

2020年度

## K<sub>2</sub> 英語 問題

### 注意

1. 試験開始の指示があるまでこの問題冊子を開いてはいけません。
2. 解答用紙はすべてHBの黒鉛筆またはHBの黒のシャープペンシルで記入することになっています。HBの黒鉛筆・消しゴムを忘れた人は監督に申し出てください。(万年筆・ボールペン・サインペンなどを使用してはいけません。)
3. この問題冊子は16ページまでとなっています。試験開始後、ただちにページ数を確認してください。なお、問題番号はI～IVとなっています。
4. 解答用紙にはすでに受験番号が記入されていますので、出席票の受験番号が、あなたの受験票の番号であるかどうかを確認し、出席票の氏名欄に氏名のみを記入してください。なお、出席票は切り離さないでください。
5. 解答は解答用紙の指定された解答欄に記入し、その他の部分には何も書いてはいけません。
6. 解答用紙を折り曲げたり、破ったり、傷つけたりしないように注意してください。
7. この問題冊子は持ち帰ってください。

#### マーク・センス法についての注意

マーク・センス法とは、鉛筆でマークした部分を機械が直接よみとって採点する方法です。

1. マークは、下記の記入例のようにHBの黒鉛筆で枠の中をぬり残さず濃くぬりつぶしてください。
2. 1つのマーク欄には1つしかマークしてはいけません。
3. 訂正する場合は消しゴムでよく消し、消しきらずはきれいに取り除いてください。

マーク記入例：

A	1	2	3	4	5
	○	○	●	○	○

 (3と解答する場合)

- I . 次の文を読み、下記の1～10それぞれに続くものとして、本文の内容ともっともよく合致するものを、各イ～ニから1つずつ選び、その記号を解答用紙の所定欄にマークせよ。

Films like *Robot and Frank* and *I, Robot*, as well as animated television shows like *The Jetsons*, have portrayed a future where robotic servants undertake household duties, allowing families to spend more time together and for elderly people to remain independent for longer.

A future of robotic care givers is closer than we may realize. Robotic vacuum cleaners and lawn mowers are already available, and assistive technologies for elder care are used widely in Japan. Middlesex University's robot Pepper recently appeared before a parliamentary select committee in the UK to answer questions about the role of robots in education.

Carer robots are a relatively recent phenomenon. With people living longer there is a growing population of elderly people who will require assistance with their daily lives. However, a lack of available carers means we could have an adult-care crisis in the near future. Japan, for example, is facing a predicted shortage of 370,000 care-givers by 2025.

Whilst the current assistive technologies are still a far cry from a future where our meals are cooked for us and all our household duties are completed for us, they offer a tantalizing prospect of a possible future. Most robots are currently used in heavy industry and manufacturing, where dangerous and repetitive tasks are routinely undertaken by automated systems. However, these heavy-duty industrial robots are not designed to operate in the presence of people, as they move fast and are made from hard materials, which could potentially cause injuries.

Current collaborative robots, or cobots as they are otherwise known, are made with stiff joints and links. When working closely with humans, their speed is controlled to ensure they can safely interact with people. However, the next generation of collaborative robots will be made from softer materials, such as rubber, silicon, or fabric. "These robots are inherently safe due to the material properties they are made of," says Helge Wurdemann, a roboticist at University College London. "These types of soft, stiffness-controllable robots are promising to achieve the accuracy and repeatability of current collaborative robots and at the same time

ensure safe interaction with humans.”

One of the greatest challenges is that the navigation systems for human interactive robots are still not yet fully developed. They work, to a degree, but can easily become confused, such as with robotic vacuum cleaners failing to return to their charging base. In simple laboratory conditions, robots can determine the best route to take, but a real-life environment, such as a home filled with tables, chairs, and general clutter, is very different. “Many of these algorithms have been developed in the laboratory and are relatively simple compared to the level of clutter and human activity within a real home,” explains Nicola Bellotto, a computer scientist at the University of Lincoln and the technical manager of Enrichme, a project attempting to build robots to help care for and monitor the elderly.

Robots also struggle with changes of surface and stairs. In 2017 a self-directed security robot in Washington D.C. drowned itself after falling down steps into an office fountain. Operating safely in the presence of children and animals can also be a challenge, as demonstrated in 2016 when a security robot ran over a little boy at a shopping center in Silicon Valley after the child approached it.

Coordination of movement in response to sensor information is another challenge in robotics, which in turn affects a robot’s ability to interact with the environment. Robots can struggle with tasks that most humans, and even dogs, would find quite simple, such as catching a ball. This is due to the incredible number of factors that need to be considered, all of which can overwhelm a self-directed system and cause errors to occur. “From a machine-learning perspective, most of the decisions are easier to make than they are to carry out for a robot,” says Diane Cook, co-director of the Artificial Intelligence Laboratory at Washington State University. “Some tasks that are mentally challenging for humans are simpler for robots, while some of the simple movements for humans are quite challenging for robots.”

There is also the question of whether we want our robotic carers to look human. There is the concept of the “uncanny valley”, where objects that almost, but not quite, mimic human form can discourage people from using them. Instead, like the robotic vacuum cleaners in our homes, robots could be aesthetically designed around their function. “The more it looks like a human, the more that person

receiving the care is going to resist the care provided by the robot,” says Cook. “A robot is only useful if the person being cared for accepts it.”

In some cases, a non-humanoid robot can be exactly what is needed. Robotic animals, such as Paro, are starting to be used as pets in care homes that do not allow animals, or as additional companions for people suffering from <sup>\*</sup>dementia.

Many modern-day robots are function-specific, such as robotic vacuum cleaners, rather than being multi-functional mechanoids. Designing a robotic system to fulfil multiple functions can be challenging, especially if their tasks are not related. In the near future at least, we are most likely to have multiple robot carers, all designed for different functions. However, this raises the problem of where would we store them all when they are not being used.

There have also been recent developments in integrating smart home technology with robotic systems to create homes with embedded automated systems. One such example is Chiron; a research project to develop a <sup>\*\*</sup>ceiling-mounted rail system that would allow an assistive robot to travel from room to room, using room-specific adapters for the environment they are in. Given the navigational and mobility challenges facing a self-directed robot in a home environment, this rail-mounted system provides an example of how carer robots could be integrated into the very fabric of our homes.

However, this system also presents its own challenges. To enable a ceiling-mounted rail network, significant changes to the home would be required before the robot could operate there. Of course, customized care homes could be built with the rail system already installed. Still, the significant costs that will come with rail-based installations would be a massive challenge to overcome.

Ultimately, carer robots will assist rather than replace human carers, as robotics could never duplicate the companionship that comes from a flesh-and-blood carer. Not even the most advanced robotic simulation of a person could truly mimic a human being.

Instead, having assistive technologies perform the physically demanding tasks would allow carers to operate more effectively. “Robots do not necessarily replace people’s jobs, but they can support the way they work,” says Helen Dickinson, an expert in public services at the University of New South Wales. “It isn’t just

passing on the most physical jobs, although there certainly is interest in having robots do tasks that require patience and repetition, where people get run down and \*\*\*compassion fatigue can be a factor.”

It is entirely possible that we will, one day, have assistive technologies in the home, but the more advanced systems will not be here for some time, and will not be how they are portrayed in fiction. Instead, our homes themselves could become our carers, with robotic units becoming an extension of the home. Thus, the robot uprising could be reduced to them simply refusing to wash the dishes.

\*dementia : 認知症

\*\*ceiling-mounted : 天井取付型の

\*\*\*compassion fatigue : 共感疲労

1. The author gives the example of a shortage of care-givers in Japan to show that
  - イ. the world of robot carers is already here.
  - ロ. Japan is leading the world in assistive technology.
  - ハ. there will be a demand for robot carers in the future.
  - ニ. robot carers alone will not meet the needs of the elderly population.
  
2. The underlined word “tantalizing” (paragraph 4) is closest in meaning to
  - イ. doubtful.
  - ロ. fascinating.
  - ハ. technical.
  - ニ. worrying.
  
3. The passage suggests that current collaborative robots are able to work with people because
  - イ. their joints are not flexible.
  - ロ. they are made from soft materials.
  - ハ. they are programmed to do repetitive tasks.
  - ニ. their motion can be set to a safe speed.

4. The underlined word “inherently” (paragraph 5) is closest in meaning to
- ㄱ. accidentally.
  - ㄴ. fundamentally.
  - ㄷ. occasionally.
  - ㄹ. possibly.
5. The passage mentions all the following technical challenges for self-directed robots EXCEPT
- ㄱ. knowing how to communicate with children and animals.
  - ㄴ. adjusting to different kinds of floors.
  - ㄷ. climbing up and down stairs.
  - ㄹ. coordinating movements in response to changes in the environment.
6. The passage suggests that one way to avoid the problem of the “uncanny valley” (paragraph 9) is to
- ㄱ. teach people that robots are just machines after all.
  - ㄴ. design robots that look as human as possible.
  - ㄷ. encourage people to develop an emotional attachment to their robot.
  - ㄹ. make the appearance of robots fit their purpose.
7. One advantage of a ceiling-mounted robotic system is that
- ㄱ. it is much less expensive than using self-directed robots.
  - ㄴ. it allows for a different specialized robot in every room.
  - ㄷ. the robot doesn’t need to navigate around the furniture.
  - ㄹ. the home itself doesn’t need to be automated.
8. The passage suggests all the following EXCEPT that
- ㄱ. robotic animals have the potential to serve in elder care.
  - ㄴ. robots in the near future will be limited to a specific function.
  - ㄷ. robots can help human carers by doing physically demanding tasks.
  - ㄹ. once our homes become fully automated, robots will be unnecessary.

9. The author would probably agree that

- イ. there are limits to what robot technology can achieve.
- ロ. the laboratory is the best place to develop robot algorithms.
- ハ. for mental tasks, humans are more reliable than robots.
- ニ. the intelligent robots of fiction will one day be a reality.

10. The most appropriate title for this passage is

- イ. A Robot in Every Home.
- ロ. Will We Have Robot Carers?
- ハ. Recent Advances in Robot Technology.
- ニ. Should Robots Mimic Human Beings?

II. 次の1～10のそれぞれにおいて、下線部イ～ニのうち、英語表現上正しくないものを1つずつ選び、その記号を解答用紙の所定欄にマークせよ。

1. Quebec law requires that<sub>イ</sub> all public signs were<sub>ロ</sub> in French, but permits<sub>ハ</sub> the addition, in smaller letters, of<sub>ニ</sub> a translation into another language.
2. Many people are prepared to giving<sub>イ</sub> judgements on<sub>ロ</sub> how standard their own speech is<sub>ハ</sub> and how best<sub>ニ</sub> to teach the correct form of language to children.
3. Millions of people have been lifted out<sub>イ</sub> of poverty in developing countries as a result of free trade. However, it is less<sub>ロ</sub> clear whether the profits resulting<sub>ハ</sub> from free trade have distributed<sub>ニ</sub> fairly within and among populations.
4. Turbulence is one of the endure<sub>イ</sub> mysteries of physics. After more than a century of studying it, we have only come up<sub>ロ</sub> with a few answers about<sub>ハ</sub> how it works and affects<sub>ニ</sub> the world around us.
5. The researcher collected small samples from<sub>イ</sub> the bones of the dinosaur, and used<sub>ロ</sub> a microscope, she identified<sub>ハ</sub> growth marks in<sub>ニ</sub> the bone tissue.
6. A study published<sub>イ</sub> last year by<sub>ロ</sub> the University of Sydney found that global tourism accounted<sub>ハ</sub> for 8 percent of total carbon emissions, three times high<sub>ニ</sub> than previously thought.



7. Fish have evolved an amazing variety of adaptations with the different environments in which they live.
8. From the nineteenth century onward, scientists have maintained that planets circle other stars just as our planets did our sun.
9. The challenge in writing a summary is to distinguish the essential to the inessential: to do this, you need to have a clear sense of the argument.
10. I had seen American medicine work, but now I was seeing a completely different system brought comfort to a terminally ill woman.

Ⅲ. 次の空所(1)～(6)を補うのにもっとも適当なものを、それぞれ対応する各イ～ニから1つずつ選び、その記号を解答用紙の所定欄にマークせよ。

A. Two friends walking their dogs

Susan: Hi, there! Nice to see you. I haven't seen you in a while.

Russell: Good to see you, too. It's nice to be back. I had to go on a business trip and poor old Snowy had to stay in a pet hotel.

Susan: Oh, the poor thing. ( 1 ). Still, he looks really happy to be out in the park again.

Russell: He certainly is happy. But, I'm not so happy with him. It turns out that he behaved so badly at the pet hotel that they banned him from going back again!

Susan: Oh, dear. Whatever for? He's usually such a delightful and friendly fellow. Why don't you have me look after him next time you go away?

Russell: ( 2 ). As long as you don't mind him chewing up all of your shoes.

- (1) イ. Pet hotels are really fun to visit  
ロ. Dogs need to have a proper diet  
ハ. That must have been tough on him  
ニ. Having puppies is very difficult

- (2) イ. Believe me, it will never happen again  
ロ. Please, don't worry about it  
ハ. What a lovely opportunity for you  
ニ. That's really very kind of you

B. Ladies at an art museum

Chiaki: Here you are, at last! I've been waiting for you since two o'clock. And all the while, I've had to look at this strange sculpture.

Hanako: Oh, I'm so sorry to keep you waiting so long! The bus to the museum was late due to the terrible traffic. But, you're right, that thing is quite strange. ( 3 )?

Chiaki: I've been wondering about it this whole time. My theory is that it's either two people with three heads, or a large plate of fried eggs.

Hanako: Hmm... well, if it's the latter, I'd like it better with a bit of seasoning. I've never liked eggs without a sprinkling of salt and pepper.  
[Laughing.]

Honestly, I don't know what these modern artists are thinking of sometimes.

Chiaki: Something too philosophical to be understood by non-experts, I suppose.  
( 4 )?

Hanako: Yes, let's do that. My eyes need to view some beautiful landscape paintings to recover.

- (3) ㄱ. What on earth do you think it might be  
    ㅋ. What ever shall we do about it  
    ㆁ. Did you ever see so many at the same time  
    ㄴ. How do you think it got there

- (4) ㄱ. Would you like to have a coffee  
    ㅋ. Shall we go in and enjoy the old masterpieces  
    ㆁ. Do you have any plans for this Sunday  
    ㄴ. How about looking at this sculpture a little longer

### C. Planning ahead for an assignment

Father: Why are you in such a hurry?

Jasper: I have a really important assignment, and I have to finish it tonight.

Father: When is it due?

Jasper: It's due tomorrow, first period. That's why I'm so stressed out.

Father: Jasper, how many times do I have to tell you to get things done earlier?

Jasper: Yeah, yeah... I know. I've heard it a million times. I should get my work done early so that I have a chance to check it over. ( 5 ).

Father: No, mister. It is easy to say and easy to do. Think and plan ahead.

Jasper: So, you've never been late for a deadline? I seem to recall hearing you

complain about a few things that you didn't get around to until the last minute.

Father: OK, sure. Then maybe I should advise you to ( 6 ).

- (5) ㄱ. Easier done than said  
      □. Doing is as easy as saying  
      ㄷ. Saying and doing are easy  
      ㄴ. Easier said than done
- (6) ㄱ. do as I do, and say as I say  
      □. do as I say, not as I do  
      ㄷ. do what I say, and do what I do  
      ㄴ. not do what I say, or what I do

IV。次の空所(1)~(6)を補うのもっとも適当なものを、それぞれ対応するイ~ニから1つずつ選び、その記号を解答用紙の所定欄にマークせよ。

In 1980 the Japanese arcade game manufacturer Namco Limited introduced Pac-Man to the world. The lead designer was Iwatani Toru, who intended to create a game that did not emphasize violence. By paying careful attention to themes, design, and colors, Iwatani hoped that Namco could market an arcade game that would ( 1 ) to females. The game concept was therefore inspired by food and eating as opposed to the shooting of space aliens and other enemies that were common in most arcade games of the time. Players moved through a simple maze, eating colored dots ( 2 ) all were gone, thereby completing a level and moving on to the next maze. In Japanese slang, *paku-paku* describes the snapping of a mouth open and shut, and thus the central character, ( 3 ) a small pizza with a slice cut out for the mouth, was given the name Pac-Man.

The game was made challenging by a group of four “ghosts” on each level that tried to catch and consume Pac-Man. When players learned that the ghosts moved in patterns, they became obsessed with devising precise routes for Pac-Man to ( 4 ).

With its innovative design, Pac-Man had a greater ( 5 ) on popular culture than any other video game. Guides to playing Pac-Man emerged on best-seller lists in the United States, soon followed by popular songs, a cartoon television series, merchandise, and magazine articles, as ( 6 ) as countless versions and imitations of the game for every electronic gaming platform.

- |                  |            |               |            |
|------------------|------------|---------------|------------|
| (1) イ. appeal    | ロ. give    | ハ. prefer     | ニ. take    |
| (2) イ. although  | ロ. by      | ハ. since      | ニ. until   |
| (3) イ. comparing | ロ. looking | ハ. resembling | ニ. similar |
| (4) イ. collect   | ロ. direct  | ハ. follow     | ニ. get     |
| (5) イ. factor    | ロ. impact  | ハ. increase   | ニ. shock   |
| (6) イ. many      | ロ. much    | ハ. often      | ニ. well    |

【以下余白】



