

[I] 次の文章を読んで設問に答えなさい。[*印のついた語句は注を参照しなさい。](72点)

One December evening in 1873, Nantclwyd Hall hosted a garden party. While staying at the manor*, Major Walter C. Wingfield, an inventor and soldier who had served in India and then China during the Second Opium War*, used the occasion to introduce a new game to his fellow guests. He called it *sphairistike*, roughly translated from ancient Greek for “the art of playing ball.”

^(a) Inspired by a ball game played indoors by aristocrats for centuries, Wingfield’s innovation was to move the game outside and replace the leather ball with a bouncing rubber one. The game was a hit. (X) months, Wingfield had patented *sphairistike*. He began a business, published two books to promote the game and sold playing sets. Presented ^(b) in a handsome, long wooden box, a typical set included written instructions, a long net, court markers, a rubber ball, pegs and tape to mark the court, and four lopsided* rackets. (中略) In the first year, Wingfield sold a thousand sets that quickly spread across the British Empire and beyond. Just three years later, in 1877, the first tournament of champions for lawn tennis, as the sport became known, was held at Wimbledon.

(Y) the major’s game of tennis is rarely recognized as a product of hominin* evolution, the ability to strike a bouncing ball with a racket is evidence ^(c) of an ancient symbiosis* between human and tool. Consider what happens when you pick up a tennis racket the first time. At that moment, the racket is just a thing. An external object in the world. Next, a ball is tossed in your direction to strike. Perhaps you use both hands, keeping your feet firmly planted, and swing at the wrong angle, with the racket’s face parallel to the ground. You miss. But a coach gives you some instruction and then tosses another ball your way. Now

you turn your body to the side, step forward, grip the racket at the right angle and swing to the ball with the racket's wide face perpendicular* to the ground. The racket releases a fulfilling *thwock**! The ball sails over the net.

(Z) more practice, each swing becomes more natural, each ball hit more precisely as your hand feels ever more at home wrapped around the grip. As the literary scholar Steven Connor has noted in *A Philosophy of Sport*, one possible origin for the word “racket” is *rachette*, Middle French* for the palm of the hand. This etymology* suggests how the racket becomes a part of the hand itself. “If I wish the racket to become me,” Connor writes, “I must first become it.” Or, as one of the greatest living tennis players, Roger Federer, once said, “I love my racket, and it’s the extension of my arm, and it does all the magic for me.”

(d)
One study has shown how Federer’s sense of bodily extension is not magic but an acutely human experience. In 2017, researchers at the University of Genoa in Italy published a study in which they tested how tennis players perceived the space around their bodies when holding rackets. They had subjects hold their own tennis racket and then a racket they had never used before. The subjects were asked to verbally respond (e) to a tiny electrical current to their hand and a random sound that was played by a speaker positioned at either the hand or the end of the racket. The purpose was to measure the subjects’ reaction time to the vibrations and sounds. When subjects were holding their own rackets, they reacted much more quickly. This suggests that the subjects had embodied their own rackets (f) more fully than the unfamiliar ones.

(あ) an experience is not (い)(う) tennis rackets but (え)(お) tool humans create and master: brooms, rakes, spoons, fishing rods, needles, saws, pencils, paintbrushes, saxophones, computer mice, prosthetics*, wheelchairs and far more. We are all having this

experience every day of our lives. We adopt tools as extensions of our arms, legs, eyes, brains and more as we navigate our daily to-dos. If you wear glasses every day, you are more ^(f)likely to notice you're not wearing them than when you are.

How does this happen? One theory looks at what first happens to us as babies. Human infants are great explorers. We touch and feel everything. As we do this, we develop a sense of what belongs where. These explorations trace the topographies* of our bodies and our relationship with things, how our bodies interact with the spaces and objects surrounding us. This theory posits* that in the neocortex* of a human child's brain is something called a "somatosensory* map." This atlas of the body, as known through the senses, tells a child where skin ends and the world begins.^(g) Unlike most maps, though, this one is not fixed. It changes constantly and rapidly as we use things and then leave them behind. So, when a child wipes their nose, then scribbles with a crayon, then uses a wooden hammer to hit a pretend nail,^(f) the map of their bodies and tools is like a dry-erase board that is constantly being written and rewritten.

Sometimes we rewrite the map from necessity. After all, the human body itself is endlessly changing. Young people's bodies flower; older people's bodies decline. As an infant grows into an adolescent,^(g) the mind is endlessly adjusting to the body's development—or trying to, if you've ever seen a stumbling toddler* or gangly teenager. Through trial and error, and practice and repetition, with tools we can purposefully rewrite the map. The map is more than a metaphor.^(h) When a violinist practices six hours a day, they can increase the relative size of the area in their neocortex that corresponds to their fingers.

Another theory that explains how objects become part of our bodies is called "radical embodiment." This view isn't based on the idea of a map. Instead, objects become part of a whole, unconscious and dynamic human-

thing system. This means that our brains actually perceive tools as literal parts of our bodies^(工). When a person rides a bike, there is a beautiful unison where the person and bike become part of the person-bike machine. i) But a bike that has a flat tire, no handlebars and a broken chain becomes just a bike, and its rider becomes just a person.

(By Chip Colwell, writing for *Smithsonian Magazine*,
February 26, 2024)

[注] manor 大邸宅

the Second Opium War 第二次アヘン戦争、アロー戦争 (1856～1860)

lopsided 傾いた

hominin ホミニン (霊長類の一種、現生人類、現代人を含む人類に近い種
や絶滅した種を含む)

symbiosis 共生

perpendicular 直角の

thwock 強く打つ音

Middle French 中期フランス語 (14世紀半ば～17世紀初頭)

etymology 語源

prosthetics (prosthetic 義足などの人工器官)

topographies (topography 地形)

posits (posit 仮定する、想定する)

neocortex 大脳新皮質 (大脳の表面の進化的に新しい部分)

somatosensory 体の感覚機能の (皮膚感覚や深部感覚の)

toddler よちよち歩きの幼児

I - A 空所(X)～(Z)に入るもっとも適切なものを次の1～4の中からそれぞれ一つ選び、その番号を解答欄に記入しなさい。

- | | | | | |
|-----|------------|-----------|--------------|-----------|
| (X) | 1 Across | 2 For | 3 Throughout | 4 Within |
| (Y) | 1 Although | 2 Because | 3 Since | 4 When |
| (Z) | 1 Besides | 2 Except | 3 With | 4 Without |

I - B 下線部 (a)～(i) の意味・内容にもっとも近いものを次の1～4の中からそれぞれ一つ選び、その番号を解答欄に記入しなさい。

(a) Inspired

- | | | | |
|-------------|-----------|--------------|------------|
| 1 Exhausted | 2 Expired | 3 Influenced | 4 Required |
|-------------|-----------|--------------|------------|

(b) promote

- | | | | |
|-------------|-----------|-----------|------------|
| 1 advertise | 2 enhance | 3 prevent | 4 restrain |
|-------------|-----------|-----------|------------|

(c) evidence

- | | | | |
|------------|----------|---------|-----------|
| 1 a belief | 2 a bias | 3 proof | 4 tribute |
|------------|----------|---------|-----------|

(d) extension

- | | |
|----------------|------------|
| 1 continuation | 2 delay |
| 3 education | 4 progress |

(e) verbally

- | | | | |
|--------------|----------|-----------|------------|
| 1 accurately | 2 orally | 3 quickly | 4 silently |
|--------------|----------|-----------|------------|

(f) scribbles

- | | | | |
|----------|-------------|----------|----------|
| 1 breaks | 2 decorates | 3 erases | 4 writes |
|----------|-------------|----------|----------|

(g) an adolescent

- | | |
|------------|------------------------|
| 1 a baby | 2 a middle-aged person |
| 3 a senior | 4 a young adult |

(h) a metaphor

- | | | | |
|-------------|--------------|-------------|------------|
| 1 a monitor | 2 a presence | 3 a reality | 4 an image |
|-------------|--------------|-------------|------------|

(i) unison

- | | | | |
|------------|------------|-----------|---------|
| 1 conflict | 2 division | 3 harmony | 4 scene |
|------------|------------|-----------|---------|

I - C 波線部 (ア)~(エ) の意味・内容をもっとも的確に示すものを次の 1 ~ 4 の中からそれぞれ一つ選び、その番号を解答欄に記入しなさい。

(ア) embodied their own rackets

- 1 made their own musical instruments
- 2 made their own rackets part of their body perception
- 3 their own rackets surgically attached to their bodies
- 4 transformed themselves into actual rackets

(イ) navigate our daily to-dos

- 1 drive to work every day
- 2 guide our guests to do well
- 3 manage our task lists of the day
- 4 walk through the milk farm

(ウ) where skin ends and the world begins

- 1 how to distinguish one's own body from the surroundings
- 2 what to expect from travelers from the world
- 3 when the world is at your finger tips
- 4 when to start learning domestic and world history

(エ) literal parts of our bodies

- 1 actual sections of our physical features
- 2 descriptions of our limbs
- 3 manuals on how we operate body parts
- 4 virtual parts of the tools

I - D 二重下線部の空所(あ)～(お)に次の1～8の中から選んだ語を入れて、本文の意味・内容に合う文を完成させたとき、(あ)と(い)と(お)に入る語の番号を解答欄に記入しなさい。同じ語を二度使ってはいけません。選択肢の中には使われな
いものが三つ含まれています。選択肢は文頭に入るものも含め、すべて小文字に
してあります。

(あ) an experience is not (い)(う) tennis rackets but
(え)(お) tool humans create and master

1 all

2 every

3 for

4 includes

5 limited

6 recommended

7 such

8 to

I - E 本文の意味・内容に合致するものを次の1～8の中から三つ選び、その番号を解答欄に記入しなさい。

- 1 The first form of tennis dates back to ancient Greece, developed from an indoor game played with a leather ball.
- 2 Several months after Wingfield started to sell the *sphairistike* kit, the first tournament was held in Britain.
- 3 The origin of the word “racket” implies that feeling the racket as part of your hand is a step in the process of making it serve you well.
- 4 Researchers in Italy reported that tennis players lost specific perceptions of the space around their bodies when holding their own rackets.
- 5 According to one theory, human babies develop a sense of what belongs around them even without touching or feeling those things.
- 6 We can modify the somatosensory map through repeated physical activities using various tools.
- 7 With regular practice, a violinist can increase the relative size of the area of the brain that controls their fingers.
- 8 To become a part of a perfect person-bike machine, we need to learn to cope with a flat tire and a broken chain.

〔Ⅱ〕 次の文章を読んで設問に答えなさい。[*印のついた語句は注を参照しなさい。](78点)

Car tires on roads, the ^(a)roar of airplane engines, the evening sirens of police cars, and the constant clatter of machinery on construction sites — millions of people around the world get out of bed every day and go to work or school with the ^(b)annoying, invisible companion of noise.

Many of us have become used to a noisy environment, and we may rarely notice it consciously. But it nevertheless affects our bodies and minds, and every year ^(c)noise pollution takes a toll. According to the World Health Organization*, noise is the world's second biggest environmental cause of ill health, second only to air pollution.

There are often noise controls in the workplace, although a 2019 Curtin University study found that almost one in five Australian working men experienced noise above recommended limits on their most recent working day. But environmental noise on the commute, in social venues*, and particularly when it affects the home environment: it can have dramatic effects. One EU study estimates that 22 million people in Europe live with chronic noise-induced stress, and that constant noise causes 12,000 ^(c)premature deaths in Europe annually.

The good news is that scientists and engineers are starting to focus ⁽¹⁾on technological solutions that could dampen* the noise from our loudest transportation, and might even enable the walls of our homes to neutralize* noise.

Noise is defined as unwanted sound. The definition is imprecise, given that (あ) is (い) varies (う) person (え) person and may (お) on both the physical environment (か) a person's mental state. If our mood is bright, we are better at coping with the noise around us. When we are tired or sad or hungover*, even low noise levels can be

annoying.

Despite the imprecise definition, there is general agreement on what is harmful. The WHO recommends a noise limit of 55 decibels* (dB) — ^(d)roughly equivalent to a washing machine. Safe Work Australia suggests 50dB for work involving concentration or lots of conversation, and 70dB for faster-paced occupations, with a limit of 85dB as an average over eight ^(e)hours. Noise above that level is considered harmful to health over time, and even momentary noise levels above 140dB — the level of sledgehammering* or gun shots — can cause instant hearing damage.

The unit of sound is the decibel: tenths of the fundamental “bel” named in honor of Alexander Graham Bell*. (The decibel has proven more practical for everyday use.) Its scale is logarithmic*, so that an increase in just 3dB indicates a doubling of noise intensity. So if you turn on two machines that each make 80dB of noise, the noise is now twice as loud, but it is 83dB, not 160dB.

There are also different types of noise, using different decibel ratings, so that dB (A) is used for steady noise over a period of time, such as traffic noise or background music throughout the day, while dB (C) is used for impulse noise, such as an explosion. But in fact (X) short-^(f)term noise can cause permanent hearing damage, it is the constant noise of everyday life that really takes its toll. Harvard University researchers scanned the bodies of 500 people and found that the risk of severe heart conditions such as heart attack and stroke increases by 34% for every 5dB increase in noise levels over a 24-hour period.

Noise has also been linked to several types of cancer, diabetes*, obesity*, and high blood pressure. Traffic is the biggest source of noise, (Y) traffic noise is a growing problem in cities around the world, as more people live more densely than ever, with more cars on the roads. An estimated 254 billion vehicle kilometers were travelled on Australia’s roads

in 2022-23, a rise of 5.8% on the year before, and up more than 20% on 20 years before.

Countries with a rapid take-up* of electric vehicles may benefit slightly (Z) their quieter operation, but noise from tires on the roads and wind buffeting* is worse than engine noise, and in many nations there are calls or initiatives to reduce traffic and environmental noise.

Noise-reduction technology comes in two variants: passive and active. Passive methods do not need to be activated or otherwise switched on, but reduce noise continuously by virtue of the materials they are built from, or their design. Active methods perform more mechanical or electronic work in response to noise.

The most common passive silencer is an ordinary wall. It absorbs a significant portion of the sound that hits it, while some of the noise is reflected back into the street or back into the indoor room. Noise barriers around highways use this simple, passive mechanism.

A variation on the passive wall uses new diffraction* technology developed by 4Silence* in the Netherlands under an EU-funded “Whisper” project. Special noise-barrier fences use curved metal grids* that direct the noise upwards and away from the surroundings, instead of just blocking it. Such a grid just one meter in height can remove noise as efficiently as a 3-meter concrete wall.

There are also opportunities to reduce noise under car tires. In the EU engineers are to test asphalt with rubber powder added from end-of-life car tires, making the asphalt less stiff and thus reducing vibrations in car tires, lowering noise levels by 4-5dB. In Australia, Boral* is partnering with southern Sydney councils on a similar but recycling-led initiative titled “Reusing Rubber: Recycling Tires for Roads,” applying research that suggests that adding crumbed rubber to asphalt can double the life of a road.

(By Mikkel Meister, writing for *Science Illustrated*, February 15, 2024,
イギリス式につづり・表記はアメリカ式に変更)

- [注] the World Health Organization 世界保健機関 (通称WHO)
venues (venue 会場、会場場所)
dampen 削ぐ、弱める
neutralize ~の効力を中和する
hangover 二日酔いの
decibels (decibel デシベル、音響の強さなどの単位)
sledgehammering 大金づちで打つこと
Alexander Graham Bell アレクサンダー・グラハム・ベル (1847~1922)
(スコットランド出身の科学者・発明家で電話技術を開発)
logarithmic 対数の
diabetes 糖尿病
obesity 肥満
take-up 普及率
wind buffeting 風が叩きつけることによる騒音
diffraction (音波が) 障害物の背後に伝わる現象
4Silence オランダの建設資材会社
grids (grid 格子)
Boral オーストラリアの建設資材会社

II - A 空所(X)~(Z)に入るもっとも適切なものを次の1~4の中からそれぞれ一つ
選び、その番号を解答欄に記入しなさい。

- | | | | | | | | | |
|-----|---|-------|---|---------|---|--------|---|-------|
| (X) | 1 | after | 2 | because | 3 | before | 4 | while |
| (Y) | 1 | and | 2 | but | 3 | or | 4 | since |
| (Z) | 1 | about | 2 | by | 3 | from | 4 | of |

II - C 波線部 (ア)~(エ) の意味・内容をもっとも的確に示すものを次の 1 ~ 4 の中から
それぞれ一つ選び、その番号を解答欄に記入しなさい。

(ア) noise pollution takes a toll

- 1 noise complaints are becoming common
- 2 noise reduction is expensive
- 3 noisy crowds can either excite or irritate us
- 4 noisy environments affect us negatively

(イ) to focus on technological solutions

- 1 to concentrate on skillful engineers
- 2 to meet technology-based standards
- 3 to pursue construction policies
- 4 to stress innovative measures

(ウ) by virtue of the materials they are built from

- 1 despite the structural limitations
- 2 despite their construction costs
- 3 thanks to the efficiency of construction workers
- 4 thanks to what they are made of

(エ) making the asphalt less stiff

- 1 enhancing the flexibility of the asphalt
- 2 fixing the bumps of the asphalt
- 3 polishing the surface of the asphalt
- 4 strengthening the core of the asphalt

II - D 二重下線部の空所(あ)～(か)に次の1～8の中から選んだ語を入れて、本文の意味・内容に合う文を完成させたとき、(あ)と(え)と(か)に入る語の番号を解答欄に記入しなさい。同じ語を二度使ってはいけません。選択肢の中には使われないものが二つ含まれています。

(あ) is (い) varies (う) person (え) person and may
(お) on both the physical environment (か) a person's mental
state

- | | | | |
|-------|------------|--------|---------|
| 1 and | 2 depend | 3 from | 4 or |
| 5 to | 6 unwanted | 7 what | 8 which |

II - E 本文の意味・内容に合致するものを次の1～8の中から三つ選び、その番号を解答欄に記入しなさい。

- 1 According to the World Health Organization, people are conscious of noisy environments and manage to prevent health issues caused by noise.
- 2 Even though there are often noise controls in the workplace, it is where people suffer from chronic noise-induced stress the most.
- 3 A decibel is a sound measurement unit equal to one tenth of "a bel" which is named after Alexander Graham Bell.
- 4 The unit dB (A) is suitable for measuring impulse noise, and the unit dB (C) is used for continuous noise.
- 5 People are more likely to develop serious diseases related to traffic noise in large cities.
- 6 Greater adoption of electric cars could have a minor effect on reducing noise pollution.
- 7 Passive noise-reduction technologies require activation or otherwise need to be switched on.
- 8 Special noise-barrier fences guide the noise downwards and away from the surroundings.

II - F 本文中の太い下線部を日本語に訳しなさい。(指示代名詞 it の内容を明らかにして訳しなさい。)

It absorbs a significant portion of the sound that hits it, while some of the noise is reflected back into the street or back into the indoor room.

〔Ⅲ〕 次の会話を読んで設問に答えなさい。(50点)

(Lisa and Alison are siblings who are sitting in the backyard, talking about social media.)

Lisa: Hey Alison, did you see my latest post on Instagram? I got so many likes on that photo from our hike last weekend!

Alison: No, I didn't see it. You know I don't really use social media much.

Lisa: Oh right, I forgot. _____ (a) _____ It's so fun to share photos and connect with friends!

Alison: I don't know. [ただ、私生活の多くをネット上に公開するのは気が引ける。] I'm really worried about privacy and security.

Lisa: What do you mean? It's just photos and status updates. What's the big deal?

Alison: Well, once you put something online, it's out there forever. Even if you remove it, someone could have taken a screenshot or saved it. It's like you're giving up control over your own information.

Lisa: I guess I never really thought about it that way. I just like sharing my life with my friends and family. _____ (b) _____

Alison: I get that, but there are other ways to connect with people that don't involve putting your whole life on display for the internet. I prefer to keep my personal life, well, personal.

Lisa: But don't you miss out on a lot by not being on social media? Like, how do you keep up with what's going on with your friends?

Alison: _____ (c) _____ You know, through text, or phone calls, or actually hanging out in person. Crazy concept, I know.

Lisa: Ha ha, very funny. But seriously, I feel like social media is just a part of life now. It's how people communicate and stay informed.

Alison: Maybe, but it's not the only way. _____ (d) _____ Like,

have you ever thought about how much data these social media companies are collecting about you? They're tracking everything you do, every site you visit, every photo you like.

Lisa: Okay, that's a little creepy when you put it like that.
_____ (e) _____ Why would they care about a regular person like me?

Alison: Who knows? They could sell it to advertisers, or use it to control what content you see. And what if there's a data breach and all your personal information gets leaked?

Lisa: Yikes! I hadn't considered that.

Alison: It happens much more often than you think. _____ (f) _____

Lisa: All the time! I get so sick of them. Why?

Alison: One of the reasons you get junk email is because your email address was leaked somewhere. That shows you exactly how safe your information is.

Lisa: Are you serious? That's pretty scary to think about.

Alison: Exactly. That's why I'm so cautious about what I put online. I don't want my whole life to be an open book for anyone to access.

Lisa: I can understand that perspective. Maybe I should be a little more mindful about what I post. But I still enjoy using social media to connect with people. I don't think I could give it up completely like you.

Alison: That's fair. Everyone has to find their own comfort level with it. I'm not saying social media is all bad, I just think people should be aware of the potential risks and make informed decisions about what they share.

Lisa: That makes sense. You've definitely given me some food for thought. Maybe I'll do a little social media privacy checkup.
_____ (g) _____

Alison: That's a good idea. And maybe I could make a little more effort to connect with people through social media... in a limited, cautious way, of course.

Lisa: _____ (h) _____ Who says social media has to be all or nothing?

Alison: Definitely. It's all about finding a balance that works for you. Just remember, the internet never forgets!

Ⅲ - A 空所 (a)~(h) に入るもっとも適切なものを次の 1~10 の中からそれぞれ一つ選び、その番号を解答欄に記入しなさい。同じ選択肢を二度使ってはいけません。選択肢の中には使われないものが二つ含まれています。

- 1 And there are a lot of downsides to it.
- 2 But what are they going to do with all that data?
- 3 Didn't you post that last week?
- 4 Do you ever get junk emails?
- 5 I couldn't believe how many views your video got.
- 6 I just talk to them directly.
- 7 I'll tighten up my settings.
- 8 It makes me feel more connected to people.
- 9 Look at us, finding a middle ground!
- 10 Why don't you like social media again?

Ⅲ - B 本文中の [] 内の日本語を英語で表現しなさい。

ただ、私生活の多くをネット上に公開するのは気が引ける。