

[I] 次の英文を読んで設問に答えなさい。

Compared with constitutional revision, the economy, celebrity gossip, and Japan's role in the geopolitical changes (a) place in East Asia, (あ)日本のメディアと政治家は最近まで環境問題をそれほど重視してこなかった。 Suddenly, though, the environment is back on the agenda. A record-hot summer and natural disasters in western Japan, including the flooding of Kansai International Airport, drove home the importance of dealing with climate change. But in cities like Kyoto, where international tourism drives large sectors of the local economy, the problem of waste and garbage and the environmental challenges it (b) are the more urgent problems.

Japan's ubiquitous* use of plastic and the environmental problems associated with it have long been noted by those from countries with strict local ordinances* or national legislation to control the use of plastic. (い)Related to the plastic waste problem is one that shocks visitors from countries where food shortages and starvation remain issues: Japan's huge volume of wasted food, which often (c) in plastic containers. The Environment Ministry estimated food loss at about 6.46 million tons in 2015. (う)That's more than double the nearly 3.2 million tons of food assistance that was distributed worldwide in 2014, according to the United Nations' World Food Programme.

Local governments around the country are (d) efforts to reduce food loss and food waste, and (え)京都は食品ロスを減らすことを最優先とすると最近発表した。 Earlier this month, Mayor Daisaku Kadokawa cited the 6.46-million-ton food loss figure in announcing new efforts. The city's calculations are that food loss in Kyoto, with a population of 1.4 million, is about 64,000 tons annually—1 percent of Japan's total. Kyoto's goal is to reduce food loss to 50,000 tons by 2020. To achieve that goal means pressuring food sellers and distributors to revise the so-called one-third rule, whereby the period from when a food product is produced to its designated “consume-by” date is divided into three shorter periods. The first is the time it takes food manufacturers to get the food to retailers. (お)二つ目は小売業者が製品を販売することとした期間である。 The third is by when consumers are recommended to eat it. (か)Missing one of these arbitrary “deadlines” can mean food is thrown away, despite the fact that it remains safe to eat.

Some supermarkets in Kyoto have responded to efforts to change the rules, and Kadokawa says they have the backing of most Kyoto residents. (き)But the tougher problem, not limited to Kyoto, is getting convenience stores to rethink the way they operate so as to reduce food loss. There were more than 55,000 convenience stores nationwide as of August, according to data from the Japan Franchise Association. Kyoto Prefecture had just over 1,000, and unofficial

estimates from Kyoto-based environmental activists say the city of Kyoto has at least 600 convenience stores.

Aware that Kyoto's international reputation could take a serious hit if environmentally conscious customers, regardless of nationality, don't see more efforts to combat food loss in restaurants, supermarkets, and convenience stores—which is increasing due to the tourist boom—^(く)Kyoto at least recognizes that food loss reduction is now an immediate economic, political, and public relations issue, as well as an environmental one.

What Kyoto needs to do next is to impose even tougher legal requirements of the kind found in other countries on food suppliers and retailers to control food and plastic waste. Japan's convenience stores have ^(け)benefited from the tourism boom in Kyoto and elsewhere. They are politically powerful and will fight hard to ensure reduction policies are as voluntary as possible. However, if Kyoto is serious about becoming a role model for the rest of the nation in reducing food loss, the mayor and the city know that it's now time to take ^(け)that next step.

設問

問1 (a)～(e)に入れるのにふさわしい動詞を選択肢から選び、この場所にふさわしい形にして入れなさい。一つの動詞を複数回使ってはならない。

benefit challenge come make play present take

問2 下線部(あ)を英語に訳しなさい。

問3 下線部(い)を日本語に訳しなさい。

問4 thatの内容を明らかにして、下線部(う)を日本語に訳しなさい。

問5 下線部(え)を英語に訳しなさい。

問6 下線部(お)の日本語の意味を表すように、次の単語を並び替え、6番目と10番目に入る単語を解答欄に記しなさい。

are in is period product retailers second
sell supposed the the the to which

問7 下線部(か)を日本語に訳しなさい。

問8 下線部(き)を日本語に訳しなさい。

問9 下線部（く）で述べられている内容の理由を、日本語75字以内でまとめなさい。

問10 下線部（け）の that next step とはどのようなものか、日本語75字以内で説明しなさい。

〔Ⅱ〕 次の英文を読んで設問に答えなさい。

The so-called trolley problem is the quintessential* moral puzzle posed by philosophers. A runaway train is heading towards five people tied to a track. By diverting the train down a sidetrack, you can save five lives. However, one person is on the sidetrack and will die. What should you do? Most people— young and old, rich and poor—believe you should divert the train. Now imagine the same situation—the train is heading towards five people tied to the track—but this time you are standing on a bridge above the track, next to an overweight man. Once again you can save five lives, but only by pushing the heavy man onto the track. He will die, but he is large enough to stop the train. What should you do? This time, almost everyone agrees that you should not kill one person to save the five lives.

This well-known puzzle is hardly realistic, but it is relevant to how we programme autonomous machines, in particular the driverless car, (a) may be on our streets within a decade or so. Imagine the car is faced with an unavoidable accident—it can swerve* one way and hit a child, or (ア) and run into several adult pedestrians. What should it be programmed to do?

There are tough engineering challenges for driverless cars to overcome before they are allowed to operate. But ethical issues might turn out to be the bigger obstacle. If so, (イ) would be bad news. The driverless car will hurt some people [1], but the benefits will be immense. They include social gains [2], economic and efficiency gains [3], and environmental gains [4]. Just as the invention of the car led to the creation of suburbs, so the driverless car will allow a re-imagination of our urban space.

Above all, however, it will be directly life-saving. Around the world, more than a million people are killed in car accidents each year, most because of driver error. (A) The driverless car *won't* (い), *won't* (ろ), and *won't* (は).

So what is to be done? The crucial point is to acknowledge that trolley dilemmas are going to be extremely rare. The driverless car won't have slow, human reaction times. If something unexpected occurs on the road ahead, (ウ) will almost always be able to brake in time to avoid a collision.

But we still need to work out what to do in those unusual cases (b) an accident is unavoidable. What kind of morals should be programmed into the machine? (エ) the original trolley problem shows is that most of us do

not have simple ① utilitarian instincts—that is, we don't necessarily believe that the best course of action is always to maximise happiness, or to save the maximum number of human lives. If we did, we would see no difference between diverting the train and pushing the man over the bridge. Rather, most of us have ② Kantian instincts—we object to humans (such as the overweight man) being used merely as a means to an end. However, I think that when it comes to machines, we will be more tolerant of their making utilitarian decisions and (c) they will probably be programmed to save as many lives as possible.

Driverless cars are merely one example of the autonomous machines (d) we will delegate ethical choices. When should the carebot* call for help if a patient is not taking her pills? What degree of risk to civilian life is acceptable before the autonomous missile launches an attack? (B) An added complication is machine-learning—as machines “learn” how to act, they may end up behaving in unforeseen ways. As a result, it will make less and less sense to hold humans responsible for machine action—hence, I predict, our growing preference for utilitarian solutions.

If anything, the driverless car is the least problematic of these new dilemmas. Of course, we need to establish who is responsible for the ethics (e) a vehicle is programmed, and what the ethical formula will be. It would be ridiculous if passengers or manufacturers were free to choose their car's morality for themselves, so that, for example, you would select a Kantian Toyota while I opted for a utilitarian Ford. A much more straightforward approach would be for governments to insist upon a general “minimise loss of life” rule. We could then disregard the bizarre questions put by philosophers, such as “would you rather save two pedestrians or a successful businessperson?” But we need to work out quickly what ethics should be encoded into autonomous devices, and how machine ethics should be regulated. Otherwise we will delay the arrival of technologies—such as the driverless car—and hold up all the extraordinary benefits (オ) promise.

設問

問1 (a)～(e)の空欄に補うのにふさわしい語句を選択肢から選び、その番号を解答欄に書きなさい。一つの語句を複数回使ってはならない。

1 that 2 to which 3 where 4 which 5 with which

問2 (ア)～(オ)の空欄に入れるのにふさわしい単語を選択肢から選び、その番号を解答欄に書きなさい。選択肢の単語は文頭に来るものも小文字で記してある。一つの単語を複数回使ってはならない。

1 another 2 it 3 that 4 they 5 what

問3 以下の(A)～(D)のかっこ内の語句は、第3パラグラフの空欄[1]～[4]から抜いたものである。あてはまる空欄の番号を解答欄に記しなさい。

- (A) (an end to all that wasted time behind the wheel)
- (B) (lorry and taxi drivers will lose their livelihoods)
- (C) (there will be many fewer cars and more options to car-pool)
- (D) (think of elderly people currently isolated in their homes because they no longer feel confident driving)

問4 下線部(A)の文は自動運転車の利点について記した文である。空欄(い)、(ろ)、(は)にあてはまる内容を英語で入れて文を完成させなさい。(い)、(ろ)、(は)の答えの順番は問わない。

問5 英文冒頭の trolley problem の場合に、第6パラグラフの① utilitarian instincts, ② Kantian instincts によって人はどのように考えるか、それぞれ日本語30字以内で書きなさい。

問6 下線部(B)を日本語に訳しなさい。

問7 次の英文(1)～(5)について、本文の内容と一致するものにはAを、一致しないものにはBを、本文からは読み取れないものにはCを解答欄に記入しなさい。解答欄は問3の解答欄の右横にある。

- (1) The trolley problem demonstrates that people will generally choose to sacrifice a smaller number of people to save a larger number.
- (2) The trolley problem is typical of the kind of moral dilemma most of us face frequently in our daily lives.
- (3) Moral questions will be a bigger barrier to the development of driverless cars than technological problems.
- (4) The writer believes that when programming autonomous machines, we are more likely to adopt a utilitarian approach than a Kantian one.
- (5) The writer predicts we will be able to choose what kind of driverless car we buy on the basis of the ethical choices it is programmed to make.

[Ⅲ] Read the passage below and answer the questions that follow it.

Why six hours of sleep is as bad as none at all

Not getting ^(a)enough sleep is harmful (A) both your health and productivity. Yawn. We've heard it all before. But the results of a recent study show just how bad the effects of a cumulative* lack of sleep can be on performance. ^(あ)The subjects of this lab-based sleep study who were allowed to get only six hours of sleep a night for two weeks straight functioned as

poorly as those who were prevented from sleeping for two days straight. The shocking thing is that the people who slept six hours a night thought they were doing just fine.

This sleep deprivation study, published in the journal *Sleep*, took 48 adults and restricted their sleep to a maximum of four, six, or eight hours a night for two weeks; one unlucky subset was deprived of sleep for three days straight. During their time in the lab, the subjects were tested once (B) two hours (unless they were (7) asleep, of course) on their cognitive* performance as well as their reaction time. They also answered questions about their mood and any symptoms they were experiencing.

(1)

As you can imagine, the subjects who were allowed to sleep eight hours a night had the highest performance on average. Those who got only four hours a night did worse each day. The group who got six hours of sleep seemed to be managing all right, until around day 10 of the study.

In the (b) last few days of the experiment, the subjects who were restricted to a maximum of six hours of sleep (C) night showed the same low level of cognitive performance as the people who weren't allowed to sleep at all. Getting only six hours of sleep was as bad as not sleeping for two days straight. The group who got only four hours of sleep each night performed just as poorly, but they hit their low sooner.

One of the most alarming results of this study is that the six-hour sleep group didn't rate their sleepiness as being (c) that bad, even as their cognitive performance was going downhill. The no-sleep group progressively rated their sleepiness level higher and higher. By the end of the experiment, their level of sleepiness had increased by two levels. But in the six-hour group, it had only jumped one level. These findings raise questions about how people cope when they don't get enough sleep.

(2)

Complicating matters is the fact that people are terrible (D) knowing how much time they actually spend asleep. According to a survey reported by the CDC*, more than 35 percent of Americans sleep less than seven hours in a typical 24-hour period. However, those who suffer from sleep problems don't accurately estimate how long they sleep each night. Even just a little sleep deprivation, in this case six rather than eight hours of sleep across two weeks, leads to frightening results. Cumulative sleep deprivation isn't a new concept by any means, but it's (4) rare to find research results that are so clear about its effects.

Figuring out how to consistently get enough sleep is not easy. The advice that experts have given (E) decades is probably a good place to start: have a consistent bedtime, don't look at electronic screens for at least 30 minutes before bed, limit alcohol intake (alcohol makes many people sleepy, but it can also decrease the quality and duration of sleep), and get enough exercise. Other advice that you'll hear less often, but which is equally valid, is to lose excess weight.

Other causes of sleep problems include physical, neurological*, and psychological issues. For example, stress and worry can negatively affect sleep. The CDC has called lack of sleep a health problem, and for good reason. Diet, exercise, mental health, and physical health all affect how well we sleep, and in turn, whether we can perform to the best of our abilities. Fixing bad sleep habits to get enough sleep is challenging. But if you're functioning as if you haven't slept for two days straight, isn't it worthwhile?

Questions

- For each of the underlined words marked (a) to (c), give another word with a similar meaning that could be used instead. For those marked (ア) and (イ), give a word with the opposite meaning.
- Select the most suitable word to fill each of the blank spaces marked (A) to (E). On the answer sheet, enter the number (1 – 4) that corresponds to each option you select.

(A) 1 about	2 in	3 to	4 with
(B) 1 each	2 every	3 for	4 in
(C) 1 at	2 in	3 over	4 per
(D) 1 about	2 at	3 for	4 to
(E) 1 about	2 during	3 for	4 in
- Translate the underlined sentence marked (あ) into Japanese.
- Choose the most appropriate section title to insert in the box marked (1).
 - Six hours of sleep can sometimes be enough
 - Six hours of sleep isn't enough
 - Why six hours of sleep is what we should aim for
 - Why we can manage on only six hours of sleep

5. Choose the most appropriate section title to insert in the box marked (2).
- (a) Sleep deprivation: effects still unclear
 - (b) Sleep deprivation: rare and frightening
 - (c) We have a good idea how much we sleep
 - (d) We have little idea how much we sleep
6. Choose the most appropriate section title to insert in the box marked (3).
- (a) Fixing sleep can never be done
 - (b) Fixing sleep: easier said than done
 - (c) Fixing sleep is easily done
 - (d) Fixing sleep: not worth the effort
7. According to the passage, are the following statements true or false? On the answer sheet, indicate those you consider to be true with an A, and those you think are false with a B. If you think it is impossible to tell from the passage whether a particular statement is true or false, indicate this with a C.
- (1) The subjects who slept for six hours each night thought they were performing better than they actually were.
 - (2) The subjects who only slept for six hours each night showed the worst level of cognitive performance sooner than any other group in the study.
 - (3) The group that slept for four hours each night rated their level of sleepiness the same as the no-sleep group.
 - (4) Experts say that exercising directly before going to bed is damaging to sleep quality.
 - (5) Drinking alcohol will often help a person sleep longer but decrease the quality of their sleep.
 - (6) Body weight has no effect on sleep quality.

[IV] Do you think that machines will ever be able to replace doctors? How do you think new technology will be used in health care in the future? Write about 100 words in English on this topic.

NOTES

carebot	a robot designed to function as a caregiver
CDC	Centers for Disease Control and Prevention (a US federal agency)
cognitive	relating to <i>cognition</i> (i.e. the mental process involved in knowing, learning, and understanding things)
cumulative	having a result that increases in strength or importance each time more of something is added
neurological	related to the nervous system
ordinance	an official rule or order
quintessential	representing a perfect or typical example of something
swerve	change direction suddenly
ubiquitous	widespread

Adapted from *Oxford Advanced Learner's Dictionary* (8th edition), etc.

[出典] 以下の資料に基づく

- [I] Eric Johnston, "For Kyoto, a Chance to Lead Japan in Fight Against Food Loss." *Japan Times*, 20 Oct. 2018.
- [II] David Edmonds, "Cars Without Drivers Still Need a Moral Compass. But What Kind?" *The Guardian*, 14 Nov. 2018.
- [III] Jill Duffy, "Why Six Hours of Sleep Is as Bad as None at All." *Fast Company*, 7 Mar. 2016.