産業医科大学

平成29年度入学試験問題（一般入試）

英　　語

注　意

1. 問題冊子は，指示があるまで開かないこと。
2. 問題冊子は7ページ，解答紙は2枚である。
   「始め」の合図があったら，それぞれページ数および枚数を確認すること。
3. 解答開始前に，試験監督者の指示に従って，すべての解答紙それぞれ2ヵ所に受験番号を記入すること。
4. 解答は，黒色鉛筆(シャープペンシルも可)を使用し，すべて所定の欄に記入すること。欄外および裏面には記入しないこと。
5. 試験終了後，監督者の指示に従って，解答紙の順番をそろえること。
6. 下書き等は，問題冊子の余白を利用すること。
7. 解答紙は持ち帰らないこと。

〔1〕 次の英文を読んで，文中の（ ア ）～（ コ ）に入れるのに最も適当な英語一語をそれぞれ書きなさい。

After fourteen years of living in Tokyo, Paul's Japanese language ability is still limited. He can handle the simple needs of daily life—shopping, （ ア ） food, asking for directions—yet can't connect simple ideas into a continuous conversation or story. He can （ イ ） himself and tell you that he works as a university teacher, yet he doesn't get far （ ウ ） the basic facts he needs to convey. Though he's open and engaging, he can't really express his personality in （ エ ）, so with strangers he switches to English if （ オ ）. He feels somewhat embarrassed by this lack and recognizes that it fits the typical image of the ignorant American abroad.

The reality of daily life, however, is that Paul gets by quite well （ カ ） only foreign language basics. He vacations in America, watches American movies and news, and has plenty of foreign friends. His Japanese wife speaks excellent （ キ ）. Paul is happy and does not feel like a stranger—he knows Tokyo well, and has a lot of knowledge about food and the customs of （ ク ） life in Japan. He can order food and drink, shop, ask for directions and make basic small talk. The administrative documents at his university are mostly （ ケ ） into English for the benefit of foreign staff members. He's happy living as a foreigner who can speak mostly just one language. He seems to have found a way of living abroad that （ コ ） depend heavily on using the local language.

[Adapted from *The Intercultural Mind: Connecting Culture, Cognition and Global Living*, by Joseph Shaules, Intercultural Press, 2015, p. 172]

〔2〕 次の英文を読んで設問に答えなさい。

Many festivals and sports events are organized periodically[*1] every few years. The Olympics, the World Cup,[*2] and other major international sports events are obvious examples, but there are also conferences, concerts, arts festivals, and exhibitions. (1) If you are engaged in organizing a periodic event like one of these, you will know that there are special problems that do not arise with one-off[*3] events. Its periodic cycle must be maintained regardless of clashes with other big events that might be on a similar cycle. For example, in 2012 we saw the consequences of the European athletics[*4] championships moving to a two-year cycle; the championships took place just a few weeks before the Olympic Games and only a handful of competitors did both.

The general problem of event clashes is simple. If one event occurs every C years (or months or days), then it runs the risk of clashing with events whose periodic cycle is a factor[*5] of the number C. So, if C = 4, the event might occur in the same year as events with one- or two-year cycles; if C = 100, then you have to worry about it occurring at the same time as events that are on cycles of 2, 4, 5, 10, 20, 25, or 50. This means that the way to avoid a clash is to pick your periodic cycle, C, to be a prime number.[*6] It will then have no divisors[*7] (other than 1) and there will be little chance of a clash. It seems strange that it is very hard to find periodic events which do that. The grandest sports events, like the Olympics, the Commonwealth Games,[*8] and the World Cup, use C = 4, never C = 5.

There is an interesting counterpart of this problem in the field of biology. The small insect called the cicada[*9] feeds on plants and tree leaves. Cicadas spend most of their lives underground, emerging for only a few weeks to mate,[*10] sing their song, and then die. There are (2) two American types, both belonging to the genus[*11] *Magicicada*, which in particular spend a remarkable period of time on this life cycle. The type found in the south of the United States remains underground for thirteen years, while the other, found in the east, does so for seventeen years. They all lay their eggs in trees and, after the eggs have fallen to the ground, the hatchlings[*12] go underground, where they attach themselves to the tree roots. Then, thirteen or seventeen years later, they will all emerge on schedule in huge numbers over a surface area of about 100 square miles during a narrow period of just a few days.

This remarkable behavior raises many questions. The unusual cycle times of thirteen or seventeen years have the characteristic of both being prime numbers. This means that parasites[*13] and other predators[*14] with shorter life cycles (many of them have two- to five-year cycles) will not be able to develop in step with the cicada and wipe them out. If one cicada had a fourteen-year cycle, then it would be in danger of predators with two- and seven-

year life cycles.

What happened to the prime numbers smaller than thirteen? Biologists believe that the tendency of these cicadas to reproduce so infrequently is a response to the danger of sudden cold days that are common in their environments. Breeding less often is a response to being in a dangerous environment. It also ensures that the common predators, mainly birds, can't develop a total dependence on eating them if they only appear every thirteen or seventeen years.

Finally, why do they all emerge at once, within just a few days? (3) Again, this may be a strategy that has won out in the long run because cicadas that do it tend to survive with greater probability than those that don't. If they all emerged in their millions over a long period of time, the birds would happily eat them in modest quantities day by day. The result would be that they would all get eaten. But if they almost all emerge in a very short time, the birds will quickly become full and huge numbers of cicadas will survive because the predators are just too full to eat any more. Evolution apparently discovered by trial and error the existence of prime numbers, as well as the benefits of keeping people guessing.

【Adapted from "Prime Time Cycles," in *100 Essential Things You Didn't Know: You Didn't Know about Math & the Arts*, by John D. Barrow, W.W. Norton & Company, 2014, pp. 119-121】

〔注〕 ＊1 periodically：周期的に，定期的に

＊2 World Cup：ワールドカップ(各種スポーツ，特にサッカーの世界選手権試合)

＊3 one-off：1回限りの　　＊4 athletics：運動(競技)

＊5 factor：因数，約数　　＊6 prime number：素数

＊7 divisor：除数，割算で割る方の数

＊8 Commonwealth Games：コモンウェルスゲームズ(イギリス連邦に属する国や地域が参加して4年ごとに開催されるスポーツ競技大会)

＊9 cicada：セミ　　＊10 mate：つがう，交尾する

＊11 genus：(生物の分類上の)属　　＊12 hatchling：(孵化したての)幼虫

＊13 parasite：寄生動物，寄生虫　　＊14 predator：捕食者

〔設　問〕

1. 下線部(1)を日本語に訳しなさい。

2. 下線部(2)が頻繁に繁殖しない事実について，本文で述べられている二点の見解を日本語で書きなさい。

3. 下線部(3)について，この理由を本文の内容に沿って日本語で書きなさい。

4. 本文の内容に関する次の文(1)～(5)を読み，正しいものには○，間違っているものには×を，それぞれ記入しなさい。

(1) If one major sports event is held every two years and another one is held every four years, it is likely that few athletes will join both events when their dates are close to each other.

(2) You can avoid having a clash of scheduling if you make your event an annual one.

(3) The periods during which two American types of *Magicicada* remain underground are equivalent to prime numbers.

(4) Although the two types of *Magicicada* spend a different number of years underground, they have the same life cycle.

(5) One type of *Magicicada* in the United States appears in huge numbers during just a few days, while the other type does not.

〔3〕 次の英文を読んで設問に答えなさい。

Although both chimpanzees*1 and young human children help others in some situations, there is one special form of helping in which only children engage: providing needed information. It is important to realize that this is not dependent on language. (1) Human infants inform others from as early as twelve months of age, before they can speak, by pointing. Chimpanzees and other apes*2 do not point for one another at all, and, as I will argue, they do not use any other means of communication to give helpful information to one another about things either.

Scientists set up a situation in which twelve-month-old infants, who could not yet speak, watched while an adult engaged in some task such as stapling*3 papers. The adult also handled another object during the same period of time. Then she left the room, and another adult came in and moved the two objects to some shelves. The original adult then came back in, papers in hand, ready to continue stapling. But there was no stapler on her table, as she searched for it, gesturing with confusion but not talking at all. The infants perceived the adult's problem and wanted to help her, which most of them did by pointing to the location of the stapler that the adult was looking for. The children were far less likely to point at the other object, which had been handled just as much as the stapler. It was obvious that the infants did not want the stapler for themselves. Once she had it in her hand, the children stopped pointing and were satisfied. In subsequent studies, the scientists also ruled out the possibility that infants simply wanted to see the stapling activity repeated.

While infants consistently demonstrate an understanding of pointing as a means of giving information, the same is not true of apes. Apes do not point for one another, and when they do point for humans, they do so mainly to get humans to get food for them. Indeed, in all observed cases of apes pointing for humans, the motive is a command. Also, apes who have learned some kind of human communication use it to communicate only with humans, not with one another, and they do so almost exclusively for command purposes. Some years ago, my colleague and I observed that if a human needed a tool to open a box that contained food for the ape, the ape would point to the location of the tool for the human. One could interpret this as informing the human, but it is also possible that the ape is ordering the human to "get the tool." (2) A recent study directly compared apes and human children as they pointed for tools in a situation like ours, with the difference that in one condition the tool was used by the human to get something for the subjects, whereas in another condition the tool was used by the human to get something for herself. The scientists used an "ABA" design. In the first and third sessions, ape and child subjects pointed to a tool the adult human used to get something

for them. But in the middle session, they were supposed to point to a tool the adult human used to get something for herself (with no reward for the subject). What they found out was that the apes only pointed when they themselves would get something in the end, which is consistent with the interpretation that their pointing is really a command ("get the tool"). The infants, on the other hand, pointed equally often in both cases.

Perhaps surprisingly, apes do not even understand pointing when it is used in a manner of providing information.(3) Apes follow gaze and pointing direction to visible targets, but they do not seem to understand an intention to communicate information. Thus, in many different studies we have found that when apes are searching for hidden food, and a human points to a cup to inform them of its location, the apes do not understand; they do not ask themselves why the pointer wants them to pay attention to the cup. This makes perfect ape sense because in their everyday lives apes do not experience someone helping them by pointing out food — they compete with others for food — so they do not assume an altruistic*4 intention. Human infants, on the other hand, understand pointing that gives information and make the appropriate reaction in such situations even before they can speak, at twelve to fourteen months of age. Confronted with pointing, infants appear to ask themselves, "why does *she* think that my paying attention to that cup will be helpful for *me*?" This ability to ask a question to oneself is based on something like the philosopher Paul Grice's*5 principle of cooperation:*6 others are trying to be helpful by informing me of things that are related not to themselves but to me. Chimpanzees do not operate with anything like a principle of cooperation, and thus they have no basis for understanding how pointing can have meaning to them.

【Adapted from *Why We Cooperate*, by Michael Tomasello, A Boston Review Book; The MIT Press, 2009, pp. 14-18】

〔注〕 ＊1 chimpanzee：チンパンジー　　＊2 ape：類人猿
＊3 staple：ホッチキスでとめる　　＊4 altruistic：利他的な
＊5 Paul Grice：ポール・グライス(1913-1988；イギリス出身の哲学者・言語学者)
＊6 principle of cooperation：会話の協調原理(グライスが提案した，人間のコミュニケーションを取り仕切る一般原則)

〔設　問〕

1. 下線部(1)を日本語に訳しなさい。

2. 下線部(2)の結果分かったことを，本文の内容に沿って日本語で書きなさい。

3. 下線部(3)について，この理由を本文の内容に沿って日本語で書きなさい。

4. 本文の内容に関する次の文(1)~(5)を読み，正しいものには○，間違っているものには×を，それぞれ記入しなさい。

(1) The children wanted to help the adult find the stapler because she asked them where it was.

(2) The children's stopping their pointing at the stapler after the adult found it was evidence that they didn't want it for themselves.

(3) The reason why the infants pointed to the location of the stapler was that they simply wanted to watch the adult stapling again.

(4) Many studies have found that when apes search for hidden food, they do act on the meaning of a human's pointing to its location.

(5) Children at a young age understand that pointing is a form of cooperation.

〔4〕 (英作文)

選挙権年齢が「20 歳以上」から「18 歳以上」に引き下げられたことによって，今後日本の社会にどのような影響が及ぼされると思いますか。あなたの考えを 100 語程度の英語で書きなさい。