2019年度　　〔試験時間　60分〕

D 6　英　語

この冊子は，英語の問題で1ページより15ページまであります。

〔注　　意〕

(1) 試験開始の指示があるまで，この冊子を開いてはいけません。

(2) 監督者から受験番号等記入の指示があったら，解答用マークシートに受験番号と氏名を記入し，さらに受験番号をマークしてください。

(3) 解答は，所定の解答用マークシートにマークしたものだけが採点されます。

(4) 解答用マークシートについて

① 解答用マークシートは，絶対に折り曲げてはいけません。

② マークには黒鉛筆(ＨＢまたはＢ)を使用してください。
指定の黒鉛筆以外でマークした場合，採点できないことがあります。

③ 誤ってマークした場合は，消しゴムで丁寧に消し，消しくずを完全に取り除いたうえ，新たにマークしてください。

④ 解答欄のマークは，横1行について1箇所に限ります。
2箇所以上マークすると採点されません。
あいまいなマークは無効となるので，はっきりマークしてください。

⑤ 解答用マークシートに記載されている解答上の注意事項を，必ず読んでから解答してください。

(5) 試験開始の指示があったら，初めに問題冊子のページ数を確認してください。
ページの落丁・乱丁，印刷不鮮明等に気づいた場合は，手を挙げて監督者に知らせてください。

(6) 問題冊子は，試験終了後，持ち帰ってください。

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1 Read the following passage and answer the questions below. (64 points)

[1] Since the term "artificial intelligence" was first invented, at a kind of constitutional convention of the mind at Dartmouth in the summer of 1956, a majority of researchers have thought the best approach to creating A.I. would be to write a comprehensive program that laid out both the rules of logical reasoning and sufficient knowledge of the world. If you wanted to translate from English to Japanese, for example, you would program into the computer all of the grammatical rules of English, the entirety of definitions contained in the *Oxford English Dictionary*, and then all of the grammatical rules of Japanese, as well as all of the words in the Japanese dictionary. Only after all of that, would you feed it (1) a sentence in a source language and ask it (1) to tabulate* a corresponding sentence in the target language. You would give the machine a language map. This perspective is usually called "symbolic A.I." — because its definition of cognition is based on symbolic logic — or, disparagingly*, "good old-fashioned A.I."

[2] There are two main problems with the old-fashioned approach. The first is that it's awfully time-consuming on the human end. The second is that it only really works in domains where rules and definitions are very clear: in mathematics, for example, or chess. Translation, however, is an example of a field where this approach fails horribly, (2) because words cannot be reduced to their dictionary definitions, and because languages tend to have as many exceptions as they have rules. More often than not, a system like this is liable to translate "minister of agriculture" as "priest of farming." Still, for math and chess it worked great, and the proponents* of symbolic A.I. took it for granted that (3) no activities signaled "general intelligence" better than math and chess.

[3] There were, however, limits to what this system could do. In the 1980s, a robotics researcher at Carnegie Mellon University pointed out that it was easy to get computers to do adult things but nearly impossible to get them to do things a 1-year-old could do, like hold a ball or identify a cat. By

the 1990s, despite advancements in computer chess, we still weren't remotely close to artificial general intelligence.(4)

[4] There has always been another vision for A.I. — a dissenting* view — in which the computers would learn from the ground up (from ((5-a))) rather than from the top down (from ((5-b))). This notion dates to the early 1940s, when it occurred to researchers that the best model for flexible automated intelligence was the brain itself. A brain, after all, is just a bunch of widgets*, called neurons, that either pass along an electrical charge to their neighbors or don't. What's important are less the individual neurons themselves than the manifold* connections among them. This structure, in its simplicity, has afforded the brain a wealth of adaptive advantages. The brain can operate in circumstances in which information is poor or missing; it can withstand significant damage without total loss of control; it can store a huge amount of knowledge in a very efficient way; it can isolate distinct patterns but retain the messiness necessary to handle ambiguity.(6)

[5] There was no reason you couldn't try to mimic this structure in electronic form, and in 1943 it was shown that arrangements of simple *artificial* neurons could carry out basic logical functions. They could also, at least in theory, learn the way we do. With life experience, depending on a particular person's trials and errors, the synaptic connections among pairs of neurons get stronger or weaker. An artificial neural network could do something similar, by gradually altering, on a guided trial-and-error basis, the numerical relationships among artificial neurons.(7) It wouldn't need to be preprogrammed with fixed rules. It would, instead, rewire itself to reflect patterns in the data it absorbed.

[6] This attitude toward artificial intelligence(8) was evolutionary rather than creationist. If you wanted a flexible mechanism, you wanted one that could adapt to its environment. If you wanted something that could adapt, you didn't want to begin with the indoctrination* of the rules of chess. You wanted

to begin with very basic abilities — sensory perception and motor control (9) — in the hope that advanced skills would emerge organically. Humans don't learn to understand their first language by memorizing dictionaries and grammar books, so why should we possibly expect our computers to do so?

(Adapted from *New York Times*)

(Notes) **tabulate** : arrange
disparaging : showing that you do not think something is very good; criticizing
proponents : supporters
dissenting : disagreeing
widgets : any small mechanism or device, the name of which is unknown
manifold : of many different kinds
indoctrinate : make someone accept a particular belief uncritically

(1) What does the underlined word (1) refer to? Choose one from the choices and mark the number on your **Answer Sheet.**

1 the computer
2 the dictionary
3 the researcher
4 the rule

(2) Which of the items below best summarizes the meaning of the underlined part (2)? Choose one from the choices and mark the number on your **Answer Sheet.**

1 because languages cannot be captured solely by definitions and rules.
2 because languages can be described solely by exceptions.
3 because there are more rules than exceptions.
4 because we cannot trust dictionary definitions.

(3) Complete the sentence below so that it is the closest in meaning to the underlined part (3). Choose one from the choices and mark the number on your **Answer Sheet.**

There are no activities that demonstrate "general intelligence" as ((3)) as math and chess.

1 long
2 poorly
3 soon
4 well

(4) Which of the items below is the closest in meaning to the underlined part (4)? Choose one from the choices and mark the number on your **Answer Sheet.**

1 we were not remote from artificial general intelligence.
2 we were far from developing artificial general intelligence.
3 we had not overlooked artificial general intelligence.
4 we had almost simulated general intelligence.

(5) Which of the items below shows the pair of words that correctly fill in the blank (5-a) and (5-b) in the paragraph [4]? Consider the context, choose the best one from the following choices, and mark the number on **Answer Sheet.**

	(5-a)	(5-b)
1	rules	data
2	data	rules
3	neurons	symbols
4	symbols	neurons

(6) Which of the items below is the closest in meaning to the underlined part (6)? Choose one from the choices and mark the number on your **Answer Sheet.**

1 the brain can remove different patterns and ignore the messy information to deal with something clear.
2 the brain can separate clear patterns but keep the messy information to deal with something clear.
3 the brain can remove different patterns and ignore the messy information to deal with something unclear.
4 the brain can separate clear patterns but keep the messy information to deal with something unclear.

(7) Complete the blanks below so that it has the closest meaning to the underlined part (7). Choose one from the choices and mark the number on your **Answer Sheet.**

by gradually changing the ((7-a)) that represent relations among artificial neurons based on ((7-b))

	(7-a)	(7-b)
1	numbers	inspiration
2	trials	inspiration
3	numbers	feedback
4	trials	feedback

(8) Which of the items below is the closest in meaning to the underlined part (8)? Choose one from the choices and mark the number on your **Answer Sheet.**

1 an approach that aims to analyze a person's own experience
2 an approach that aims to illustrate how artificial neurons work
3 an approach that aims to teach human habits
4 an approach that aims to model the human brain

(9) Which of the items below is the typical example of the underlined part (9)? Choose one from the choices and mark the number on your **Answer Sheet.**

1 finding a ball and holding it
2 solving math problems
3 storing knowledge about the world
4 translating English into Japanese

(10) Read each statement below and, according to the passage above, mark your **Answer Sheet** with either **T**, if it is true, or **F**, if it is false.

1 The symbolic A.I. approach uses grammatical rules and dictionary definitions for machine translation.
2 The symbolic A.I. approach cannot be established without human input, which takes an incredibly long time.
3 By 1990, nobody had mentioned things that the symbolic A.I. was unable to do.
4 A group of researchers thought that it was a good idea to make A.I. somewhat similar to the human brain.
5 Artificial neurons could learn in the same way that the human brain does, in principle, because they were able to compute advanced logical functions.
6 The author thinks that it is definitely impossible to make a computer that learns like humans.

2 Choose one item from the answer choices below to fill in each blank in the sentence and complete the phrases in the best possible way. Mark the numbers from top to bottom on your **Answer Sheet**. All answer choices start with lower-case letters. (12 points)

(1) ((a)) ((b)) ((c)) ((d)), the investor ((e)) ((f)) ((g)) with many options.

1 given	2 left	3 not
4 of	5 the global economy	6 was
7 the uncertainty		

(2) ((a)) ((b)) ((c)) ((d)) ((e)) this ((f)) toward non-smoking environments?

1 accounts for	2 do	3 movement
4 think	5 what	6 you

(3) ((a)) ((b)) ((c)) ((d)) ((e)) ((f)) ((g)) past decades, we need to be prepared for a super-aging society.

1 as	2 continues	3 decline
4 if	5 in	6 the birthrate
7 to		

(4) ((a)) ((b)) ((c)) ((d)) ((e)) the university ((f)) ((g)) of their study rooms.

1 an improvement	2 been	3 for
4 has	5 negotiating	6 the students' union
7 with		

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3 Read the following emails and answer the questions below. (24 points)

TO: John Williams <williams@castlerock.edu>
FROM: Keita Tanaka <rikadaisei_tanaka@ed.rikadai.ac.jp>
SUBJECT: Internship this summer
DATE: 25 May 2018
MESSAGE: Dear Professor Williams, My name is Keita Tanaka. I am a student of Tokyo University of Science, majoring in information science. We met last month at the international conference of science and technology. I really enjoyed your talk. It was very stimulating and also related to my field of research. If you remember, you briefly talked to me at my poster presentation. At that time, you mentioned that it might be possible for me to work at your lab for a month this summer. I am wondering whether the position is still open, and if so, would August fit in with your schedule? I will have a poster presentation at the Annual Conference of People-Computer Interaction, which will be held at Castle Rock University at the end of July, and I'm wondering if it would be possible to start the internship soon after the conference. I look forward to hearing from you. Best regards, Keita

TO: Keita Tanaka <rikadaisei_tanaka@ed.rikadai.ac.jp>
FROM: John Williams <williams@castlerock.edu>
SUBJECT: Re: Internship this summer
DATE: 30 May 2018
MESSAGE: Dear Keita, Thank you for contacting me. I'm pleased to hear that you found my talk interesting. It was good to speak to you at the conference. Regarding your questions about the internship in our lab, we have two positions open this summer. These positions are great for students who are interested in gaining experience in graphical user interface systems. It will start at the beginning of August. To apply, you need to send your curriculum vitae and one recommendation letter from your advisor to our lab's email address: jwlab@castlerock.edu. The due date is June 10. Unfortunately, we cannot cover travel expenses and costs for accommodations. So, you might want to apply for a student travel grant for the Annual Conference of People-Computer Interaction, which will be held at our university. However, the grant only covers travel costs. If you need any further details about the internship application, please contact our administrative staff member, Helen Parker. She uses the same lab email address as above. The application deadline is coming soon (June 10). We will let you know whether you have been accepted for the internship by the end of June. Best, John

Read each statement below and, according to the emails above, mark your **Answer Sheet** with either **T**, if it is true, or **F**, if it is false.

1 Keita and Professor Williams met in May 2018.

2 Keita is likely to go to the Castle Rock University this summer whether or not he is accepted to the internship.

3 To apply for the internship, Keita needs to ask his advisor to write a recommendation letter by the end of June.

4 Professor Williams does not encourage Keita to get the student travel grant for the conference.

5 The student travel grant for the conference will pay the conference participation fee.

6 If Keita wants to know the format of the curriculum vitae, he should send an email to Helen Parker.

7 Keita needs to send his curriculum vitae and recommendation letter to Professor Williams' personal email address.

8 Keita will be notified about whether he can work at Professor Williams' lab at the beginning of July.

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