

1. 次の英文を読み、設問に答えなさい。

The conservation of energy would let us think that we have as much energy as we want. Nature never loses or gains energy. (あ) the energy of the sea, for example, the ① thermal motion of all the atoms in the sea, is practically unavailable to us. In order to get that energy organized, herded, to make it available for use, we have to have a difference in temperature, or else we shall find that although the energy is there we cannot make use of it. There is a great difference between energy and (1) of energy. The energy of the sea is a large amount, but we cannot harness it.

The conservation of energy means that the total energy in the world is kept the same. But in the irregular jiggings that energy can be spread about so uniformly that, in certain circumstances, there is no way to make more go one way than the other—there is no way to control it any more.

I think that by an ② analogy I can give some idea of the difficulty, in this way. I do not know if you have ever had the experience—I have—of sitting on the beach with several towels, and suddenly a tremendous (2) comes. You pick up the towels as quickly as you can, and run into the bathhouse. (い) you start to dry yourself, and you find that this towel is a little wet, but it is drier than you are. You keep drying with this one until you find it is too wet—it is wetting you as much as drying you—and you try another one; and pretty soon you discover a horrible thing—that all the towels are ③ damp and so are you. There is no way to get any drier, even though you have many towels, because there is no difference in some sense between the wetness of the towels and the wetness of yourself. I could invent a kind of quantity which I could call 'ease of removing water'. The towel has the same ease of removing water from it as you have, so when you touch yourself with the towel, as much water comes off the towel on to you as comes from you to the towel. It does not mean there is the same amount of water in the towel as there is on you—(X) it—but they have the same dampness. When things get to the same dampness then there is nothing you can do any longer.

Now the water is like the energy, because the (3) amount of water is not changing. (If the bathhouse door is open and you can run into the sun and get dried out, or find another towel, then you're saved, but suppose everything is closed, and you can't get away from these towels or get any new towels.) In the same way if you imagine a part of the world that is closed, and wait long enough, in the accidents of the world the energy, like the water, will be ④ distributed over all of the parts (4) until there is nothing left of one-way-ness, nothing left of the real interest of the world as we experience it.

(Adapted from Richard P. Feynman, *The Character of Physical Law*, 1965)

[1] 下線部①～④の意味の説明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 (1) から (4) にマークしなさい。

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|---|-------------------|-----------------|-----------------|--------------------|
| ① | 1. fabric-related | 2. heat-related | 3. size-related | 4. weather-related |
| ② | 1. difference | 2. feeling | 3. function | 4. similarity |
| ③ | 1. cold | 2. dirty | 3. heavy | 4. wet |
| ④ | 1. contributed | 2. dispersed | 3. invented | 4. refused |

[2] 空所(1)～(4)に入る最も適切な表現を選択肢1～4の中から選び、マークシートの解答欄

(5) から (8) にマークしなさい。

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|-----|------------------|--------------------|---------------|-------------------|
| (1) | 1. achievability | 2. availability | 3. relativity | 4. responsibility |
| (2) | 1. downpour | 2. drizzle | 3. lightning | 4. waterfall |
| (3) | 1. maximum | 2. necessary | 3. proper | 4. total |
| (4) | 1. enormously | 2. environmentally | 3. evenly | 4. excitedly |

[3] (あ)と(い)に入る最も適切な語句を選択肢1～8の中から選び、それぞれ、マークシートの解答欄 (9) と (10) にマークしなさい。

1. Additionally 2. In spite of 3. Nor 4. Or 5. Otherwise 6. Regardless 7. Then 8. Yet

[4] (X)に入る英文を作りたい。次の1～8を文法的・内容的に最も適切な順序に並べ替えたとき、1番目にくるものの番号を解答欄 (11) に、6番目にくるものを解答欄 (12) にマークしなさい。

1. a big towel 2. a little towel 3. have 4. in 5. more 6. than 7. water 8. will

[5] 英文の内容に一致するものを選択肢1～9の中から4つ選び、マークシートの解答欄 (13) から (16) にマークしなさい。

1. When the 'ease of removing water' is the same for your towel as it is for you, you need to dry yourself twice as fast to achieve the same result.
2. In the author's analogy, if you can dry your towel in the sun, you are no longer in a closed system.
3. We can't harness the energy of the sea because it's too cold.
4. Towels can reach a point where they are wetting you as much as drying you.
5. While he believes it's a useful analogy for understanding the conservation of energy, the author has never been rained on at a beach.
6. The tendency of energy to distribute uniformly makes it difficult to harness.
7. A towel can have less water in it than is on you and still not be able to dry you.
8. Conservation means that the total amount of energy in a system fluctuates because of uneven jiggings.
9. The author's conclusion is that the world is not really interesting.

2. 次の英文を読み、設問に答えなさい。

It is often said that our understanding and knowledge of death separates the human animal from all other animals. We alone know that we will die—that one day, suddenly or slowly, our life, our loves, our dreams will (あ). Our greatest art, music, and literature, as well as acts of religion and morality, are all inspired by this awareness. Perhaps we are the only animals with foreknowledge of death, but when it comes to grieving, scientists have observed that we are not so unique.

The study of animal grief is a young field, largely because studies of any animal behaviors that one might think of as “human” were ignored for much of the twentieth century. It was commonly held that nonhuman animals were only reactive beings, lacking thoughts and emotions, and responding to stimuli as unthinking, unfeeling robots. Scientists were cautioned about being anthropomorphic, that is, regarding animals as they are often depicted in naive films and storybooks—as if they were (い) dressed up in fur or feathers. Researchers who thought they detected animal emotions—especially those that we think of as uniquely human, such as love, joy, or grief—were considered to be sentimentalists. In the last few decades, though, wildlife biologists have ① amassed so many firsthand accounts of animals caring for and mourning their dead that the idea of animal grief is no longer as suspect as it once was.

Scientists ② grappling with animal grief must find some way of framing their questions into hypotheses they can test. So far, none of them have figured out how to set up an experiment to address the big question of whether or how animals understand death. But they are getting closer to answering what once seemed an equally daunting problem: why do animals grieve? There are enough examples of grief in species as varied as goats, baboons, and gorillas that the emotion may be an experience shared by many species. If so, then it must have an evolutionary history and confer some benefit—that is, it must be (う) in some way, enabling the mourner to survive long enough to reproduce and pass his or her genes to the next generation. Otherwise, natural selection would have ③ weeded out grief long ago.

From a study of twenty-two wild-baboon females who had lost either an infant or other close relative to a predator, scientists know that the animals' stress hormones ④ flare for four weeks after the attack. They typically act in a “bereaved” manner, too, the researchers say, sitting apart from other baboons and not seeking out grooming (a behavior that has both social and hygienic benefits). In time, the baboons' stress hormones (え), and they again spend time with their fellows. At first glance, it would seem that grieving would leave baboons—or other mourning animals—at great risk of either falling ill or being taken by a predator themselves. But another study, by neuroscientists Karen Wager-Smith and Athina Markou, suggests that the mourning period is actually a neurobiological necessity, particularly for any animal that forms close bonds with another individual. The researchers note that stress can inflict “microdamage” in key areas of the brain, such as the hippocampus and prefrontal cortex, both of which are concerned with memory, emotions, personality, and planning. But the brain is not a static organ; it responds dynamically to life's events by pruning away neurons that are no longer needed and ⑤ sprouting new ones. Rewiring takes time and energy, and so a period of mourning—of sleeping longer, minimizing social contact, eating less—can ultimately prove beneficial. And, indeed, all of the baboons eventually recovered from their grief, made new friends, or gave birth to new children. Grief for them can have an “adaptive value,” as evolutionary biologists are fond of saying; it

enables an animal to recover from what is essentially minor brain trauma and carry on with the purpose of life—reproducing.

(Adapted from Virginal Morell, "Mournful Creatures" *Lapham's Quarterly*, Fall 2013)

- [1] 空所 (あ) ～ (え) に入る最も適切な語を選択肢 1 ～ 4 の中から選び、マークシートの解答欄 (17) から (20) にマークしなさい。

(あ)	1. come true	2. continue	3. deteriorate	4. end
(い)	1. animals	2. machines	3. people	4. spirits
(う)	1. advantageous	2. deficient	3. religious	4. sufficient
(え)	1. increase	2. intensify	3. subside	4. suffer

- [2] 下線部 ① ～ ⑤ の意味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 (21) から (25) にマークしなさい。

①	1. censored	2. collected	3. created	4. cultivated
②	1. discussing	2. dissecting	3. tackling	4. torturing
③	1. elevated	2. eliminated	3. entertained	4. exhilarated
④	1. flatline	2. plummet	3. rebound	4. spike
⑤	1. digesting	2. formatting	3. growing	4. withering

- [3] 次の英文全体の要旨を述べた文章中の空所 (ア) ～ (ク) に入る表現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 (26) から (33) にマークしなさい。

The passage opens with a common (ア) about a major difference between humans and other animals; in short, humans know that they will die. But as the paragraph goes on to explain, perhaps many animals are more capable of grief than we have given them (イ) for. The second paragraph looks at the (ウ) that stopped scientists from looking at animal grief through much of the twentieth century. The third paragraph examines the struggles scientists have faced trying to form hypotheses to explore these questions and offers examples of some of the animals in which grief has been (エ). Given these examples, the paragraph concludes, grief must have some kind of adaptive value; otherwise, why would evolution have allowed it to (オ)? As is explained in the final paragraph, the authors of one study looking at wild baboons suggest that a period of grief is useful for (カ) the brain; a baboon that temporarily (キ) out from social interaction can eventually recover from trauma and get back to the biological (ク) of reproducing.

(ア)	1. affection	2. deception	3. interception	4. perception
(イ)	1. aim	2. belief	3. credit	4. reason
(ウ)	1. biases	2. events	3. evidences	4. insights
(エ)	1. developed	2. imagined	3. manufactured	4. observed
(オ)	1. fail	2. mourn	3. profit	4. remain
(カ)	1. reenergizing	2. reorganizing	3. repeating	4. rewinding
(キ)	1. blocks	2. checks	3. hits	4. looks
(ク)	1. basis	2. bargain	3. being	4. business

3. The following dialogue involves a Japanese teacher talking to her foreign students about the idea of *omotenashi*. Read the dialogue and answer the questions which follow.

Teacher: Christel Takigawa really ① made a splash with her *omotenashi* speech. But what do you think *omotenashi* even means?

Jamal: In English, I think the best translation would be hospitality.

Teacher: (ア), but is the idea of good hospitality the same in every country and culture?

David: (イ). For example, in my country, I think good hospitality implies friendliness. Service with a smile, ② so to speak. People like to make ③ small talk when they're serving you, but that doesn't happen as much in Japan. But I don't think that means people in Japan are being inhospitable. It just reflects different cultural values.

Teacher: (ウ), David. Clearly culture is going to shape how we interpret actions.

Ashley: Sometimes I find the formality of Japanese hospitality a bit ④ off-putting. If a friend comes to my house, I usually tell them to make themselves at home, and I really mean it. It's not just for them, either. It's for me, too. I don't want to have to run around after them all day. (エ)?

Teacher: Sure. A common definition is that *omotenashi* is about (あ) the needs of guests and performing your duties in a (い) manner.

[1] Choose the answer that could best replace the corresponding underlined section ① ~ ④ in the dialogue. Mark your answers on the mark sheet ((34) through (37)).

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|---|------------------------|------------------------|-----------------------|-----------------------|
| ① | 1. became infamous | 2. gained attention | 3. messed things up | 4. put out the fire |
| ② | 1. as a result | 2. as you please | 3. by the way | 4. in other words |
| ③ | 1. casual conversation | 2. insightful analysis | 3. subtle suggestions | 4. witty observations |
| ④ | 1. distracting | 2. relaxing | 3. superior | 4. uncomfortable |

[2] Complete the dialogue by choosing the most appropriate answer for each gap (ア) through (エ). Mark your answers on the mark sheet ((38) through (41)).

- | | | | | |
|-----|------------------------------------|-------------------------------------|-------------------------|----------------------------------|
| (ア) | 1. I want to say | 2. Perfect | 3. Seriously | 4. You may be right |
| (イ) | 1. Absolutely | 2. I don't think so | 3. It could be | 4. I won't say no |
| (ウ) | 1. I fail to understand your point | 2. I think you're missing the point | 3. That's a great point | 4. That's only one point of view |
| (エ) | 1. Do I need to say more | 2. Do you see what I mean | 3. What do you think | 4. Where am I going with this |

[3] Complete the definition of *omotenashi* provided by the teacher with the most appropriate answer in gaps (あ) and (い). Mark your answers on the mark sheet in spaces (42) and (43) .

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|-----|-----------------|------------------|----------------|-----------------|
| (あ) | 1. anticipating | 2. articulating | 3. celebrating | 4. complicating |
| (い) | 1. conscience | 2. conscientious | 3. conceited | 4. conspicuous |

4. (1) ~ (4) の各文を完成させるために、空所に入るべき最も適切な語句を ① ~ ④ から選び、それぞれマークシートの解答欄 (44) から (47) にマークしなさい。

(1) Hardly () the cottage when it began to rain.

- ① did we reach ② do we reach ③ had we reached ④ have we reached

(2) The teacher asked me at what temperature water ().

- ① boiled ② boils ③ is boiled ④ was boiled

(3) My wife and I () each other since we were in high school.

- ① got to know ② have been knowing ③ have known ④ know

(4) I feel embarrassed about what happened and would rather the event ().

- ① being forgotten ② is forgotten ③ to be forgotten ④ were forgotten

5. 次の (1) ~ (5) の文の [] 内の語を最も適切な語形に書き直しなさい。ただし、語尾に “-ed” と “-ing” の付くものは不可とします。解答は解答用紙 (記述式) に記入しなさい。

(1) What I really need is a [depend] and trustworthy babysitter.

(2) With your good looks and storytelling skills, you could get a job as a [motivate] speaker.

(3) I think this must be one of the most [icon] buildings in the world.

(4) If you ask me, the [probable] of success is diminishing fast.

(5) I think we should cut back because we're facing [finance] uncertainty.

6. 和文の内容とほぼ同じ意味になるように、指定された文字から始まる適切な 1 語を空所 ① ~ ⑧ に入れて、英文を完成させなさい。解答は解答用紙 (記述式) に記入しなさい。

A driverless car is an ① (a) that has an autopilot system allowing it to safely move from one place to another without help from a human driver. Ideally, the only role of a human in such a vehicle would be ② (i) the destination. The implementation of driverless cars could ③ (t) lead to many improvements in transportation, including a reduction in car accidents, more efficient transportation, and an increase in road ④ (c). There are, however, many hurdles to successfully implementing the driverless car as a common and effective method of transportation. This is especially true in situations in which a driverless car would need to safely ⑤ (n) alongside normal cars directed by human drivers.

To be useful, a driverless car must be able to go to a given destination based on passenger-provided instructions, avoid environmental ⑥ (o), and safely avoid other vehicles. Some proposed methods for ⑦ (m) these goals involve developing entirely new transportation infrastructures or substantially ⑧ (a) the existing infrastructures to accommodate driverless vehicles.

(Adapted from Daniel Liden, “What Is a Driverless Car?” <http://www.wisageek.com/>, 6 June 2015)

無人運転車とは、人間の運転者の手を借りずにある場所から別の場所へと安全に移動することが可能な自動操縦システムを有する自動車のことである。理想的には、そのような自動車における人間の役割は行き先を指示することのみとなる。無人運転車の実用化によって、理論的には、交通事故の低減、より効率的な交通、交通容量の増加といった交通機能の様々な改善がなされるだろう。しかし、一般的かつ効果的な輸送手段として無人運転車を無事に実現するためには多くの障害も存在する。とりわけこのことは、人間が運転する普通の自動車と同じ道を安全に誘導走行する必要がある際に当てはまる。

役に立つためには、無人運転車は、搭乗者の指示の下で周囲の障害物や他の自動車を安全に避けながら目的地まで走行できなければならない。それらの目標を達成するため、全く新しいインフラを整備するか、または現存のインフラを無人運転車に適応するものに大きく変えるといったいくつかの方法が提案されている。