〔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。](81点)

Our brains are very flexible. Some people use their brains to create art. Others use them to solve math problems. Some do both — plus a host (a) of other actions.

Our brain is made up of two halves called hemispheres. The left and right sides are symmetric, meaning they look more or less the same. The major brain structures that control how we think, move, feel and see are found in both halves.

But the sides can act separately. For instance, the left side of the brain controls vision and movement on the right side of the body. And vice versa (ア). Some functions, such as speech, can be controlled more by one side of the brain than the other. This has led some people to suggest that the two halves are specialized.

People sometimes describe those of us who are more creative as being "right-brained," and those who are more logical as "left-brained." This became a very popular idea about how the brain works. But it isn't really true. To understand where it came from, we have to go back 70 years.

The theory about left and right brains emerged (W) work that started in the 1950s. Roger Sperry was a neuroscientist at the California Institute of Technology in Pasadena. He got curious about how the two sides of the brain interact. He focused (X) a thick bundle of nerve fibers that joins the two halves. It's called the corpus callosum* and in people it contains more than 200 million nerve fibers.

This connection helps the brain's two sides communicate and work together. But doctors had discovered that cutting the corpus callosum could help treat severe cases of epilepsy*. In this disorder (b), excess nerve-cell

activity can overwhelm(c) the brain. It's been described like a lightning storm inside the head. Too much nerve-cell firing(d) can cause harmful seizures*. Cutting the corpus callosum quieted them. And it didn't seem to have a big effect on normal brain function.

That splitting the brain didn't seem to cause problems fascinated Sperry. To better understand why, he started working with people who had gotten their corpus callosum cut. Sperry asked these volunteers to cover one eye at a time. Then he showed them a series of words. The people could only recall words they viewed with their right eyes, not their left. When shown objects, people could draw things they saw with their left eyes but could not describe them (Y) words. These results suggested that the ability to use and understand language is based in the left side of the brain.

This finding made sense for other reasons, too. From other studies, researchers knew about two parts of the brain important for language. They are called Broca's area and Wernicke's area. Both are usually found on the left side of the brain.

Sperry's "split-brain" research changed (Z) we thought our brain worked. Indeed, he would share the 1981 Nobel Prize in physiology or medicine for his work. But the idea of right- versus left-brain skills also caught people's imaginations(e). An article based on Sperry's work had been published in the *New York Times Magazine* in 1973. It took ideas from his findings and other case studies and ran with* them. It claimed skills such as musical ability were controlled entirely by the right brain. In this way, important research gave way to speculation(f).

In fact, this early research had one huge limitation: Scientists back then had no way to look inside a living brain. Now, researchers have several tools that can image the working brain. One is functional magnetic resonance imaging, or fMRI*. It can track blood flow in the brain. Active

brain cells need lots of oxygen, which is carried by blood. So high levels of blood flow are used to pinpoint (f) regions where the brain is active.

In 2013, researchers used MRI* to scan the brains of more than 1,000 kids and young adults. They measured whether some brain functions seemed isolated to the left or right sides. And a few functions were tied more strongly to one side, these scans showed. Among them was language, which supported Sperry's findings from decades earlier. But most brain networks bounced between both hemispheres.

That (ウ) disproved (g) the idea that only the right hemisphere is at work when you perform music or create art, says Diana Sarko. "That's just not true. [Activity] is very, very distributed (h)." And, she adds, "Thank goodness it is, because both sides of the brain have a lot to offer." Though not part of the MRI work, Sarko studies the brain at Southern Illinois University in Carbondale.

Michelle Ellefson agrees. The theory that one side of the brain can control general traits like creativity or logic is out of date, she says. A neuroscientist, she works at the University of Cambridge in England. "The thinking now," she says, "is that although (あ) may be one area largely (い) for some sort (う) skill, (え) doesn't work (お) its own." Brain imaging shows that "everything's interconnected."

Not only do brain areas work together, but sometimes networks also change or move. Such shifts may be seen in response to injury. And they give further evidence that many functions aren't limited to specific areas of the brain.

Some functions are controlled more by regions on one side of the brain than the other. But traits like creativity and logic are far too complex to use just one brain area. In fact, any time you create a painting or solve a math problem, lots of areas on both sides of the brain team up. So the next time a quiz or a friend tells you that you're "left-

brained" or "right-brained," remember: You have your whole brain to thank for all the amazing things you can do.

(By RJ Mackenzie, writing for *Science News Explores*, November 1, 2024)

[注] corpus callosum 脳梁
epilepsy てんかん
seizures (seizure 発作)
ran with (run with ～を推し進める)
fMRI 機能的磁気共鳴画像法
MRI 磁気共鳴画像法

Ⅰ－A 空所(W)～(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。

(W)	1	by	2	from	3	to	4	under
(X)	1	at	2	in	3	on	4	to
(Y)	1	as	2	from	3	in	4	to
(Z)	1	how	2	what	3	where	4	why

Ⅰ－Ｂ　下線部 (a)～(h) 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) a host of

1　a large number of　　2　a small number of

3　an equal number of　　4　an odd number of

(b) disorder

1　health　　2　illness　　3　place　　4　situation

(c) overwhelm

1　activate　　2　distract　　3　dull　　4　stun

(d) firing

1　blocking　　2　slowing　　3　storing　　4　triggering

(e) caught people's imaginations

1　made people disappointed　　2　made people excited

3　made people relieved　　4　made people surprised

(f) pinpoint

1　create　　2　facilitate　　3　heal　　4　locate

(g) disproved

1　confirmed　　2　explored　　3　questioned　　4　rejected

(h) distributed

1　concentrated　　2　dispersed

3　intensified　　4　relaxed

Ⅰ－C　波線部 (ア)～(ウ) 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) vice versa

1　the left side of the brain controls vision and movement on the left side of the body

2　the left side of the brain doesn't control vision and movement on the left side of the body

3　the right side of the brain controls vision and movement on the left side of the body

4　the right side of the brain doesn't control vision and movement on the left side of the body

(イ) gave way to speculation

1　was contradicted by argument

2　was extended by guesswork

3　was preceded by theorizing

4　was weakened by analysis

(ウ) bounced between both hemispheres

1　moved from one hemisphere to the other

2　moved out of both hemispheres

3　stayed away from both hemispheres

4　stayed in one hemisphere or the other

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。

although（　あ　）may be one area largely（　い　）for some sort（　う　）skill,（　え　）doesn't work（　お　）its own

1	attributed	2	by	3	in	4	it
5	of	6	on	7	responsible	8	there

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　Creative people popularized the idea that it is better to be right-brained.

2　The idea that there are specialized functions for each side of the brain was first seriously challenged in the 1950s.

3　Sperry's research showed that split-brain patients were often able to remember a word if they had seen it first with their right eyes, then their left.

4　Sperry's findings were consistent with previous studies and inspired further discussion.

5　Early brain research was limited in that there were no tools available to examine the inner working of an active brain.

6　The study using MRI discovered few people whose speech function was strongly associated with one side of the brain.

7　The 2013 study confirmed the earlier proposal that the two halves of the brain mostly worked independently of each other.

8　The two sides of the brain interact so closely that it may not be reasonable to call someone left-brained or right-brained.

Ⅰ－F　本文中の太い下線部を日本語に訳しなさい。

traits like creativity and logic are far too complex to use just one brain area

〔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。](69点)

The idea of a humanlike artificial intelligence assistant that you can speak with has been alive in many people's imaginations since the release of *Her*, Spike Jonze's 2013 film about a man who falls in love with a Siri-like AI named Samantha. Over the course of the film, the protagonist* grapples* with the ways in which Samantha, real (X) she may seem, is not and never will be human.

Twelve years (Y), this is no longer the stuff of science fiction. Generative AI tools like ChatGPT and digital assistants like Apple's Siri and Amazon's Alexa help people get driving directions, make grocery lists, and plenty else. But just like Samantha, automatic speech recognition systems still cannot do everything that a human listener can.

You have probably had the frustrating[(a)] experience of calling your bank or utility company and needing[(a)] to repeat yourself so that the digital customer service bot on the other line can understand you. Maybe you've dictated a note on your phone, only to spend time editing garbled* words. Linguistics and computer science researchers have shown that these systems work worse for some people than for others. They tend to make more errors if you have a non-native or a regional[(b)] accent, are Black, speak in African American Vernacular English*, code-switch*, if you are a woman, are old, are too young or have a speech impediment*.

Unlike you or me, automatic speech recognition systems are not what researchers call "sympathetic listeners." Instead of trying to understand you by taking in other useful clues like intonation or facial gestures, they simply give up[(ア)]. Or they take a probabilistic* guess, a move that can sometimes result in an error.

As companies and public agencies increasingly adopt automatic

speech recognition tools in order to cut costs, people have little choice but to interact with them. But the more that these systems come into use in critical fields, ranging from emergency first responders and health care to education and law enforcement, the more likely there will be grave consequences when they fail to recognize what people say. Imagine sometime in the near future you've been hurt in a car crash. You dial 911 to call for help, but instead of being connected to a human dispatcher, you get a bot that's designed to weed out (c) nonemergency calls. It takes you several rounds to be understood, wasting time and raising your anxiety level at the worst moment.

What causes this kind of error to occur? Some of the inequalities that result from these systems are baked into the reams of* linguistic data that developers use to build large language models. Developers train artificial intelligence systems to understand and mimic human language by feeding them vast quantities of text and audio files containing real human speech. But whose speech are they feeding them? If a system scores high accuracy rates (イ) when speaking with affluent white Americans in their mid-30s, it is reasonable to guess that it was trained using plenty of audio recordings of people who fit this profile.

With rigorous* data collection from a diverse range of sources, AI developers could reduce (d) these errors. But to build AI systems that can understand the infinite variations in human speech arising from things like gender, age, race, first vs. second language, socioeconomic status, ability and plenty else, requires significant resources and time.

For people who do not speak English — which is to say, most people around the world — the challenges are even greater. Most of the world's largest generative AI systems were built in English, and they work far better in English than in any other language. On paper, AI has lots of civic potential for translation and increasing people's access to information

in different languages, but for now, most languages have a smaller digital footprint, making it difficult for them (ウ) to power large language models. Even within languages well-served by large language models, like English and Spanish, your experience varies (e) depending on which dialect of the language you speak.

Right now, most speech recognition systems and generative AI chatbots reflect the linguistic biases of the datasets they are trained on. They echo prescriptive, sometimes prejudiced (f) notions of "correctness" in speech. In fact, AI has been proved to "flatten" linguistic diversity. There are now AI startup companies that offer to erase the accents of their users, drawing on the assumption that their primary clientele* would be customer service providers with call centers in foreign countries like India or the Philippines. The offering perpetuates* the notion that some accents are less valid (g) than others.

AI will presumably get better at processing language, accounting for variables like accents, code-switching and the like. In the U.S., public services are obligated (h) under federal law to guarantee equitable* access to services regardless of what language a person speaks. But it is not clear (あ) (い) alone will be (う) incentive (え) the tech industry (お) move (か) eliminating linguistic inequities.

Many people might prefer to talk to a real person when asking questions about a bill or medical issue, or at least to have the ability to opt (Z) interacting with automated systems when seeking key services. That is not to say that miscommunication never happens in interpersonal communication, but when you speak to a real person, they are primed to be a sympathetic listener.

With AI, at least for now, it either works or it doesn't. If the system can process what you say, you are good to go. If it cannot, the onus* is on you to make yourself understood.

(By Roberto Rey Agudo, writing for *The Conversation*, January 27, 2025)

［注］ protagonist　主人公

grapples　（grapple　格闘する）

garbled　（garble　勝手に手を加える）

African American Vernacular English　主にアフリカ系アメリカ人によって話される英語の変種

code-switch　（多言語話者が）発話の中で言語を切り替える

speech impediment　言語障害

probabilistic　確率に基づく

reams of　大量の

rigorous　厳密な

clientele　顧客

perpetuates　（perpetuate　固定化する）

equitable　公平な

onus　義務

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	as	2	but	3	like	4	since
（Y）	1	down	2	off	3	on	4	up
（Z）	1	back to	2	out of	3	short of	4	up to

Ⅱ－Ｂ　下線部 (a)～(h) 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) frustrating

1 annoying　　2 disappointing

3 opposing　　4 pressing

(b) regional

1 domestic　　2 limited　　3 local　　4 selective

(c) weed out

1 bother　　2 eliminate　　3 operate　　4 retain

(d) reduce

1 diminish　　2 induce　　3 lose　　4 simplify

(e) varies

1 changes　　2 explodes　　3 qualifies　　4 remains

(f) prejudiced

1 authorized　　2 conventional

3 discriminatory　　4 exotic

(g) valid

1 efficient　　2 legitimate　　3 logical　　4 pragmatic

(h) obligated

1 convinced　　2 persuaded　　3 promised　　4 required

Ⅱ－C　波線部 (ア)～(ウ) 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) they simply give up

1　the machines facing you just keep giving the same answer

2　the machines helping you just connect you to other machines

3　the machines listening to you just stop interpreting your words

4　the machines speaking to you just start repeating your words

(イ) scores high accuracy rates

1　awards itself many points

2　counts the exact number of something

3　is evaluated as mostly correct

4　is forced to store a record

(ウ) most languages have a smaller digital footprint

1　a large number of languages lack sufficient electronic resources

2　a wide variety of languages have been input into pocket-sized devices

3　enough data from languages around the world have been collected

4　many languages can only be translated orally or in writing

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、(い)と(え)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二つ含まれています。

But it is not clear（　あ　）（　い　）alone will be（　う　）incentive（　え　）the tech industry（　お　）move（　か　）eliminating linguistic inequities

1	below	2	enough	3	for	4	of
5	that	6	to	7	toward	8	whether

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　Researchers in linguistics agree with those who are doing computer science that not everyone benefits equally from digital assistants.

2　Humans are described as sympathetic listeners because they accept the misunderstandings made by their conversation partners.

3　Customers cannot avoid using automatic speech recognition systems as they are employed more and more widely.

4　The linguistic data utilized for training large language models is generally free from the problem of diversity.

5　AI systems now can deal with the unlimited variations that human languages have without careful preparation.

6　English is the most effective language to build generative AI systems because there are many dialects found around the world.

7　Some newly established AI developers provide ways of removing variations found in the way people speak English.

8　The rapid development of AI has helped to refine interpersonal communication.

〔Ⅲ〕 次の会話を読んで設問に答えなさい。(50点)

(*Alison is traveling on a train in Japan. She sees Hikaru studying an English grammar book.*)

Alison: Wow, it looks like you are studying really hard!

Hikaru: Thank you. Yes, I am. I have to prepare for the university entrance exams.

Alison: So you want to study English at university?

Hikaru: No, actually I want to study law. _____(a)_____ I guess you are a native speaker?

Alison: Yes, I'm British.

Hikaru: Oh, wow, I really want to visit Britain one day. I love English soccer and the Premier League.

Alison: Well, you should come one day!

Hikaru: Can I ask you something about English? There's something I don't understand in this textbook. It's this example sentence: "Military units rely on clear and simple massaging."

Alison: (*Laughing*) Oh, that's just a typo!

Hikaru: What's a typo?

Alison: I mean a misprint — a mistake in the text. "Massaging" should be "messaging."

Hikaru: Oh, I see! _____(b)_____ It's a statement about military communications.

Alison: I remember when I was studying German in England, there was a very confusing mistake in our textbook. [紛らわしいように思えることは間違いかもしれないって覚えておく必要があると思う。]

Hikaru: Yes. _____(c)_____ Look at this: "The famous *Titanic* sank on her very first voyage."

Alison: What's wrong with that?

Hikaru: _____(d)_____ It should be "its very first voyage."

Alison: Actually, there is no mistake this time. In English, we typically think of ships as female.

Hikaru: Why?

Alison: _____(e)_____ But you have to remember that in many European languages, most objects are gendered male or female. English speakers usually struggle with this. I mean, when they learn those languages. But of course we still find those languages easier than, say, Japanese or Chinese.

Hikaru: I often think about the differences between Japanese and English. There are so many!

Alison: But do you enjoy learning English?

Hikaru: I used to, for sure. _____(f)_____ But preparing for university entrance exams — it's not enjoyable!

Alison: What do they test you on? Is there any listening and speaking involved?

Hikaru: No, there's usually no listening and speaking. It's mostly reading comprehension. To do well, you need to study a lot of grammar and vocabulary.

Alison: It's a shame there's no speaking. _____(g)_____

Hikaru: Am I? Thank you. To be honest, I had no confidence speaking English until I did a homestay in Australia last summer. It was my first time outside Japan. The first week I was there, I could hardly speak at all. But then I suddenly realized that I was understanding people, and that I could reply.

_____(h)_____

Alison: That's wonderful! And you definitely speak very well. I have to get off at the next stop, but I wish you lots of luck with your

exams. My name's Alison, by the way.

Hikaru: Thank you! I'm Hikaru. And nice to meet you!

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 they would understand me.

2　But we all have to take an English exam.

3　Don't assume it's a mistake.

4　I honestly don't know!

5　I'll be happy to help.

6　In fact, I think this textbook has another one.

7　In the past it was fun.

8　Well, it's a ship.

9　Yes, it makes sense now.

10　You are obviously good at that!

Ⅲ－B　本文中の［　　］内の日本語を英語で表現しなさい。

紛らわしいように思えることは間違いかもしれないって覚えておく必要があると思う。