

2022年度 理工学部 一般選抜 問題訂正

教科・科目	ページ	設問	誤	→	正
英語	6	3	(上から2行目・最初の単語) Paul	→	Poole

1. 次の英文を読み、設問に答えなさい。

“Some twenty years ago ① I saw, or thought I saw, a synchronal or simultaneous flashing of fireflies. I could hardly believe my eyes, for such a thing to occur among insects is certainly contrary to all natural laws.”

So wrote Philip Laurent in the journal *Science* in 1917, as he joined the debate about this perplexing phenomenon. For 300 years, Western travelers to Southeast Asia had been returning with tales of enormous congregations of fireflies blinking on and off in unison, in displays that supposedly stretched for miles along the riverbanks. These anecdotal reports, often written in the romantic style favored by authors of travel books, provoked ② widespread disbelief. How could thousands of fireflies orchestrate their flashings so precisely and on such a vast scale?

For decades, no one could come up with a plausible theory, (1) by the late 1960s, the pieces of the puzzle began to fall into place. One clue was so obvious that nearly everyone missed it. Synchronous fireflies not only flash in unison—they flash in *rhythm*, at a constant tempo. Even when isolated from one another, they still keep to a steady beat. That implies that each insect must have its own means of keeping time, some sort of internal clock. This hypothetical oscillator is still unidentified anatomically but is presumed to be a cluster of neurons somewhere in the firefly’s tiny brain. Much like the natural pacemaker in our hearts, the oscillator fires repetitively, generating an electrical rhythm that travels downstream to the firefly’s lantern and ultimately triggers its periodic flash.

The second clue came from the work of the biologist John Buck, who did more than anyone else to make the study of synchronous fireflies scientifically respectable. In the mid-1960s, he and his wife, Elisabeth, traveled to Thailand for the first time, in hopes of seeing the spectacular displays for themselves. In an informal but revealing experiment, they captured scores of fireflies along the tidal rivers near Bangkok and released them in their darkened hotel room. The insects flitted about nervously, then gradually settled down all over the walls and ceiling, always spacing themselves at least 10 centimeters apart. (2) they twinkled incoherently. As the Bucks watched in silent wonderment, pairs and then trios began to pulse in unison. Pockets of synchrony continued to emerge and grow, (3) as many as a dozen fireflies were blinking on and off in perfect concert.

These observations suggested that the fireflies must somehow be adjusting their rhythms in response to the flashes of others. To test that hypothesis directly, Buck and his colleagues later conducted laboratory studies where they flashed an artificial light at a firefly (to mimic the flash of another) and measured its response. They found that an individual firefly will shift the timing of its subsequent flashes in a consistent, predictable manner, and that the size and direction of the shift depend on when in the cycle the stimulus was received. For some species, the stimulus always advanced the firefly’s rhythm, as if setting its clock ahead; for other species, the clock could be either delayed or advanced, depending on whether the firefly was just about to flash, whether it was halfway between flashes, and so on.

(4), the two clues suggested that the flash rhythm was regulated by an internal, resettable oscillator. (5) that immediately suggested a possible synchronization mechanism: In a congregation of flashing fireflies, every one is continually sending and receiving signals, shifting the rhythms of others and being shifted by them in turn. Out of the hubbub, sync somehow emerges spontaneously.

We are (6) led to entertain an explanation that seemed unthinkable just a few decades ago—the fireflies organize themselves. No maestro is required, and it doesn’t matter what the weather is like. Sync occurs through mutual cuing, in the same way that an orchestra can keep perfect time without a conductor. What’s counterintuitive here is that the insects don’t need to be intelligent. They have all the ingredients they need: Each firefly contains an oscillator—a little metronome—whose timing adjusts automatically in response to the flashes of others.

(Adapted from Steven H. Strogatz, *Sync: How Order Emerges from Chaos in the Universe, Nature, and Daily Life*, 2003)

[1] 下線部①が示すPhilip Laurentの心境に最も近いものを選択肢1～4の中から選び、マークシートの解答欄(1)にマークしなさい。

1. What he saw was disgusting.
2. What he saw was dreadful.
3. What he saw was incredible.
4. What he saw was scary.

[2] 下線部②が指す事柄として最も適切なものを選択肢1～4の中から選び、マークシートの解答欄(2)にマークしなさい。

1. Fireflies coordinate the flashing of their lights.
2. Fireflies emit light along the riverbanks.
3. Fireflies flock together in Southeast Asia.
4. Fireflies move in liaison with other fireflies.

[3] 空所(1)～(6)に入る最も適切な接続表現を選択肢1～6の中から選び、マークシートの解答欄(3)から(8)にマークしなさい。同じ選択肢を二度選んではいけません。なお、文頭にくるべき語も小文字にしています。

1. and
2. at first
3. but
4. taken together
5. thus
6. until

[4] 次の文は英文全体の要旨を述べたものである。下記の空所(ア)～(カ)に入る語として最も適切なものを選択肢1～9の中から選び、マークシートの解答欄(9)から(14)にマークしなさい。同じ選択肢を二度選んではいけません。

Though some people questioned their (ア), for several hundred years, many Western travelers to Southeast Asia reported on a particular natural phenomenon—the synchronized blinking of groups of fireflies. It was not until the 1960s that a (イ) theory came together to account for how this is possible. Firstly, what people noticed is that the fireflies blinked at a steady tempo. This ability, people reasoned, must come from something internal to the fireflies, though nobody has yet determined where this ability (ウ), anatomically speaking.

Another piece of the puzzle was solved by John Buck, who, together with his wife, captured fireflies in Thailand and released them into their darkened hotel room. What they noticed was the way the fireflies spaced themselves on the walls and ceiling and slowly began to synchronize their flashes based on the fireflies nearest them. This synchronization increasingly spread to other fireflies. Buck later tested his ideas in the laboratory, using the flash of an artificial light to explore how fireflies adjust their own flashes accordingly. Like a clock being adjusted forwards or backwards, some fireflies advanced their flashes and some delayed them to achieve synchronization with the (エ). Through simple (オ) fireflies achieve a (カ) that to us might seem like it would require greater intelligence.

1. accounts
2. adjust
3. credible
4. feat
5. mechanisms
6. memory
7. resides
8. resonates
9. stimulus

[5] 英文で用いられている比喩を考慮して、下記の空所(1)～(5)に入る語として最も適切なものを選択肢1～9の中から選び、マークシートの解答欄(15)から(19)にマークしなさい。ただし、空所(2)と(3)の解答、つまりマークシートの解答欄(16)と(17)の順序は問いません。同じ選択肢を二度選んではいけません。

Fireflies congregate like (1). The light in each of their tails blinks steadily like (2) or (3). They adjust their blinks according to the fireflies flashing around them like (4). Through this process, they gradually sync together with other fireflies like (5).

1. a beating heart
2. a changing traffic light
3. a group of musicians playing without a conductor
4. a metronome
5. an oscillating fan
6. people gathering at a church
7. people traveling to Southeast Asia
8. someone changing their schedule
9. someone changing the time on a clock

2. 次の英文を読み、設問に答えなさい。

Many people ① retain an interest in politics – we all would like laws made to suit us – but fewer and fewer people seem interested in being politicians. It's simply not a very attractive job. In a world of myriad possibilities, especially for those who have the technical abilities that bring lavish rewards in the private sector, politics looks like a real ② grind. Politicians have to work very hard, under intense scrutiny, for little reward. They sometimes suffer public contempt and media abuse; more often their hard work is greeted with indifference. Unsurprisingly, the class of people interested in doing politics is shrinking. This is good news if you do happen to have an appetite (1) it. The competition is not what it was, so that a desire to get into politics is often all it takes to be given that chance. In Britain the current crop of leading politicians is drawn from a remarkably narrow set of political careerists, most of who have been doing politics since they were at university. Many of them were at university together.

The present British prime minister, foreign secretary, chancellor of the exchequer, education secretary, leader of the opposition, shadow chancellor and shadow home secretary were all part of the same generation of Oxford politics students. I didn't go to Oxford, but I did go to the same school as David Cameron – Eton – at the same time he did. When we were there, he was pointed out to me as someone who wanted to be prime minister. We were sixteen. Eton is an ③ absurdly privileged school full of well-connected and ambitious boys, but few had an interest in politics; most wanted to be bankers or film stars. I only heard of one other who wanted to be prime minister. His name was Boris Johnson. (A) Watching these two rise effortlessly to the top of British politics makes it hard to believe that the greasy pole is as greasy as it used to be.

Does it matter that the political class is shrinking? In one sense, no. It is a (2) of broad satisfaction with the political system that most people don't want to have anything to do with politics if they can help it. If they were really unhappy, the high entry barriers would not put them off. More likely in their ④ rage they would tear them down.

However, there are real dangers to this narrowing of the political class. It opens up a gap between politicians and the rest of us, which can ⑤ breed contempt both ways. [X], we will start to look down on them as weirdos. Meanwhile, the politicians will start to look down on us as fools, because we don't understand the business they are in. The disdain many voters feel for professional politicians is matched by the disdain many professional politicians feel for the voters. Each thinks the other lot don't get (3). As the gap grows, it becomes easier for politicians to gravitate towards their fellow elites, who at least have a respect for insider knowledge. The political network interlocks with networks of financial, technological and military expertise, which locks the public out. A narrow class of politicians is bound to have a ⑥ skewed view of the world it inhabits, because members rarely get to see how their world looks from the outside. The failure to anticipate the financial crisis of 2008 is evidence of how easily closed-off groups can lose sight of what they are doing.

Above all, there is the danger that Benjamin Constant warned against. If we leave routine politics in the hands of a narrow group of specialists, we won't know how to take it back from them when we need it. People who think they can pick up politics when they need it often find that when they really need it they don't know (4) to find it. The only way to learn how to do politics is to keep on doing it, in good times as well as bad. We need more politics and we need more politicians.

(Adapted from David Runciman, *Politics*, 2014)

- [1] 下線部①～⑥の意味に最も近いものを選択肢1～5の中から選び、マークシートの解答欄 (20) から (25) にマークしなさい。
- ① 1. are encouraged to have 2. continue to have 3. obtain 4. regain 5. remain
 ② 1. dull work 2. groundbreaking discovery 3. hike 4. joy 5. reward
 ③ 1. appropriately 2. fortunately 3. obviously 4. ridiculously 5. unfortunately
 ④ 1. ambition 2. anger 3. love 4. panic 5. sadness
 ⑤ 1. cancel 2. cause to weaken 3. give birth to 4. inhale 5. intensify
 ⑥ 1. comprehensive 2. distorted 3. grand 4. identical 5. tiny
- [2] 空所(1)～(4)に入る最も適切な語を選択肢1～5の中から選び、マークシートの解答欄 (26) から (29) にマークしなさい。
- (1) 1. for 2. in 3. of 4. to 5. with
 (2) 1. design 2. fantasy 3. hope 4. post 5. sign
 (3) 1. along 2. it 3. on 4. sick 5. with
 (4) 1. this 2. whatever 3. when 4. where 5. who
- [3] 次の語句を文法的・内容的に最も適切な順に並べかえて X を完成させたとき、2番目にくるものの番号をマークシートの解答欄 (30) に、5番目にくるものの番号をマークシートの解答欄 (31) にマークしなさい。なお、文頭にくるべき語も小文字にしてあります。
1. have a peculiar 2. if we 3. interest in politics 4. is only for people who happen
 5. politics 6. think that professional 7. to
- [4] 下線部(A)の意味に最も一致するものを選択肢1～5から選び、マークシートの解答欄 (32) にマークしなさい。
1. イギリス政界で出世するには、以前より時間がかかる。
 2. イギリス政界で出世するためには、以前ほど油を売っている暇はない。
 3. イギリス政界で出世するためには、以前ほどおべっかを使う必要がない。
 4. イギリス政界で出世するのは、以前ほど困難ではない。
 5. イギリス政界で出世するのは、以前ほど珍しくない。
- [5] 英文の内容に最もふさわしいタイトルを選択肢1～5から選び、マークシートの解答欄 (33) にマークしなさい。
1. Engineers: The New British Elites 2. Mutual Hate 3. No Pain, No Gain
 4. Get Involved in Politics Before It's Too Late 5. Why We Shouldn't Trust Politicians
- [6] 英文の内容に最も一致するものを選択肢1～7の中から3つ選び、マークシートの解答欄 (34) から (36) にマークしなさい。ただし、解答の順序は問いません。
1. Many students at Eton College wanted to become law-makers.
 2. People lose sight of what they are doing when they are in closed groups.
 3. People with technical expertise tend not to be interested in becoming politicians.
 4. Politicians inevitably respect the voters.
 5. The more politicians and people look down on each other, the more they will bond with the people in their class.
 6. The writer attended the University of Oxford with David Cameron.
 7. Ultimately, it does not matter whether the political class is getting smaller.

3. Read the following radio interview transcript between Lulu Garcia-Navarro (LGN) and Joyce Paul (JP) and answer the questions which follow.

LGN: For almost half a century, Joyce Poole has been listening to what elephants have to say and studying the way they behave and communicate. Now she and her husband, Petter Granli, have created the African Elephant Ethogram, a ① comprehensive audio-visual library of the animals. Tell us about these recordings. What is an ethogram, and how does it work?

JP: Well, an ethogram is really a library of all the behaviors of a species. And so this ethogram is not just the vocalizations, the calls of elephants. But it's also all their behaviors. So the way they communicate, using their ears and their trunk and also the other things they do, for instance, different techniques they use to feed. But, of course, people are—especially radio programs—would be very interested in the sounds that they make.

LGN: Indeed, we are. And I want to play a few of these. Let's listen to something called the baroo rumble.

(soundbite of elephant rumbling)

JP: Baroo rumbles are made when a calf or elephant is feeling ② hard done by. It's a kind of ③ woe is me, and please come and make me feel better and comfort me.

LGN: All right. Let's hear now what you call a greeting ceremony.

(soundbite of elephant trumpeting)

LGN: Wow. Tell us about this one.

JP: Well, you know, elephants live in families. Elephants live up to 70 years old. And so members of a family stay together for life. But they're like our families. They're not always together. So the families will split up. And then when they come back together, they have greeting ceremonies. So they rumble. And they trumpet. They urinate and defecate and spin around and clank their tusks together. It's an extraordinary sight.

(Adapted from National Public Radio, "Scientist Joyce Poole on What Elephants Have to Say." May 30, 2021)

- [1] Choose the most similar meaning for each underlined word or expression ① through ③. Mark your answers on the mark sheet in through .

- | | |
|------------------------------|--------------------------------|
| ① 1. broad and in-depth | 2. clear and concise |
| 3. fixed and permanent | 4. sound and sight |
| ② 1. hardy and strong | 2. strong and stropy |
| 3. treated fairly but stern | 4. treated harshly or unfairly |
| ③ 1. my life is so rewarding | 2. my life is so simple |
| 3. my life is so tough | 4. my life is so wonderful |

- [2] Which of the three statements listed below are most strongly supported by the interview? Mark your answers on the mark sheet in through . Your answers may be in any order.

1. An ethogram is more than just a collection of animal sounds.
2. Elephants and calves use the baroo rumble in different ways.
3. Elephants stay together for life, never leaving each other's side.
4. Elephants urinate and defecate when they see something extraordinary.
5. Elephants use more than one part of their body to communicate.
6. Elephants will only bang their tusks with other elephants when they are upset.
7. Poole has been studying elephants for longer than an elephant can live.
8. Rumbles are used by elephants to express both pleasure and displeasure.

[3] Complete the following paragraph by filling in the blanks (1) through (6) from the options below and based on the content of the interview above. Mark your answers on the mark sheet in through .

I heard this interview the other day on the radio about elephants. Did you know that elephants have a special sound they make when they (1)? They also have a sound they make when they're (2) after a long separation. There is this couple who have made it their life's (3) to record all of their calls and stuff. You know, I thought only humans had ceremonies, but it (4) out elephants do, too. When they see each other again after a long separation, they get all excited, start trumpeting, and (5) themselves. I think I might try trumpeting when I get home tonight. Who knows, maybe I will start a (6). I think I'd better leave the rest of the ceremony to the elephants, though.

- | | | | | |
|-------|-------------------------------------|-----------------------------------|---------------|--------------|
| (1) | 1. are over the hill | 2. are over the moon | | |
| | 3. have a crush on another elephant | 4. think the world's against them | | |
| (2) | 1. breaking up | 2. catching up | 3. keeping up | 4. making up |
| (3) | 1. lesson | 2. mission | 3. savings | 4. time |
| (4) | 1. breaks | 2. finds | 3. turns | 4. works |
| (5) | 1. feed | 2. pamper | 3. relieve | 4. wash |
| (6) | 1. history | 2. memory | 3. trend | 4. war |

4. (1) ~ (5) の空所に入る語句として最も適切なものを選択肢 1 ~ 4 の中から選び、マークシートの解答欄 から にマークしなさい。

- (1) She is one of those professors who () smartphones in class.
 1. refuse allowing 2. refuse to allow 3. refuses allowing 4. refuses to allow
- (2) The restaurant is closed until () notice.
 1. brief 2. farther 3. further 4. more
- (3) Some studies show that listening to Mozart does not have a positive () on your mental health.
 1. affect 2. care 3. effect 4. stain
- (4) Please give this letter to () the door.
 1. whoever answer 2. whoever answers
 3. whomever answer 4. whomever answers
- (5) If I had been able to speak Spanish, I () in Mexico last summer.
 1. did not get lost 2. must not get lost
 3. would not get lost 4. would not have got lost

5. 以下の英文は、人工知能研究の倫理的側面について述べたものである。(1)～(7) の空所に入る語として最も適切なものを選択肢 1～9の中から選び、マークシートの解答欄 (54) から (60) にマークしなさい。同じ選択肢を二度選んではいけません。

Many kinds of researchers—biologists, psychologists, anthropologists, and so on—encounter (1) at which they are asked about the ethics of their research. For now, A.I. research is mostly self-regulated—a matter of (2), not rules. “The fact that papers on A.I. do come up on Twitter nontrivially often” has made an (3), Brent Hecht, a computer-science professor at Northwestern University, said. “The vast majority of researchers don’t want to be the subject of these types of discussions.” Last year, I participated in an online workshop organized by Partnership on A.I., a nonprofit coalition (4) by several of the biggest tech firms. In the workshop, which was focused on (5) more responsible research in the field, we discussed alternative release strategies: sharing new work in stages, or with specific audiences, or only after risks have been (6). Hecht, who helped write the Association for Computing Machinery blog post that called for a more organized ethics process, predicts that increasing numbers of researchers, (7) what their babies could grow up to become, will begin avoiding certain research topics.

(Adapted from Matthew Hutson, “Who should stop unethical A.I.?” *The New Yorker*, February 15, 2021)

- | | | | | |
|----------------|--------------|------------------|----------------|---------------|
| 1. checkpoints | 2. concluded | 3. contemplating | 4. encouraging | 5. expression |
| 6. impression | 7. founded | 8. mitigated | 9. norms | |