1 次の(1)～(12)の(　　)に入れるのに最も適切なものを，下の(a)～(d)からそれぞれ1つずつ選び，その記号をマークせよ。

(1) The question is not (　　) to this situation.
(a) linear　(b) intermediate　(c) maternal　(d) relevant

(2) The WHO predicts that by 2030, chronic respiratory diseases will be the third-leading cause of (　　) worldwide.
(a) humanity　(b) sympathy　(c) charity　(d) mortality

(3) Objectives of the study were explained to the patients and informed (　　) was obtained.
(a) ascent　(b) enforcement　(c) consent　(d) encouragement

(4) On the (　　), another experiment was successful.
(a) consecutive　(b) constant　(c) continuous　(d) contrary

(5) The paper should be written (　　) more clearly.
(a) seemingly　(b) slightly　(c) smoothly　(d) steadily

(6) The audience was (　　) by the classical music.
(a) slipped　(b) specialized　(c) squeezed　(d) stimulated

(7) To (　　) AIDS and treating the disease may be the toughest and most urgent assignment the world faces.
(a) elucidate　(b) explicate　(c) saturate　(d) eradicate

(8) Almost 93% of children with special health care needs had a standard source of (　　) care and sick care.
(a) distrustful　(b) preventive　(c) multitude　(d) profuse

(9) Jonathan was born with Down syndrome, a genetic disorder that (　　) from an additional chromosome.
(a) gives　(b) produces　(c) stems　(d) chances

(10) Drug addiction is often accompanied by noncompliance with medical advice, which can (　　) the completion of a full recovery.
(a) surge　(b) parallel　(c) hinder　(d) exhibit

(11) When women are optimistic about the future, they are less likely to be (　　) postpartum depressive symptoms.
(a) in agreement with　(b) at risk of　(c) made use of　(d) having the understanding of

(12) Russia's well-known demographic (　　) is derived from a low birth rate and a short life expectancy due to alcohol abuse and heavy smoking.
(a) reproduction　(b) equivalence　(c) escalation　(d) decline

2 次の(1)と(2)の各パラグラフ(段落)には，まとまりをよくするために取り除いた方がよい文が一つある。取り除く文として最も適当なものを，それぞれ下線部(a)～(d)のうちから一つずつ選び，その記号をマークせよ。ただし，各パラグラフは独立したものである。

(1)

Although Japanese and American high schools have some similarities, they are different in many ways. (a)For instance, in Japan, students must take an entrance exam to enter high school. (b)In contrast, in the U.S., there are no entrance exams, and what high school you go to is normally determined by where you live. (c)Also, Japanese students study mathematics, science, history, physical education, and English, and so do the Americans. (d)In addition, dress regulations at Japanese high schools are much stricter than American schools.

(2)

While living on your own has some definite advantages, it also has some disadvantages. The main disadvantage is that it is more expensive. (a)To begin with, you have to spend a lot of money for rent. (b)In addition, you have to pay a deposit for an apartment. (c)Furthermore, Internet banking is increasingly becoming available for making deposits. (d)Another disadvantage is that it is not as convenient as living with your parents. You have to do all the house work yourself. If you live with your parents, you won't have to waste time traveling to visit them.

(Martin, D. F. (2010). *Write Away Right Away* より一部改変)

3 次の英文が完成した文章になるように，文意に沿って，(1)～(4)の(a)から(f)を並べ替えた後，それぞれ１番目，３番目，６番目にくるものの記号をマークせよ。

Does the potential to win or lose money influence the confidence one has in one's own decisions? Does either of them help learn more quickly? Researchers from the University of Geneva (UNIGE), Switzerland, in collaboration with the University of Amsterdam and ENS Paris, investigated confidence bias in a learning context through a system of monetary punishment and reward. They (1) [(a) we become more (b) to seek rewards than when (c) when learning (d) learning to avoid losses (e) demonstrated that (f) confident in our choices]. However, this confidence rapidly evolves into over-confidence, which leaves us thinking that we are better than we actually are. Learning in a loss context mitigates these errors of judgment. Moreover, the prospect of monetary gains makes us less flexible, while the fear of losing money preserves our ability to adapt.

Evaluating one's learning performance relies on how confident one feels about one's decisions. But can our ability to learn and to judge our decisions be influenced by economic factors? In other words, (2) [(a) our performance (b) involves monetary (c) with a situation that (d) identically when faced (e) gain or loss (f) do we judge]?

The UNIGE researchers tested 84 participants to investigate confidence bias in the context of reward or punishment-based learning, known as reinforcement learning. Participants were shown two abstract symbols on a screen. One symbol was associated with a 75% probability to win 50 cents and the second one only 25% probability to win. On each trial, they had to choose one of the symbols to try to win and evaluate how confident they were in their choice. As the task progressed, (3) [(a) to refine (b) the symbol that paid (c) their decisions by (d) out the most (e) the subjects learned (f) identifying]. The principle was reversed for the loss: participants were asked to select the symbol that was associated with the lowest probability to lose money and then assess the accuracy of their decisions.

The initial results showed that the ability to learn is statistically identical when participants learn to seek gains and when they learn to avoid losses. On the other hand, participants were much more confident when it came to making money rather than avoiding losing it.

Half of the participants then underwent a second experiment: the researchers reversed the quality of the symbols, making the best the worst. Participants (4) [(a) difficulty noticing (b) in the context of (c) of financial loss quickly (d) while those in the context (e) this change and adapting, (f) financial gain had more] noticed the change and were flexible. This is probably the result of evolution: when there's a danger, you have to think quickly and adapt your decisions, while when everything is going well, we try to maintain the positive situation. This implies that the desire for gain induces a certain inflexibility among learners, who think that what has paid out once will always pay out.

These results demonstrate that teaching should be tailored to what we want an individual to learn and how. The learning context is crucial. The fear of loss makes people anxious and they begin to doubt their choices; yet it also provides more flexibility and accuracy. The lure of profit, on the other hand, boosts self-confidence and well-being but reduces our ability to make assessments.

(Lebreton, M. et al. (2019). *PLOS Computational Biology* より一部改変)

4 次の英文を読んで，以下の問いの答えを，それぞれ(a)～(d)より１つずつ選びマークせよ。

The prevalence of concussions in sports is well known. A concussion is usually caused by a blow to the head, and results in temporary unconsciousness or confusion, and other symptoms. So, too, is the challenge clinicians and others face when they have to decide when an athlete can return to the game after a head injury. While most athletes recover from a sports-related concussion in about seven to 10 days, some need more time. This predicament makes managing the treatment of sports-related concussions very complicated.

Researchers from Florida Atlantic University's College of Engineering and Computer Science and collaborators have come up with a novel solution. They are teaching machines how to predict recovery time from sports-related concussions based on symptoms like headache, dizziness and fatigue. Their study, published in the American College of Sports Medicine's journal, *Medicine & Science in Sports & Exercise*, can be used as the foundation for a decision support system that would aid clinicians in developing individualized treatment for injured athletes. This research also is part of a larger ongoing effort by the team to develop machine learning models to help diagnose, track and treat a variety of brain health issues.

Using data from the National Athletic Treatment, Injury and Outcomes Network, an injury surveillance program on high school student-athletes, the researchers examined data on 2,004 concussion incidents in 22 sports, looking at where the injuries primarily occurred. They found that more than half of the concussions happened in American football.

With this information, they created a new dataset of concussive injuries in football as well as other contact sports that included wrestling, field hockey and boys' and girls' basketball, soccer, and lacrosse. This new dataset included 922 football concussions and 689 concussions from other contact sports, totaling 1,611 concussion incidents from all contact sports. For the dataset of all contact sports, the total number of symptoms reported per sports-related concussion incident ranged from zero to 17, with 55% of the student-athletes reporting five or more symptoms.

The researchers implemented a supervised machine learning-based modeling approach to predict recovery time of concussion-related symptoms within seven, 14 and 28 days. They examined the efficacy of 10 classification algorithms in building the prediction models, using the dataset representing three years of concussions suffered by these high school student-athletes in football and the other contact sports.

With the dataset showing that the most prevalent reported sports-related concussion symptom was a headache (94.9%), followed by dizziness (74.3%), and then difficulty concentrating (61.1%), the symptom-based prediction models demonstrated practical clinical value in estimating sport-related concussion recovery time. This information can be especially valuable to health care providers in concussion case management and patient care. Beyond clinical decision support, this insight also can help with planning academic accommodations and team needs.

(Bergeron, M. F. et al. (2019). *Medicine & Science in Sports & Exercise* より一部改変)

(1) Why is treating sports-related concussions a complicated issue?

(a) Creating a unified method of treating concussions is always the issue at hand.

(b) Machines are not seen as reliable in predicting recovery time.

(c) Determining when athletes will recuperate from a concussion is problematic.

(d) Ascertaining what each team needs cannot be done very easily.

(2) According to the article, which of the following is correct?

(a) Building prediction models based on classification algorithms will lead to finding a cure for brain injuries.

(b) Sports are most often the cause of brain injuries, including concussion-related symptoms.

(c) Researchers are trying to use machine learning models to help with treating brain injuries.

(d) Treating sports-related concussions will need more funding from the government in the future.

(3) Which of the following is NOT a symptom of a sports-related concussion?

(a) Headache

(b) Soreness

(c) Dizziness

(d) Fatigue

(4) How many concussion-related symptoms did the majority of the athletes report in this study?

(a) Zero to four

(b) Five to Seventeen

(c) Eighteen to fifty-five

(d) More than fifty-five

(5) In what sport did the researchers find the most concussions happen?

(a) Wrestling

(b) American football

(c) Basketball

(d) Soccer

(6) Which of the following lengths of time was NOT used to predict the recovery time of concussion-related symptoms?

(a) Ten days

(b) Twenty-eight days

(c) Seven days

(d) Fourteen days

5 次の英文を読んで，以下の問いに答えよ。

Columbia University scientists have demystified a metabolic enzyme that could be the next major molecular target in cancer treatment. The team has successfully determined the 3D structure of human ATP-citrate lyase (ACLY)—which plays a key role in cancer cell (1) and other cellular processes—for the first time.

The findings represent a first step in better understanding the enzyme in order to create effective molecular targeted (2) for patients. While previous experiments have succeeded with fragments of the enzyme, the current work reveals the full structure of human ACLY at high resolution.

ACLY is a metabolic enzyme that controls many processes in the cell, including fatty acid synthesis in cancer cells. By inhibiting this enzyme, the researchers hope to control cancer growth. In addition, the enzyme has other roles, including cholesterol biosynthesis, so inhibitors against this enzyme could also be useful toward (3) cholesterol levels.

Targeted therapy is an active area of cancer research that involves identifying specific molecules in cancer cells that help them grow, divide and spread. By targeting these changes or blocking their effects with therapeutic drugs, this type of treatment interferes with the (4) of cancer cells.

Earlier this year, another group of researchers presented results of a phase 3 clinical trial for bempedoic acid, an oral therapy for the treatment of patients with high cholesterol. The drug, a first-generation ACLY inhibitor, was shown to reduce low-density lipoprotein (LDL) cholesterol by 30% when taken alone and an additional 20% in combination with statins.

ACLY has been found to be over-expressed in several types of cancers, and experiments have found that "turning off" ACLY leads cancer cells to stop growing and dividing. Knowledge of the complex molecular architecture of ACLY will point to the best areas to focus on for inhibition, paving the way for targeted drug development.

The scientists performed an imaging technique known as cryogenic electron microscopy (cryo-EM) to resolve the complex structure of ACLY. Cryo-EM allows for high-resolution imaging of frozen biological (5) with an electron microscope. A series of 2-dimensional images are then computationally reconstructed into accurate, detailed 3D models of intricate biological structures like proteins, viruses, and cells.

A critical part of the drug discovery process is to understand how the compounds work at the molecular level. This means determining the structure of the compound bound to the target, which in this case is ACLY.

The cryo-EM results revealed an unexpected mechanism for effective inhibition of ACLY. The team found that a significant change in the enzyme's structure is needed for the inhibitor to bind. This structural change then indirectly blocks a substrate from binding to ACLY, averting enzyme activity from occurring as it should. This (6) mechanism of ACLY inhibition could provide a better approach for developing drugs to treat cancer and metabolic disorders.

(Wei, J. et al. (2019). *Nature* より一部改変)

1. 本文の空所(1)～(6)に入れるのに最も適切な語を，下記の(a)～(d)からそれぞれ１つ選び，その記号をマークせよ。

(1)	(a) proclamation	(b) shortages	(c) proliferation	(d) scarcity
(2)	(a) bases	(b) marrow	(c) satellites	(d) therapies
(3)	(a) making	(b) controlling	(c) inspiring	(d) switching
(4)	(a) progression	(b) deterioration	(c) embodiment	(d) classification
(5)	(a) germs	(b) duties	(c) illnesses	(d) specimens
(6)	(a) menial	(b) novel	(c) rustic	(d) outdated

2. 本文の内容と適合するものを下記の(a)～(h)から3つ選び，その記号をマークせよ。

(a) ACLY plays a very important function in cancer cell production.
(b) The primary goal of this research was to test a new drug for cancer treatments.
(c) One type of ACLY inhibitor can reduce LDL by between 30% and 50%.
(d) An enzyme's structure cannot be extensively altered.
(e) The research did not enable us to see ACLY at high resolution.
(f) Trying to solve the structure of ACLY was not an option for the researchers.
(g) It is difficult to identify which kinds of cancer cells grow and spread.
(h) Discovering new drugs requires scientists to look at compounds at an extremely minute level.

6

1. 次の日本語を読み，SNSがもたらした変化とその理由を**20語程度の英語**でまとめよ。なお，設定語数を大幅に超えるもの，全訳をしたものは採点の対象としない。

SNSが登場して初めて，人々は自分の電話番号や交友関係，好き嫌い，所在地など個人情報をウェブサイト上で共有するようになった。友達だけが見ることができると思っているからだ。

（日本経済新聞.（2019）. 15歳フェイスブックの憂鬱（The Economist）より一部改変）

2. 次の英語を読み，"the company" が取り入れる施策とその理由を**50字程度の日本語**でまとめよ。なお，設定字数を大幅に超えるもの，全訳をしたものは採点の対象としない。

The company is seeking to speed up its shipping time to one day for its priority members. The company, which is racing to deliver packages faster, is turning to its own employees with a proposition: Quit your job, and we will help you start a business delivering packages for the company. The company sees the new incentive as a way to get more packages delivered to shoppers' doorsteps more quickly.

（Associated Press.（2019）. *Los Angeles Times* より一部改変）