第 1 問から第 3 問では、問題文の中の [　　] 内の数字はマークシートの問番号を示している。該当する問番号の解答記入欄に答をマークしなさい。

第 1 問　次の問 1 ～ 6 の空所 [　1　] ～ [　6　] に入れるのに最も適切なものを (1) ～ (4) から 1 つ選び、その番号をマークしなさい。

問 1.　He would like to keep in [　1　] with her in the future.

(1) call　　(2) contact　　(3) interaction　　(4) relation

問 2.　I wanted to study philosophy in college, but I was finally talked [　2　] it by my parents.

(1) around　　(2) back in　　(3) down　　(4) out of

問 3.　[　3　] so often happens, she left her keys in her car.

(1) As　　(2) Even　　(3) It　　(4) What

問 4.　The [　4　] I saw him, I knew he was one of my former students.

(1) brief　　(2) chance　　(3) immediate　　(4) moment

問 5.　The teacher thinks carefully before deciding what assignment [　5　] to his students.

(1) has given　　(2) is to give　　(3) to give　　(4) to have given

問 6.　You need to take this medicine every day, [　6　] you will get much sicker.

(1) instead　　(2) nor　　(3) or　　(4) rather

第 2 問　次の問 1 ～ 4 においては、それぞれ日本語の意味に合うように下の (1) ～ (7) の語句を並べかえて空所を補い、適切な文を完成させなさい。解答は [　7　] ～ [　14　] に入れるものの番号のみをマークしなさい。ただし文頭にくる文字も小文字にしてある。

問 1.　彼女は全ての論文にほとんど同じコメントをした。

She made _____ [　7　] _____ _____ [　8　] _____ _____.

(1) about　(2) almost　(3) article　(4) comment
(5) every　(6) same　(7) the

問 2.　彼は、どんなに客が不快でも、それを表に出すことはない。

_____ [　9　] _____ _____ [　10　] _____ _____, he never shows how he feels.

(1) annoy　(2) customers　(3) him　(4) how
(5) matter　(6) much　(7) no

問 3.　彼らはみなその上院議員に質問をした。

_____ [　11　] _____ _____ [　12　] _____ _____.

(1) all　(2) asked　(3) of　(4) questions
(5) senator　(6) the　(7) they

問 4.　聴衆はその有名な交響曲のそれほど素晴らしい演奏を聴いたことがなかった。

Never _____ _____ [　13　] _____ _____ [　14　] _____ so well.

(1) famous　(2) had　(3) heard　(4) performed
(5) symphony　(6) that　(7) the audience

第 3 問 Read the article and answer the questions that follow.

Dr. Mark Sklansky has always hated shaking hands. “Hands are warm, they’re wet, and we know that they transmit disease very well,” says Sklansky, chief of pediatric cardiology at UCLA Mattel Children’s Hospital. He’s also tried to avoid this form of greeting because he knows that some patients don’t want to shake hands for religious or cultural reasons but feel compelled to when their doctor sticks out a hand. For a long time, though, being anti-handshake was fringe thinking. The handshake is such an ingrained part of the doctor-patient relationship that it happens 83% of the time, according to one 2007 analysis of more than 100 videotaped office visits.

Sklansky was once nervous to take a stand against the popular gesture. “I honestly didn’t want to admit this to anyone for the longest time,” he says. But in a 2014 paper, Sklansky and his colleagues argued that shaking hands in health care settings can spread pathogens and viruses, and that health care workers can help keep patients safe by keeping their hands to themselves.

The 《A》blowback was swift. Physicians complained that getting rid of the handshake would erode the already fragile doctor-patient bond, that the greeting was irreplaceable, and that they could manage to shake hands and wash them without spreading disease. “A lot of people laughed at the idea,” Sklansky says. “But now, people aren’t laughing.”

If social touch disappears more than just temporarily, there’s no consensus on what will replace it. But one thing is little disputed: Social interactions are about to start feeling really weird.

“As we come out of quarantine and isolation, I think we’re going to see some people offering handshakes and some people not wanting to touch them with a 10-foot pole,” says Aaron Smith, a psychotherapist and instructor in the school of social work at Renison University College in Canada who explored the pluses and pitfalls of handshakes in a journal article published in March. “There’s going to be a lot of (《B》) as people try to figure out how to greet somebody, how to professionally welcome somebody, how to meet your daughter’s boyfriend for the first time.” This uncertainty can affect those relationships. “We’re going to start seeing a lot more interpersonal and family-based sorts of conflict,” Smith predicts. If a business colleague attempts a handshake or your mom goes in for the hug, and you pull away, “there’s going to be some pretty big ripple effects in terms of the relational dynamics that we see.”

Research has shown it is possible — to some degree — to embrace touch-free alternatives. Sklansky conducted an experiment to see if he could eradicate the handshake in two of UCLA’s neonatal intensive care units, where some of the most vulnerable patients are treated. In a 2017 study, he describes setting up handshake-free zones by posting signs depicting two clasping hands, crossed-out, and encouraging the doctors, nurses and residents to try different nonverbal greetings. While about a third of providers were resistant — especially physicians, and especially men — nearly all of the patient families were in favor of not being touched by their doctor. Fewer than 10% said they wanted to be greeted with a handshake. The vast majority preferred instead when health care providers looked them in the eye, smiled, addressed them by name or asked about their wellbeing.

《C》 If you feel that personal connections are harder to form when talking to someone six feet away or through a screen on Zoom, you're not alone. "You're having to verbalize a lot more things that you would normally express with touch," says Juulia Suvilehto, a researcher at Linköping University in Sweden. Hugging someone who needs comforting or placing a hand on their shoulder often feels easier and more natural than finding the right words.

Being forced to voice these feelings might turn us into better communicators. "But the other option is that people will just stop communicating about emotions," Suvilehto says.

Just as social touch can be a substitute for language, you may have to over-communicate with words the feelings you would once get across through physical contact. Welcome to Sklansky's world, who's been taking the long, verbose way around the handshake for years. "When people reach out, I just say, 'Listen, I'd rather not shake hands. I don't think it's a good idea for different reasons.' I explain why, and I talk about the paper," he says. He opts instead for the namaste gesture. "People smile and think it's sort of funny," he says. "But I think it's something that over time, people could get used to here."

https://time.com/5842469/coronavirus-handshake-social-touch/ (改変あり)

From The Coronavirus Killed the Handshake and the Hug. What Will Replace Them? by Mandy Oaklander, TIME May 27, 2020.
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注 pediatric cardiology: 小児心臓病学 fringe: 非主流の ingrained: 簡単には変えられない
pathogen: 病原体 quarantine: 隔離 psychotherapist: 心理療法士
pitfall: 思わぬ危険 ripple effect: 波及効果 eradicate: ～を撲滅する
neonatal intensive care unit: 新生児集中治療室 wellbeing: 健康状態
verbalize: ～を言語化する verbose: 冗長な opt: ～を選択する
namaste: ヒンドゥー教徒が用いる挨拶の言葉やしぐさ

問 1. Choose the meaning of the underlined word《A》that best fits the context within the article. Write the number of your answer in [15].

(1) final conclusion (2) negative reactions
(3) reverse motion (4) unexpected surprise

問 2. Fill in the blank for《B》with the word that best fits the context within the article. Write the number of your answer in [16].

(1) awkwardness (2) betrayal (3) gratitude (4) obedience

問 3. Which of the following most accurately explains the meaning of the underlined sentence《C》? Write the number of your answer in [17].

(1) It is important not to feel isolated in spite of difficulties trying to form personal connections from six feet away or on Zoom.
(2) Many people are now forming personal connections by communicating with others six feet away or on Zoom.
(3) People do not feel lonely trying to make personal connections communicating with someone six feet away or on Zoom.
(4) Some people feel that it is more difficult to make personal connections when communicating with others six feet away or on Zoom.

問 4. Which of the following most closely expresses Dr. Sklansky's attitudes about shaking hands as mentioned in the article? Write the number of your answer in [18].

(1) He feels that most patients want to shake doctors' hands due to various religious or cultural reasons.
(2) He thinks that patients feel obligated to shake hands with doctors because doctors extend their hand to the patient.
(3) He was surprised that patients looked nervous when they attempted to shake hands with him.
(4) While he now dislikes shaking hands as a greeting, in the past he used to prefer shaking hands with his patients.

問 5. Which of the following is most accurate about Sklansky's experiment to test getting rid of the handshake mentioned in the article? Write the number of your answer in [19].

(1) About 33% of medical staff opposed efforts to try non-contact greetings.
(2) Medical staff were asked to try spoken greetings instead of physical contact greetings.
(3) Most patient families prefer medical staff who smile and give eye contact while shaking hands.
(4) The majority of patient families prefer to greet a doctor with a handshake.

問 6. Which of the following most closely expresses what is stated in the article? Write the number of your answer in [20].

(1) Expressing oneself without touching others should make communication easier.
(2) Handshaking may replace hugging because it transmits fewer germs.
(3) To reduce infection risk, verbal greetings will soon replace social touch.
(4) Touching can often be easier than communicating emotions verbally.

この後の第 4 問と第 5 問は記述用解答用紙に解答しなさい。

第 4 問　次の英文を読み、後の問いに答えなさい。

When you experience something with your senses, it evokes complex patterns of activity in your brain. One important goal in neuroscience is to decipher how these neural patterns drive the sensory experience.

For example, can the smell of chocolate be represented by a single brain cell, groups of cells firing all at the same time or cells firing in some precise symphony? The answers to these questions will lead to a broader understanding of how our brains represent the external world. They also have implications for treating disorders where the brain fails in representing the external world: for example, in the loss of sight or smell.

To understand how the brain drives sensory experience, my colleagues and I focus on the sense of smell in mice. We directly control a mouse's neural activity, generating "synthetic smells" in the olfactory part of its brain in order to learn more about how the sense of smell works.

【　あ　】

Our latest experiments discovered that scents are represented by very specific patterns of activity in the brain. Like the notes of a melody, the cells fire in a unique sequence with particular timing to represent the sensation of smelling a unique odor.

Using mice to study smell is appealing to researchers because the relevant brain circuits have been mapped out, and modern tools allow us to directly manipulate these brain connections.

The mice we use are genetically engineered so we can activate individual brain cells simply by shining light of specific wavelengths onto them – a technique known as optogenetics. Early uses of optogenetics involved light delivered through implanted optical fibers, letting researchers control coarse patches of brain cells. More recent uses of optogenetics allow more sophisticated control of precise patterns of brain activity.

【　い　】

For 《A》our study, we projected light patterns onto the surface of the brain, targeting a region known as the olfactory bulb. 《B》Previous research has found that when mice sniff different scents, cells in the olfactory bulb appear to fire in a sort of patterned symphony, with a unique pattern formed in response to each distinct smell.

When we shined light patterns onto a mouse's olfactory bulb, it generated corresponding patterns of cellular activity. We called these patterns "synthetic smells." As opposed to a pattern of activity triggered by a mouse sniffing a real odor, we directly triggered the neural activity of a "synthetic smell" with our light projections.

【 う 】

Next we trained each individual mouse to recognize a randomly generated synthetic smell. Since they can't describe to us in words what they're perceiving, we rewarded each mouse with water if it licked a water spout whenever it detected its assigned smell. Over weeks of training, mice learned to lick when their assigned smell was activated, and not to lick for other randomly generated synthetic smells.

We cannot say for sure that these synthetic smells correspond to any known odor in the world, nor do we know what they smell like to the mouse. But we did calibrate our synthetic patterns to broadly resemble olfactory bulb patterns observed when actual scents are present. Furthermore, mice learn to discriminate synthetic smells about as quickly as they did real smells.

【 え 】

Once each mouse learned to recognize its assigned synthetic smell, we measured 《C》how much they still licked when we modified the assigned smell. Within each synthetic pattern, we altered which cell were activated or when they activated.

Imagine taking a familiar song, changing individual notes in the song, and asking whether you still recognized the song after each change. By testing many different changes, one can eventually understand which precise composition of notes is essential to the song's identity and which tweaks are extreme enough to make the song unrecognizable.

Likewise, by measuring how mice changed their licking as we modified their projected light patterns, we were able to understand which combinations of cells within the pattern were important for identifying the synthetic smell.

The precise combination of cells activated was crucial. But just as important was when they are activated in an ordered sequence, akin to timed notes in a melody. For example, changing the order of cells in the sequence would render the smell unrecognizable.

【 お 】

Changes in recognition were graded, and not drastic: When we changed small parts of the pattern, the smell did not become completely unrecognizable. In fact, the degree to which the smell was recognized was proportional to the degree of change in the pattern. This implies that if I slightly modify the brain activity that represents an orange, you would still smell something similar – maybe recognizing it as citrus, or fruity.

So while the brain has huge capacity to store many different smells in unique timed sequences of cell activity, you can still recognize similar smells by the similarity in their patterns: 《D》The smell of coffee is still distinctly recognizable even with a splash of vanilla added to it.

The next step in this research is to bring the synthetic approach to real smells. To do so, we would

need to record brain activity in response to a real smell, then reactivate the very same cells using optogenetics. The synthetic re-creation of real objects in the brain is the current focus of research in multiple labs including ours.

【　か　】

Addressing this issue is exciting because it opens up possibilities not just for understanding how the brain works, but also for developing brain implants that may one day restore the loss of sensory experiences.

https://theconversation.com/synthetic-odors-created-by-activating-brain-cells-help-neuroscientists-understand-how-smell-works-141437 (改変あり)

注　decipher: ～を解読する
implant: ～を移植する
olfactory bulb: 嗅球
spout: 吹き出し口
tweak: 改変
olfactory: 嗅覚の
optical fiber: 光ファイバー
sniff: ～を嗅ぐ
calibrate: ～を調整する
splash: ひとかけ
optogenetics: 光遺伝学
coarse: 粗い
lick: ～を舐める
note: 旋律を構成する音

問 1.　下線部《A》と下線部《B》はどのような点で異なるか、本文の内容に即して日本語で説明しなさい。

問 2.　筆者らはマウスが特定のにおいを感じているか否かを確認するために、遺伝子操作したマウスをどのように訓練したか、本文の内容に即して日本語で説明しなさい。

問 3.　下線部《C》を測ることで、それぞれの合成臭について何がわかるか、本文の内容に即して日本語で述べなさい。

問 4.　下線部《D》の事実は、筆者らが実験から得たどのような結果と合致しているか、本文の内容に即して日本語で述べなさい。

問 5.　次の段落は本文のどの位置に置くのが最も適切か、【あ】～【か】の記号で答えなさい。

It turned out that the cells activated earlier in the sequence were more important for recognition than the cells that were subsequently activated.

第 5 問　次の英文を読み、下線部 (1) ～ (4) の日本語の内容を英語にしなさい。

In a study conducted in China, researchers found that moderate drinking slightly raised the risk of stroke and high blood pressure. They weren't able to figure out, though, whether small amounts of alcohol might also increase the chances of a heart attack.

(1)一日にお酒を 1、2 杯飲む人たちは、お酒を飲まない人たちよりも脳卒中や心臓病のリスクが低いと長らく考えられてきた。 But scientists were unsure if that was because the alcohol was beneficial or if the nondrinkers had other health issues.

"The claims that alcohol has some magical, protective fix ... has no particularly serious scientific basis," said Richard Peto, one of the study's senior authors from the University of Oxford.

Peto said their findings should apply to other populations beyond China and to any alcoholic drinks like beer or wine, even though the study participants mostly drank spirits. The research was published online Thursday in the journal *The Lancet*.

For their research, Chinese and British scientists took genetics into account. They focused on two variants common among East Asians that can make drinking unpleasant. (2)その変異を持つ人たちには、お酒を飲むと、すぐに顔が赤くなる、あるいは頭が痛くなるなどの異状が見られることがある。

Because such gene variations occur randomly, the researchers were able to design the equivalent of a randomized study. Much of the previous research on alcohol and health effects has relied on studies that can't prove cause and effect.

The scientists tracked more than 500,000 people across China, following them for a decade. They recorded their medical history, including whether they smoked or exercised, and how much they drank. A third of the men reported drinking most weeks, compared with few of the women.

About 160,000 of the participants had the two gene variants. Among the men in that group, drinking ranged from none to up to four drinks a day. (3)研究者たちはそれらの男性の内の何人が脳卒中や心臓発作を起こしたかを調べ、彼らを遺伝子変異を持たない被験者と比較した。 They also checked how common these health issues are in the women carrying the variants.

Overall, the study found that alcohol increases stroke risk by about one-third for every four additional drinks per day. The researchers found no protective effects for moderate drinking. They added that people who drink up to two drinks a day — which would qualify as moderate drinking — would have an increased stroke risk of about 10% to 15% when compared to nondrinkers. There weren't enough heart attacks among the participants to be able to draw a conclusion about heart risks.

In a journal commentary, the authors called for stricter controls on alcohol, saying its risks have been underestimated.

"(4)酒造産業も繁栄しており、タバコ産業と同じような形で規制されるべきだ," wrote Shiu Lun Au Yeung and Dr. Tai Hing Lam of the University of Hong Kong.

https://apnews.com/article/94d7e83e3551499b96646ad50fe97be8 (改変あり)

注　stroke: 脳卒中　　heart attack: 心臓発作