令和７年度入学者選抜学力検査問題
〈前期日程〉

外　　国　　語

英　　　語

（医学部　医学科）

注　意　事　項

1　試験開始の合図があるまでこの冊子を開いてはいけない。

2　問題はⅠからⅣまである。

3　試験開始の合図のあとで問題冊子の頁数（１～14頁）を確認し，不鮮明な印刷や乱丁・落丁などの不具合がある場合，問題用紙の交換を申し出ること。

4　試験開始の合図のあとで解答用紙を確認し，不鮮明な印刷や乱丁・落丁などの不具合がある場合，解答用紙の交換を申し出ること。解答用紙を切り離してはならない。

5　解答は必ず問題用紙の指示に従い，解答用紙の所定の欄に記入すること。
問題用紙の指示に従わない解答および所定の欄以外に記入した解答は無効である。

6　解答用紙は持ち帰ってはいけない。

7　問題用紙は持ち帰ってよい。

I 次の英文を読み，以下の質問にすべて記号で答えなさい。

An international study, led by the University of Cambridge and the Institut de Biologia Evolutiva (IBE) in Barcelona, found that butterflies use different (1) to regulate their body temperature. In Catalonia, butterflies tend to angle their wings towards the sun to warm up at lower temperatures, while British butterflies rely more on finding warm microclimates*.

However, as local temperatures rise, both populations switch to heat-avoiding behaviour. And as global temperatures rise, British butterflies may initially benefit, while Spanish butterflies may not be able to survive if they are not able to (2) quickly enough.

However, habitat loss, particularly in the UK, is an equally important threat to butterflies. (3) habitats offer butterflies a greater variety of microclimates, and initiatives such as 'no-mow May', allowing wildflowers to grow along roadsides, and planting more trees can help (4) habitat loss. The results are reported in the *Journal of Animal Ecology.*

Like all insects, butterflies are 'cold-blooded*' and use their environment to regulate their internal temperature. Understanding how butterflies thermoregulate* is important for predicting which species are most at risk from the (5) of climate change.

In a study published in 2020, several of the same researchers showed that there are significant variations in the ability of different UK butterfly species to maintain a (6) body temperature. Species that rely mostly on shade to keep cool are at greatest risk of population decline, due to climate change and habitat loss.

"The first study in the UK showed that butterflies are pretty good at regulating their body temperature in this cooler climate, but we wanted to see whether butterflies in a warmer climate, such as Spain, are doing anything differently," said lead author Eric Toro-Delgado from IBE, a joint centre of the Consejo Superior de Investigaciones Científicas (CSIC) and Universitat Pompeu Fabra (UPF). "And if there are differences, what mechanisms might be driving it?"

"In Spain, butterflies spend much more time at their optimum* temperature since it's warmer, but there's also a greater risk of overheating," said Dr Andrew Bladon from Cambridge's Department of Zoology, the study's senior author. "We wanted to see whether the (7) we got from our UK data would be repeatable in a different environment."

For the (8) study, the researchers collected similar data as the 2020 UK paper, but from butterflies in Catalonia. They measured body temperature, air temperature, and perch* temperature for almost 800 adult butterflies from 23 different species: for ten of these species, the researchers had comparable data from the UK.

"We hypothesised that Spanish butterflies might show adaptations to their warmer climate, which could give us an indication of how British butterflies might need to (2) to cope with climate change," said Bladon.

The researchers found that on a community level, butterflies in Catalonia were better at regulating, or buffering*, their body temperature than British butterflies. Butterflies in both countries switch from heat-seeking to heat-avoiding behaviour once air temperatures (9) approximately 22°C. However, the communities differ in the use of buffering mechanisms, with British populations depending more on microclimates for thermoregulation* compared to Catalan populations.

Many landscapes in the UK do not provide a sufficient diversity of thermal environments, with <u>alternating</u>(1) areas of shade and sun. For UK butterflies that rely on microclimates to regulate body temperature, habitat and biodiversity* loss is a major threat. In Catalonia, one of the reasons why butterflies are better at regulating their temperature could be because butterflies have many more thermal options (10) to them.

"In the UK, many of our nature reserves are like islands, with little variety in between," said Bladon. "If we can provide them with field (11), biodiverse road verges*, more wildflowers, and longer grass, butterflies can more easily move through the landscape, helping them find their preferred temperatures so they can <u>thrive</u>(2)."

Although Catalan butterfly populations seem to be able to thermoregulate successfully at present, rising global temperatures due to climate change put them at greater risk, since it is so warm in Spain already.

"In the UK study, the Cambridge team found that wing size was related to the ability of a species to regulate its body temperature, and that species with large wings were better at it," said Toro-Delgado. "We expected to find a similar result in Spain, but we didn't. This is likely because in a warm country like Spain, the ability to avoid heat is preferable, and wings may play a less (12) role in this than in warming up."

"Because of rising global temperatures, the UK's climate is becoming a little bit more like Spain, so climate change may benefit British butterflies in the short term," said Bladon. "But what's <u>striking</u>(3) is butterflies in both countries showed (13) of heat avoidance. And the Catalan butterflies are at greater risk since they are already near their thermal optimum."

The researchers say that beyond rising temperatures, butterflies are also at risk from associated climate impacts, such as droughts or heatwaves*. These extreme weather events can not only (14) butterflies past their thermal limits, but they can kill the plants that their caterpillars* rely on.

"Climate change is a two-pronged* attack that can take out both adult butterflies and their caterpillars," said Toro-Delgado. "Climate change and biodiversity loss go hand-in-hand, and we urgently need to (　15　) both if we're going to protect important species like butterflies."

— From Sarah Collins, "Spanish butterflies better at regulating their body temperature than their British cousins." January 9, 2024, https://www.cam.ac.uk/stories/butterflies-climate-change

Notes: microclimate　微気候（地表面に接する大気層の気候）

cold-blooded　変温の	thermoregulate　体温を調整する
optimum　最適な	perch　チョウがとまっている場所
buffer　守る	thermoregulation　体温調整
biodiversity　生物多様性	verge　端
heatwave　熱波	caterpillar　毛虫
two-pronged　二方面からの	

問1　下線部(1)(2)(3)の語に最も近い意味を持つ定義を(A)〜(D)から一つ選び，記号で答えなさい。

(1)　alternating:
(A)　occurring by turn
(B)　disappearing gradually
(C)　turning on and off
(D)　leaving on a regular basis

(2)　thrive:
(A)　survive desperately
(B)　become extinct
(C)　grow up healthy
(D)　accompany easily

(3)　striking:
(A)　compatible
(B)　intrinsic
(C)　subtle
(D)　extraordinary

問２　空所（　1　）から（　15　）を補うのに適切な１語を下の語群内の(A)から(O)より選び，記号で答えなさい。なお，（　2　）は２か所あり，同じ語が入ります。文頭に入る語も小文字で表しています。

語　群

(A) adapt	(B) address	(C) available	(D) counter
(E) current	(F) diverse	(G) effects	(H) margins
(I) methods	(J) push	(K) reach	(L) relevant
(M) results	(N) signs	(O) suitable	

II 次の英文を読み，以下の質問に答えなさい。ただし，問２，問６，問８以外は日本語で解答すること。

(1) "It's no surprise you don't sleep at night," said the therapist. I had just told him that I care for children with epidermolysis bullosa*, a rare and life-limiting genetic skin disorder often called "the worst disease you've never heard of." In children with this disease, the slightest shear force* causes their fragile "butterfly" skin to separate from the dermis* below, leaving behind a battlefield of open wounds. Over the past 15 years, I have stood guard from birth to death over so many butterfly children. To carry on, I separated myself from the stories of their deaths, storing those hardest moments in the recesses* of my mind. Yet in the quiet of the night, memories of their faces and voices often visited me.

The therapist nodded, pausing, before saying, "I think it might be time for you (2)(　　　)."

I remember the first time I didn't say goodbye. I had been working for the previous year with Steve Berman in the country's largest epidermolysis bullosa clinic. Well into his 60s, Steve possessed an energy unparalleled by that of anyone I had ever met. So I wasn't completely surprised to be jolted out of* sleep at 2 a.m. one night to find his name lit up on my phone. "Jamie, I'll stop by to pick you up on our way to the hospital. Hannah is dying." Twenty minutes later, we walked into a quiet intensive care unit* (ICU) bay. Steve had known Hannah since her birth, and she had just celebrated her 16th birthday. Now she lay there unconscious, septic*, her eyes closed, her face swollen from kidney failure*.

I stood silent and motionless, a young attending*, not wanting to do anything that took the focus off Hannah and her family. Throughout my medical training, I had been told (or perhaps had told myself) that a patient's death was not supposed to be about me. I needed to be present for the medical needs while being invisible for everything else. (3) So it surprised me when Steve bent over Hannah and gently placed a kiss on a small patch of unaffected* skin on her forehead. "I am so proud of you," he whispered to her. "It's OK to rest." Later, Steve pulled me aside. "They are my family," Steve said. "I've been with these kids and their parents for their entire lives. I can't walk away without kissing them goodbye."

It took me several more years of visiting bedsides and attending funerals with Steve before I took his advice. The night I finally did, I was standing guard in the hallway* outside the hospital room of Rahm, a 7-year-old with a severe form of epidermolysis bullosa that resulted in heart failure*. Steve was out of the country, but I knew that he would want to know that Rahm was dying. When Steve's name finally lit up on my phone, I explained the situation. "Will you make sure to tell Rahm that I'm proud of him?" he asked from the other side of the world. I assured him I would, although I didn't know quite how. Steve and I had both taken care of Rahm since his birth, but Steve was his family's anchor. Now I was the one standing in the hallway escalating* the pain medications, and <u>with each increase I felt like I was stealing time from his parents</u>(4).

Working up the courage to ask for time with Rahm, I quietly entered the room. "Dr. Berman asked me if I could say goodbye to Rahm for him."

They nodded, then added, "Dr. Feinstein, thank you for being a part of our family. Rahm has always loved you."

I walked over to the little boy, who was snuggled* into a fleecy orange blanket. His eyes were closed. "Rahm, it's Dr. Feinstein. Dr. Berman wanted me to tell you he's proud of you," I said. "I'm proud of you, too." Then, I did something I had never done before. I bent over Rahm's face and lightly kissed a soft patch of perfect skin on his forehead. "It's OK to rest," I said.

When I pronounced Rahm dead an hour later, I knew that I had wanted and needed to say goodbye and that I almost hadn't done it.

It was now becoming clear to me that at the end of life, I was part of each child's story and — equally important — the child was part of mine. And when I stopped insisting on separating my patients' stories from my own, I began to acknowledge that I, too, needed certain things in order to find a sense of peace. My work with the therapist was helping me understand why Steve needed to kiss his butterfly children goodbye. Although I would have been content to end <u>the life lesson</u>(5) there, I remember the moment when the world decided to come full circle.

I was on the indoor rower* in my icy garage when Steve's name lit up on my phone. A nagging* worry that I had been suppressing set in at full force. I hadn't seen or heard from Steve in the several weeks since he had finished immunotherapy* for an indolent lymphoma*. When I answered the phone, a soft, unfamiliar voice asked, "Could you come to the ICU to see Steve? He's asking for you." Twenty minutes later, I walked into the adult hospital, which was strikingly devoid of* the balloons and flowers that were painted on the walls of the children's hospital next door where Steve and I had worked together for nearly 15 years. I arrived at the ICU bay where Steve lay. Behind the dialysis catheters* and jugular* lines, his wiry* white hair was unmistakable. I felt a quivering start from somewhere deep in my body.

"Who is that?" he asked.

"Hi, Steve, it's Jamie," I replied.

I leaned in, and his crystalline* eyes focused directly on mine. Never one to skirt* the truth, Steve said, "Jamie, I'm dying. I wanted to say goodbye."

"I know, Steve. I want to say goodbye, too."

We spoke for several minutes. Steve asked me if I would give a eulogy* at his funeral. Then he beat me to <u>the words</u> (6) that were on the tip of my tongue.

"I am so proud of you," he said.

Still up close where he could see me, I hovered over him. I touched my lips lightly to his brow with the weight of a butterfly landing on a branch. I didn't want to cause any more pain, but I wanted him to know I was there. His skin was soft and warm.

"It's OK to rest," I said.

But I knew I needed one more thing for myself.

"I love you, Steve."

"I love you, too, Jamie."

I turned and walked peacefully away.

In the year since Steve died, I have also started to say proper goodbyes to the many children who used to keep me awake in the darkness of night. Now when their faces appear in my mind, I take the opportunity to remember their stories. I think about the parts they have played in shaping my own story. And — a little late, but better than never — I tell them out loud that I love them. Then, having returned the energy of those memories back into the world, I finally sleep.

— From James A. Feinstein, "Learning to Say Goodbye," *The New England Journal of Medicine,* 390;19, 1742-1743, May 11, 2024.

Notes:

epidermolysis bullosa　表皮水疱症	shear force　剪断力
dermis　真皮（表皮の下の皮層）	recess　奥底
jolt out of　引き戻す	intensive care unit　集中治療室
septic　敗血症の	kidney failure　腎不全
attending　主治医	unaffected　病気の影響を受けていない
hallway　廊下	heart failure　心不全
escalate　段階的に増加する	snuggle　抱き寄せる
indoor rower　ローイング・マシン（運動器具）	
nagging　払しょくできない	immunotherapy　免疫療法
indolent lymphoma　緩慢性リンパ腫	devoid of　～を持っていない
dialysis catheter　透析カテーテル	jugular　頸動脈の
wiry　堅い	crystalline　水晶のような
skirt　回避する	eulogy　弔辞

問１　therapist が筆者に下線部(1)と述べた理由を説明しなさい。

問２　下線部(2)に入る最も適切な英文の一部を下の選択肢から選び，記号で答えなさい。

① to reconsider the relationship between child patients and doctors

② to tell child patients the truth with respect

③ to ask for empathy from your colleagues

④ to figure out how to say a proper goodbye

問３　下線部(3)について以下の質問に答えなさい。

１） it は何を指しているのか明らかにしなさい。

２） 筆者がそのような気持ちになった理由を説明しなさい。

問４　each increase の具体的内容を明らかにして，下線部(4)を和訳しなさい。

問５　下線部(5)は何を意味するのか，本文に即して説明しなさい。

問６　下線部(6)は何を示すのか，本文中から抜き出しなさい。

問７　Steve の死後，筆者が治療に携わった患者に対する変化を述べなさい。

問８　本文の内容に合致する英文を以下の選択肢からすべて選び，記号で答えなさい。

(A) As the author's health problems worsened, so did his relationships with the families of his patients.

(B) Rahm's family expressed their gratitude since Steve and the author attempted every possible treatment at the end of his life.

(C) The conflicts between his behavior as a physician dealing with dying children and his personal feelings eventually made the author a sensible physician.

(D) The author's session with his therapist provided an opportunity to reflect on his professional career as a physician.

(E) The relationship between the author and Steve became increasingly awkward due to differences in the way they treated their patients, but the relationship was restored after overcoming difficulties.

(F) The author vividly remembered the time when he treated Hannah because it was a turning point in his relationship with sick children.

Ⅲ 次の英文を読み，以下の質問に答えなさい。ただし，問６，問７以外は日本語で解答すること。

Whenever you're actively performing a task — say, lifting weights at the gym or taking a hard exam — the parts of your brain required to carry it out become "active" when neurons step up their electrical activity. But is your brain active even when you're zoning out* on the couch?

The answer, researchers have found, is yes. Over the past two decades they've defined what's known as <u>the default mode network</u>(1), a collection of seemingly unrelated areas of the brain that activate when you're not doing much at all. Its discovery has offered insights into how the brain functions outside of well-defined tasks and has also prompted research into the role of brain networks — not just brain regions — in managing our internal experience.

In the late 20th century, neuroscientists began using new techniques to take images of people's brains as they performed tasks in scanning machines. As expected, activity in certain brain areas increased during tasks — and <u>to the researchers' surprise</u>(2), activity in other brain areas declined simultaneously. The neuroscientists were intrigued that during a wide variety of tasks, the very same brain areas consistently dialed back* their activity.

It was as if these areas had been active when the person wasn't doing anything, and then turned off when the mind had to concentrate on something external.

Researchers called these areas <u>"task negative."</u>(3) When they were first identified, Marcus Raichle, a neurologist at the Washington University School of Medicine in St. Louis, suspected that these task-negative areas play an important role in the resting mind. "This raised the question of 'What's baseline* brain activity?'" Raichle recalled. In an experiment, he asked people in scanners to close their eyes and simply let their minds wander while he measured their brain activity.

He found that during rest, when we turn mentally inward, task-negative areas use more energy than the rest of the brain. In a 2001 paper, he dubbed* this activity "a default mode of brain function." Two years later, after generating higher-resolution* data, a team from the Stanford University School of Medicine discovered that this task-negative activity defines a coherent network of interacting brain regions, which they called the default mode network.

The discovery of the default mode network ignited curiosity among neuroscientists about what the brain is doing in the absence of an outward-focused task. Although some researchers believed that the network's main function was to generate our experience of mind wandering or daydreaming*, there were plenty of other conjectures*. Maybe it controlled streams of consciousness or activated memories of past experiences. And dysfunction in the default mode network was floated as a potential feature of nearly every psychiatric and neurological* disorder, including depression, schizophrenia* and Alzheimer's disease*.

Since then, a flurry of research into the default mode has complicated that initial understanding. "It's been very interesting to see the types of different tasks and paradigms that engage the default mode network in the last 20 years," said Lucina Uddin, a neuroscientist at the University of California, Los Angeles.

The default mode was one of the first brain networks characterized by science. It consists of a handful of brain regions, including a few at the front of the brain, like the dorsal and ventral medial prefrontal cortices*, and others scattered throughout the organ, like the posterior cingulate cortex*, the precuneus* and the angular gyrus*. These regions are associated with memory, experience replay, prediction, action consideration, reward/punishment and information integration.

Since its discovery, neuroscientists have loosely identified a handful of additional distinct networks that each activate seemingly disparate areas of the brain. These activated areas don't act independently, but rather harmonize in synchrony with* each other. "You can't think about a symphony orchestra as just the violins or the oboes*," Raichle said. Similarly, in a brain network, the individual parts interact to bring about effects that they can only produce together.

According to research, the effects of the default mode network include mind wandering, remembering past experiences, thinking about others' mental states, envisioning the future and processing language. While this may seem like a grab bag of unrelated aspects of cognition, Vinod Menon, the director of the Stanford Cognitive & Systems Neuroscience Laboratory, recently theorized that all of these functions may be helpful in constructing an internal narrative. In his view, the default mode network helps you think about who you are in relation to others, recall your past experiences and then wrap up all of that into a coherent self-narrative.

The default mode is clearly up to something complicated; it's involved in many different processes that can't be neatly described. "It's kind of silly to think that we're ever going to be like, 'This one brain region or one brain network does one thing,'" Uddin said. "I don't think that's how it works."

Uddin began investigating the default mode network because she was interested in self-recognition, and many self-recognition tasks, such as identifying your own face or voice, appeared to be associated with the network. In recent years, she has shifted her attention to interactions between brain networks. Just as different brain areas interact with each other to form networks, different networks interact with each other in meaningful ways, Uddin said.

"Network interactions are more elucidating* to study in some ways than just a network in isolation because they do work together and then come apart and then change what they're doing over time."

She's particularly interested in how the default mode network interacts with the salience network, which seems to help us identify the most relevant piece of information at any given time. Her work suggests that the salience network detects when something is important to pay attention to and then acts as an off switch for the default mode network.

Researchers have also been examining whether mental health disorders like depression could be linked to problems with the default mode network. So far, the findings have been inconclusive*. In people with depression, for example, some researchers have found that network nodes* are overly connected, while others have found the opposite — that nodes are failing to connect. And in some studies, the default mode network itself isn't abnormal, but its interactions with other networks are. These findings may appear incompatible, but they align with* recent findings that depression is perhaps a cluster of different disorders that present with similar symptoms.

Meanwhile, Menon has developed what he calls the triple network theory. It posits* that abnormal interactions between the default mode network, the salience network and a third one called the frontoparietal network could contribute to mental health disorders including schizophrenia, depression, anxiety, dementia* and autism*. Typically, the activity of the default mode network decreases when someone is paying attention to an external stimulus, while activity in the two other networks increases. This push and pull between networks may not work the same way in people with psychiatric or developmental disorders, Menon suspects.

Deanna Barch, who studies the neurobiology of mental illnesses at Washington University in St. Louis, is intrigued by the triple network theory. Investigating how networks are wired up differently in people with mental health disorders can help researchers find underlying mechanisms and develop treatments, she said. However, she doesn't think network interactions alone will fully explain mental illness. "I think of understanding connectivity* differences as a starting point," Barch said. "It's not an endpoint."

The current understanding of the default mode network is surely not its endpoint, either. Since its discovery, it has pushed neuroscientists to think beyond the responsibilities of single brain regions to the effects of interactions between brain networks. And it's driven many people to appreciate the inward-focused activities of the mind — that even when we're daydreaming or at rest, our brain is hard at work making it happen.

— From Nora Bradford, "What Your Brain Is Doing When You're Not Doing Anything," February 5, 2024. https://www.quantamagazine.org/what-your-brain-is-doing-when-youre-not-doing-anything-20240205/

Notes:
zone out　ぼうっとする
dial back　低下する
baseline　基本的な
dub　名付ける
high-resolution　高解像度の
daydreaming　白日夢
conjecture　推測
neurological　神経学の
schizophrenia　統合失調症
Alzheimer's disease　アルツハイマー病
dorsal and ventral medial prefrontal cortices　背内側前頭前皮質と腹内側前頭前皮質
posterior cingulate cortex　後帯状皮質
precuneus　楔前部（大脳にある脳回のひとつ）
angular gyrus　角回（大脳の領域のひとつ）
in synchrony with　〜に同調して
oboe　オーボエ（木管楽器）
elucidate　解明する
inconclusive　結論に至らない
node　結節
align with　一致する
posit　推測する
dementia　認知症
autism　自閉症
connectivity　結合

問１　下線部(1)について以下の質問に答えなさい。

１）　下線部(1)はどのように定義付けられているのか述べなさい。

２）　下線部(1)が注目される契機となった疑問について説明しなさい。

問２　研究者たちが下線部(2)のように反応した理由を説明しなさい。

問３　下線部(3)の特徴がどのように説明されているのか述べなさい。

問４　Raichle の研究について以下の問いに答えなさい。

１）　Raichle が研究する際に着目した点を述べなさい。

２）　Raichle の研究から導かれた考察を述べなさい。

問５　default mode network に関する研究から判明している効果を全て列挙しなさい。

問６　Uddin の研究に関する以下の英文の空欄に英単語を入れなさい。

When Uddin began working on the default mode network, she was concerned with (　①　), but her recent interests have focused on (　②　) within brain networks.

問７　本文の内容に関する以下の英文のうち，正しいものを一つ選びなさい。

(A) The theory developed by Menon suggested that mutual imbalances in the three brain networks may contribute to mental illnesses.

(B) Many researchers recognize that a single brain region is the key to solving the mechanism when considering the default mode network.

(C) Researchers have identified a close connection between mental health disorders and the default mode network.

(D) Barch explained that only the interactive workings of brain networks play an important role in the mechanisms of mental illness development.

Ⅳ 世界経済フォーラムが発表した2024年度版「グローバル・ジェンダー・ギャップ報告書」によれば，調査対象となった146か国のうち男女平等ランキングにおいて日本は118位で，主要7か国（G7）では最下位でした。日本のジェンダー・ギャップ解消のために取り組むべき課題を一つ挙げ，その理由を100〜110語の英文で述べなさい。なお，文末に使用した語数を記すこと。