

令和4年度  
一般選抜（前期）

12時30分～14時00分

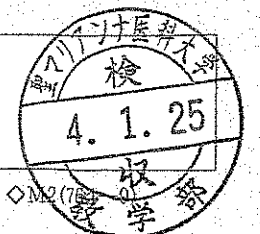
## 英 語

問題冊子 1 ～ 7 頁
解答用紙 1 ～ 2 頁

## 注 意 事 項

1. 試験開始の合図〔チャイム〕があるまで、この注意をよく読むこと。
2. 試験開始の合図〔チャイム〕があるまで、問題冊子ならびに解答用紙は開かないこと。
3. 試験開始の合図〔チャイム〕の後に問題冊子ならびに解答用紙の全ページの所定の欄に受験番号と氏名を記入すること。
4. 解答はかならず定められた解答用紙を用い、それぞれ定められた位置に問題の指示に従って記入すること。また、解答用紙に解答以外のことを書かないこと。
5. 解答はすべて黒鉛筆を用いてはっきりと読みやすく書くこと。
6. 質問は文字が不鮮明なときに限り受け付ける。
7. 問題冊子に、落丁や乱丁があるときは手を挙げて交換を求めること。
8. 試験開始60分以内および試験終了前10分間は、退場を認めない。
9. 試験終了の合図〔チャイム〕があったとき、ただちに筆記用具を置くこと。
10. 試験終了の合図〔チャイム〕の後は、問題冊子ならびに解答用紙はいずれも表紙を上にして、通路側から解答用紙、問題冊子の順に並べて置くこと。いっさい持ち帰ってはならない。  
なお、途中退場の場合は、すべて裏返しにして置くこと。
11. その他、監督者の指示に従うこと。

受験番号		氏 名	
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1 英文を読み、問題に答えなさい。(指示がある場合以外は日本語で答えること)

With the world population expected to reach nine billion before 2050, agricultural production has to increase by 70 percent. At the same time, less fresh water will become available for agriculture so the challenge is to produce more food with less water. Worldwide about one billion hectares of land is salt-affected and this number increases by three hectares every minute. In addition, the amount of brackish water is equal to the amount of fresh water. Up until now, these saline\* resources of the world have not been recognized as a way to increase agricultural production. While everybody is focusing on fresh water for agricultural production, Salt Farm Texel has a different perspective. A small field on an island off the Netherlands' northern coast promises one answer to A) the problem by means of cultivating salt tolerant crops.

Whereas today much research is focused on improving the yield of crops, Salt Farm Texel has taken the opposite approach: trying to grow crops on land previously considered unusable. The team headed by farmer Mark Van Rijsselberghe has planted around 30 types of potato and B) their approach is simple: anything that dies in the saline environment is abandoned, and anything that lives will possibly be a salt tolerant plant species. "It's faster," said Van Rijsselberghe. The bespectacled farmer jokes that in a country where much of the land lies below sea level, "We are so afraid of the sea that until 10 years ago we didn't dare to do anything with sea water and growing plants."

Van Rijsselberghe, 60, started the C) "Salty Potato Farm" more than 10 years ago in the hope of helping the world's malnourished. The team, supported by Amsterdam University, uses neither genetically modified plants nor laboratories in their search for food that grows in salty environments. To test which species will grow, he divided the farm into eight irrigated areas. Separate pipes pumped fresh and sea water, and computerized measuring devices called "sensors" controlled the water levels and the levels of salinity. "And then the computer says 'go' and then it goes to the fields and dripping irrigation\*\* starts to work and ( あ ). That's it."

Van Rijsselberghe says he was able to harvest vegetables from most of the eight test areas. The experiments do not just target potatoes—he grew carrots, cabbage, onions and beetroot—but he found that D) potatoes grew better than the other vegetables in the combination of sea and fresh water.

With more than 5,000 varieties, the potato is the world's fourth most popular food crop according to the United Nations' Food and Agricultural Organization (FAO). Plants whose

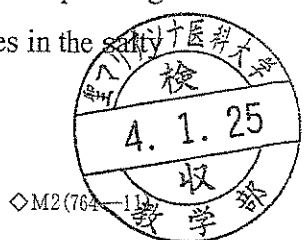
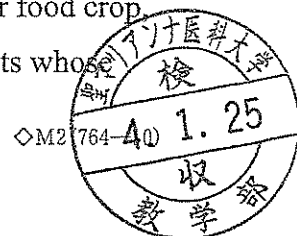
ancestors grew near or on the sea, but have moved inland with human populations, are likely still to have the necessary genes. "It could be a hundred, it could be 1,000 years ago, they still are capable of coping with saline surroundings," said Van Rijsselberghe.

The world loses around 2,000 hectares of agricultural land a day to salt induced degradation, or soil salinization, in 75 countries. One way salinization occurs is through natural processes. For example, it exists around coastal areas or where the sea has retreated over a period of time, ( 1 ). Dry regions are impacted the most as there is less water available to flush the soil causing salt build up. Soil salinization can also occur naturally when the level of water under the ground rises, caused by changes in plant life (e.g., the clearing of deeper rooted plants). In this case, the groundwater, which is already salt-affected, ( 2 ).

Another cause of salinization is mismanagement in irrigation. When farmers start irrigating land with salt water, the soil becomes increasingly damaged over time. This can be prevented, or slowed down, by flushing the soil with additional water. Often, ( 3 ), water is already scarce in the area and as a result the soil will not be adequately flushed.

The problem today affects an area the size of France—about 62 million hectares or 20 percent of the world's irrigated lands, ( 4 ) 45 million hectares in the early 1990s. According to the FAO, salt degradation threatens 10 percent of the global cereal crop, and about 800 million people in the world are undernourished. Solutions to make the land cultivable once more are too expensive for most of the areas, ( 5 ) the basin of the Yellow River in China, the Euphrates in Syria and Iraq or the Indus Valley in Pakistan. ( 6 ) Salt Farm Texel has sent thousands of its potatoes to Pakistan, where they were "successful," said Van Rijsselberghe. These "salt" potatoes could transform the lives of thousands of farmers in affected regions and, in the long term, those of around 250 million people who live on salt-afflicted soil.

The potatoes grown on Salt Farm Texel taste sweeter, because the plant produces more sugars to compensate for the salty environment. The salt absorbed by the plant stays in the leaves, not in the flesh. However, the price of the potatoes is for now prohibitive, with one kilo selling for five euros, compared to less than a euro for the same amount of "normal" potatoes. "We grow around 30,000 kilos per hectare, a farmer with good conditions around 60,000 kilos," said Robin Konijn, the farm's financial director. Nonetheless, Konijn and his team are optimistic. Countries ranging from Egypt to Bangladesh and India have already asked for advice on planting their own salt-proof crops. The team is also soon to start trying to cultivate potatoes in the wetlands of the Camargue in the south of France.

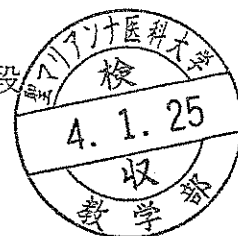


注

\*saline = consisting of or containing salt

\*\*irrigation = the practice of supplying land with water so that crops and plants will grow

- [ 1 ] 下線部 A はどのようなことか説明しなさい。
- [ 2 ] 下線部 B はどのようなものか説明しなさい。
- [ 3 ] 下線部 C の特徴を 80-100 字以内で説明しなさい。
- [ 4 ] 空欄( あ )に入る最も適切なものを選択肢から選びなさい。
- (a) all the plants will be in good condition
- (b) fresh water will help us grow crops
- (c) we can produce salty crops
- (d) we are going to kill plants
- [ 5 ] 下線部 D の理由としてどのようなことが推測できるか説明しなさい。
- [ 6 ] 空欄( い )に入る最も適切なものを選択肢から選びなさい。
- (a) will not be able to dilute the salt level under the ground
- (b) potentially destroys valuable plants' roots
- (c) might contribute to stormwater flooding around the targeted areas
- (d) will come to the surface and affect the soil in the area
- [ 7 ] 空欄(1)―(5)に入る最も適切なものを選択肢から選びなさい。
- (1) (a) leaving salt-affected soil                      (b) which kept salt in the area  
(c) when influenced by saline                      (d) with transformation into salty ground
- (2) (a) finally                      (b) furthermore                      (c) however                      (d) therefore
- (3) (a) above                      (b) high in                      (c) increasing                      (d) up from
- (4) (a) exemplifying                      (b) including                      (c) illustrating                      (d) listing
- (5) (a) For this reason,                      (b) The reason is that  
(c) Due to                      (d) Now that,
- [ 8 ] Salt Farm Texel の収穫物に関して、以下を答えなさい。
- a. 特徴
- b. a の理由
- c. 1 ヘクタールの収穫物の値段



2

Read the following passage and answer the questions.

The brains of top-level gymnasts are different from the rest of us, which is why they can perform amazing feats, research shows. Scientists from Juntendo University and other institutions studied brain scans of 10 athletes with world championship experience and found that areas of the brain 1)governing motor function, spatial perception and other processes are significantly larger in 2)volume than those of non-gymnasts. In some cases, the brain areas tend to be larger in athletes with higher competitive ability.

Researchers led by Hidefumi Waki, a professor of physiology at the Juntendo University Graduate School of Health and Sports Science in Chiba Prefecture, studied the brains of 10 male gymnasts with skills that could qualify them to serve on Japan's national team. The subjects included members of Juntendo University's gymnastics club. The study ( 3-a ) to discover what ( 3-b ) such high level gymnasts from non-gymnasts, based on the assumption that they are required to have outstanding muscular strength, flexibility and sense of body balance.

The brain processes information captured by the eyes and skin and ( 4 ) it with body movements. Nerve cells, which are concentrated in the cortex on the brain's surface, play different roles from one area of the brain to another. Magnetic resonance imaging (MRI) was used to obtain three-dimensional images of the brains to compare the volumes of their brain cortex in 34 regions with those of 10 non-athlete males of about the same age.

Five of those brain regions were found to be about 10 percent larger in the athletes than in the non-gymnasts. Those regions include one that has to do with motor function (precentral gyrus) and another that has to do with spatial perception, integration of sensory information and other processes (inferior parietal lobule). No brain region was found to be smaller in the athletes than in the ordinary males.

The scientists also studied the ( 5 ) between the volume of the cortex in the five regions and the gymnasts' competitive skills. As a general trend, they found the higher the mean of the maximum scores obtained in six gymnastics events, such as the horizontal bar and floor exercises, the larger the volume of the brain region that has to do with spatial perception, integration of sensory information and other processes. The volume of a separate region of the brain that has centralized control over a body's other organs was also found, as a tendency, to be larger in athletes with higher average scores. No correlation was found in the volume of the brain region that has to do with motor function.



“Gymnasts make quick decisions on their body position at the sight of rings, the horizontal bar or other equipment,” Waki said. 6 “Their ability for processing information before they ever make any body movements could be key to their difference in competence.” It was previously known that the volume of the brain’s cortex, where nerve cells are concentrated, differs from one person to another and can change well into adulthood.

This understanding is further supported by a study in Columbia. The study examined the brains of Columbian guerrillas who hadn’t had any formal education but learned how to read and write as adults. By comparing MRIs of the participants’ brains from before and after they learned how to read, the researchers found that the volume of the brain’s cortex had increased in part of the temporal lobe, which is home to the speech center, and other brain regions.

The gymnasts who participated in the latest study had trained for 10 to 19 years. The characteristic features of their brains are ( 7 ). “Our findings could help develop new training methods or find other gymnasts with potential,” Waki said.

- [ 1 ] Which choice CANNOT replace the underlined word 1)?  
 (a) regulating (b) responsible for (c) controlling (d) processing
- [ 2 ] In this context, what does the underlined word 2) mean?  
 (a) sound level (b) size (c) weight (d) number or quantity
- [ 3 ] Which choice fits (3-a) and (3-b) the best?

	3-a	3-b
(a)	set aside	sets up
(b)	set apart	sets back
(c)	set out	sets apart
(d)	set down	sets to

- [ 4 ] Which choice fits gap ( 4 ) the best?  
 (a) moves (b) provides (c) links (d) fastens
- [ 5 ] Which choice fits gap ( 5 ) the best?  
 (a) exchange (b) communication (c) contact (d) correlation
- [ 6 ] From the underlined part 6), what can we understand?  
 (a) Athletes who can move their bodies before they finish thinking are better than those who cannot.

- (b) The difference between an average gymnast and a high-level one may be due to when they process information.
- (c) The essential factor in competitive ability depends on the brain processes and movements of athletes.
- (d) Gymnasts who see the equipment the soonest are the ones who can move the best.

- [ 7 ] Which choice fits gap ( 7 ) the best?  
 (a) probably not developed through training but are genetic  
 (b) likely less inborn than acquired through training  
 (c) expected to be similar to non-athletes after they stop training  
 (d) not likely to reverse if the athletes begin losing competitions
- [ 8 ] Read the following statements and identify 2 true statements based on the entire passage.  
 (a) All of the subjects in the study belonged to the gymnastics club at Juntendo University.  
 (b) The precentral gyrus, a part of the brain, is associated with motor function.  
 (c) Among highly competitive gymnasts there are no differences between their brains.  
 (d) Even after growing up, the size of an individual’s brain cortex can change.  
 (e) The part of the brain that deals with motor function was the biggest among the five brain regions of the athletes.

**3** Choose a grammatically and logically correct expression for the given situation.

- [ 1 ] You are running to catch a bus. You accidentally bump into someone causing him/her to drop some books. What would you say?  
 (a) I’ll apologize if I’ve made you drop your books.  
 (b) I’m sorry. Let me help you with your books.  
 (c) Pardon me running into you. Let’s pick your books up.  
 (d) Please excuse me for your books. I’ll collect them.
- [ 2 ] You are at a cafe looking at the menu. You decide to have an omelet with tomato sauce, but the description says the sauce is served over the omelet, which is not to your liking. What would you ask when you order the dish?  
 (a) Can you remove the sauce from the omelet to be served as it is?  
 (b) I prefer the sauce to separate from the omelet.  
 (c) I’d like to have the sauce on the side, please.  
 (d) Will you set the sauce aside for the omelet?

