

問6　下線部(2)を日本語に訳しなさい。