

2017 年度入学試験問題(前期)

英 語 (問 題)

注 意

- 1) 英語の問題冊子は 13 ページあり、問題は 5 問である。白紙・空白の部分は下書きに使用してよい。
- 2) 別に解答用紙 1 枚があり、解答はすべてこの解答用紙の指定欄に記入すること。指定欄以外への記入はすべて無効である。
- 3) 解答用紙の所定欄に受験番号を記入せよ。氏名を記入してはならない。
なお、記入した受験番号が誤っている場合や無記入の場合は、英語の試験が無効となる。
また、*印の欄には何も記入してはならない。
- 4) 問題冊子、解答用紙はともに持ち出してはならない。
- 5) 試験終了時には、問題冊子の上に解答用紙を裏返して置くこと。解答用紙、問題冊子の回収後、監督者の指示に従い退出すること。

I

Fill in the blanks marked (1) through (5) below with the most suitable English word.

- 1 To show the characteristics of the change of something, such as the temperature or your weight, a (1) graph is more useful than a bar graph.
- 2 A ratio remains the same even when multiplied by the same number, or when (2) by the same number.
- 3 When the area of a rectangle is constant, the length is inversely proportional to the (3).
- 4 The speed of a car is directly proportional to the (4) it runs.
- 5 The volume of a pyramid or a cone is one (5) the volume of a prism or a cylinder with the same base area and height.

II

Following the example below, change the verb form in the parentheses marked (1) through (5) to the appropriate one. If there is no need to change the form, write the word as it is.

ex.) damage → has been damaged

Add a moderate quantity of salt to a beaker of water and stir the mixture vigorously until all the salt has dissolved. Continue to add salt, still (1 : stir) the solution, until no more will dissolve and a deposit of salt is observed in the bottom of the beaker. Gently heat the solution, which is now (2 : saturate). It will be noticed that the excess salt begins to dissolve. Continue heating gently until all the salt has dissolved. Consider what (3 : demonstrate) by this procedure. Now transfer the solution to an evaporating dish and heat it more strongly until it boils.

After a while it will be observed that the liquid level is reduced as the water evaporates, but at the same time salt (4 : begin) to appear in solid form. Consider what has caused salt to (5 : appear) as the water evaporates. Continue to boil the solution until all the water has evaporated.

III Select the most suitable definition of each of the following words from the choices that follow and answer by the letter 'ア' through 'コ'.

- | | | | |
|-------------------|-----------|------------|-------------|
| 1 cough | 2 disease | 3 fever | 4 first aid |
| 5 microscope | 6 muscle | 7 skeleton | 8 surgery |
| 9 medical history | 10 X ray | | |

- ア A medical specialty of cutting into, or performing operative procedures on the patient. A doctor who does this is a surgeon.
- イ A bony framework of the body, including the spinal column, the rib cage, the skull, and the bones of the arms and legs.
- ウ Pathological condition which causes abnormal body functions and presents certain symptoms or signs; can be caused by germs, such as bacteria or viruses.
- エ An instrument which uses a series of lenses to produce magnified images of objects too small to be seen well by the eye alone.
- オ A form of radiation used to create photographic images of bones and internal organs and, in some cases to treat them when they are diseased; overexposure can be dangerous.
- カ Emergency medical treatment given when professional medical advice is not available.
- キ Tissue composed of fibers which shortens by contraction to produce movements.
- ク Body temperature above 98.6° on the Fahrenheit scale or above 37° on the Celsius scale. Temperature is measured with a thermometer.
- ケ Air expelled from the lungs suddenly and noisily. It is usually associated with a cold or a lung disease, and may produce mucus or pus.
- コ Records of a patient's past and current illnesses and treatments.

IV

Read the following passage and answer the questions that follow.

If you don't like spending time crunching your abs ^{*1} then we might have some good news. Researchers are not only arguing over whether sit-ups do you any good but whether they might even be bad for you.

Do they give you a taut six-pack ^{*2} across your abdomen or does a flat stomach depend more on diet and general exercise (①) a specific routine? A review of all the research conducted on sit-ups reports evidence (②) they do improve flexibility and muscle strength and that in dogs flexing the spine has been shown to help the delivery of nutrients to the discs which could prevent stiffness.

So far, so good. But (③) get the desired six-pack does take an awful lot of work. In a small randomised controlled trial in Illinois in 2011 one group did daily abdominal exercises while the lucky control group did none. After six weeks detailed measurements were taken and it was found that the sit-ups made no difference to waist size or the amount of fat around their stomachs.

Many sportspeople do sit-ups as part of a raft of exercises which aim to improve their core stability, but research from Thomas Nesser from Indiana State University suggests that improving your core stability doesn't necessarily result in better athletic performance.

Whether or not they provide you with precisely the physique or fitness you desire, could sit-ups bring unintended consequences such as back pain? Stuart McGill, professor of spine biomechanics at the University of Waterloo in Canada has been studying sit-ups for years and is convinced that the traditional crunch does indeed cause us harm.

He conducted dozens of studies in his spine biomechanics lab using the cadavers of pigs, repeatedly flexing their spines in a similar way as a person might when doing a sit-up, but for many, many hours at a time. When he examined the discs in the spine afterwards, he found that they had been

squeezed to the point where they bulged. (④) the same thing happened in a human this would press on the nerves, causing back pain, and possibly even a herniated disc.

Pigs were chosen for this experiment because their spines are more similar to human spines than those of many other animals, but of course critics of these studies point out, that there are still many differences between people and pigs. Also these studies involved thousands of continuous cycles of bending. Even when training hard, people take breaks between sets of crunches.

Perhaps these results tell us what might happen at the extremes in the unlikely event that you were to do sit-ups for hour upon hour, but in real life it's clearly not the case that most people damage their discs most of the time when doing sets of 15 sit-ups. However, injuries can happen. Research published in 2005 on soldiers stationed at the US military's Fort Bragg attributed 56% of all the injuries sustained during the two-yearly Army Physical Fitness Test, (⑤) sit-ups.

Some people seem to be more prone to back problems caused by sit-ups than others. We might be fine doing 30 sit-ups a day for decades, but we might (⑥) and it's hard to know which group we fall into. It could come down to our genes. According to one paper, it's not wear-and-tear that causes most of the difficulties, but genetic factors, which account for three-quarters of the differences between the people who do get back problems and those who don't.

The Twin Spine study has been following pairs of twins in Finland, Canada and US since 1991. The researchers have found that genetics play a huge part in people's susceptibility to the degeneration of the discs in their backs. Even when one twin had a job requiring heavy lifting, while the other had a sedentary job, the frequency of back problems was about the same.

So sit-ups might lead to back pain, but only in some people. It's a good

excuse not to do them. But if you want to crunch those abs, is there a way of limiting the risk? Professor Stuart McGill recommends sliding your hands under your lower back to stop it flattening against the floor. This minimises the stress on your back. Bend one knee up and keep the other (⑧ : extend). Then raise the head and shoulders off the ground by a very small amount. He says to imagine your head is resting on bathroom scales and you are just lifting your head enough for the scale to show zero. This exercise is described in much more detail in his book *Back Mechanic*.

In his review of the sit-up research Bret Contreras from Auckland University of Technology in New Zealand recommends limiting spinal exercises to 60 repetitions per session, beginning with only 15 and building up gradually. Finally, when we've been lying down overnight or even sitting down for a long time we gain a small amount of height, which makes sit-ups harder and increases the risk of injury. So don't stand up from hours of sitting at your desk and immediately get down on the floor to do sit-ups and don't bound out of bed and do them first thing in the morning.

(BBC News, April 18, 2016. "The surprising downside of sit-ups" By Claudia Hammond)

Notes : * 1 abs: 腹筋 * 2 six-pack: 割れた腹筋

1 *In accordance with the passage, put the letter "O" if each of the following sentences is true, and "X" if it is not on your answer sheet.*

- (1) A new study revealed that there are no advantages to sit-ups.
- (2) Even if you do sit-ups regularly, you can't get a slender waist. However, you can reduce your belly fat with sit-ups.
- (3) This article mentions a report that says there is always a correlation between the stability of your body trunk and your athletic ability.
- (4) Human backbones resemble a pig's ones, but they're not exactly the same.
- (5) Even well-trained personnel may get injured with sit-ups.
- (6) One report states that 75% of the time, heredity factors determine whether sit-ups cause you back problems or not.
- (7) The best time for you to do sit-ups is right after waking up.

2 *Fill in the blanks marked ①, ②, ④, and ⑥ with the most suitable English word to complete each sentence. As for the initial letter, use of uppercase or lowercase does not matter.*

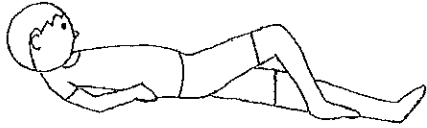
3 *Fill in the blanks marked ③ and ⑤ with the same English word.*

4 *Translate the underlined word marked ⑦ into Japanese.*

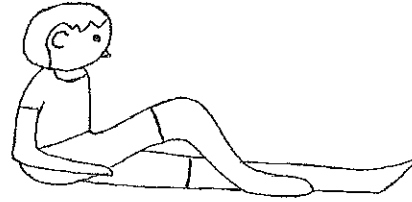
5 *Change the form of the word in the parenthesis marked (⑧) to the most appropriate one.*

6 Which of the following illustrations is the correct way of sit-ups that Professor Stuart McGill recommends?

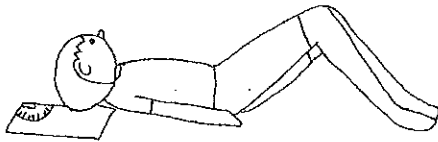
(ア)



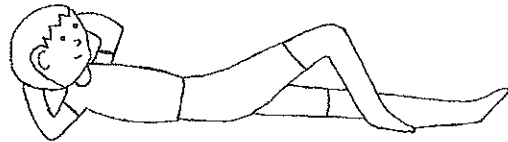
(イ)



(ウ)



(エ)



V

Read the following passage and answer the questions that follow.

Officials at the Centers for Disease Control and Prevention said on Wednesday that there was now enough evidence to definitively say that the Zika virus could cause unusually small heads and brain damage in infants born to infected mothers.

The conclusion should settle months of debate about the connection between the infection and these birth defects, called microcephaly, as well as other neurological abnormalities, the officials said.

“There is no longer (② : a) doubt that Zika causes microcephaly,” said Dr. Thomas R. Frieden, the C.D.C. director. He said the conclusion, reached after evaluating “mounting evidence from many studies,” signifies “an unprecedented association” in medicine.

“Never before in history ③ [a / been / has / situation / there / where] a bite from a mosquito can result in a devastating malformation,” Dr. Frieden said.

He and other agency officials said they hoped that the announcement increased awareness and concern about the potential threat to Americans who travel to affected areas in Latin America and those living in Puerto Rico, American Samoa and southern states where the virus is expected to arrive this summer.

The announcement may increase pressure on Congress to allocate more than \$1.8 billion in emergency funding that President Obama requested for prevention and treatment of the outbreak. While C.D.C. officials did not address funding, Dr. Sonja A. Rasmussen, the agency’s director of public health information and dissemination, said the conclusion “emphasizes the importance of working on ways to prevent Zika infection,” including efforts to develop a vaccine.

④ “Surveys have told us that a lot of people aren’t concerned about Zika

virus infection in the United States — they don't know a lot about it," Dr. Rasmussen said.

"Now that we can be more convincing that Zika virus does cause microcephaly, we hope that people will focus on our prevention messages more closely."

The C.D.C. analysis, led by Dr. Rasmussen, was published Wednesday in *The New England Journal of Medicine*, and involved weeks of research into findings that have emerged from Brazil and elsewhere, including studies of fetuses with microcephaly in pregnant women infected with Zika.

The authors said they used (⑤ : establish) frameworks for assessing whether evidence met scientific criteria proving that one factor causes another. Those criteria included the existence of cases of microcephaly that have been strongly linked to documented exposure to Zika virus. Dr. Rasmussen and her colleagues also reviewed the biologically plausible explanations for how the virus might cause damage to the brain, and the absence ⑥ [explanations / make / sense / of / other / that].

Infectious disease experts welcomed the announcement.

"The important part is that the C.D.C. can now take action without having to spend time trying to confirm the link," said Dr. Eric J. Rubin, an infectious disease expert at Harvard and an editor at *The New England Journal of Medicine*.

Michael T. Osterholm, director of the Center for Infectious Disease Research and Policy at the University of Minnesota, said the C.D.C.'s announcement was a "good call," (⑦ : add) "I give them credit for making clear and unambiguous statements about the neurologic complications."

About 700 people in the United States have been infected with the Zika virus as of last week, including 69 pregnant women, Dr. Anne Schuchat, the deputy director of the C.D.C., said on Monday at a White House briefing. About half of the cases are in Puerto Rico, where the virus is circulating

locally. Most of the other American cases have occurred in people who traveled to South America.

But Dr. Schuchat said that mosquitoes that can transmit Zika are present in 30 states during the warmer months, a much larger swath of the United States than health officials initially expected.

States considered most at risk include Florida and Texas, especially in urban areas where the mosquito thrives and in neighborhoods where (⑨ : 1) of air conditioning means more open windows that give the insects greater access to people.

The C.D.C.'s announcement comes two weeks after the World Health Organization said there was "a strong scientific consensus" that Zika causes microcephaly and other neurological disorders.

In an interview on Wednesday, Dr. Bruce Aylward, head of emergency response for the W.H.O., called the C.D.C.'s announcement "really responsible public health" and "a turning point in the course of this epidemic." American ⑩ officials realized "people are not taking precautions," he said. "They are still questioning whether Zika is the cause."

"If you are going to prevent disease, you have got to change behavior today," he added.

C.D.C. researchers relied on an innovative approach in their analysis, because available scientific evidence did not lend itself to the scientific ⑪ frameworks that are commonly used to determine causal connections: Koch's postulates, which requires that scientists infect people or animals with the suspected pathogen, and the Bradford Hill criteria, a model for studying infectious diseases.

The scientists instead used a framework called Shepard's criteria, normally used to determine whether an agent causes birth defects. For that threshold, the evidence is sufficient, Dr. Aylward said: "They can say it's definitive that it's the cause."

C.D.C. officials said they were not ready to confirm that Zika can cause neurological conditions in adults, including Guillain-Barré syndrome, ⑫ [cases / have / in / increased / of / which] some countries in the Zika outbreak.

The W.H.O. said last month that evidence substantiated the connection between the infection and Guillain-Barré syndrome. On Wednesday, C.D.C. officials said that because the syndrome can be triggered by other infections, they were waiting for the results of studies (⑬ : be) conducted in Brazil and elsewhere.

But the C.D.C. was unequivocal about microcephaly. Not ⑭ [can / cause / condition / only / the / Zika], Dr. Rasmussen said, but it appears to cause more severe forms of it. Microcephaly caused by the Zika virus resembles a particularly destructive type called “fetal brain disruption sequence,” which includes serious problems with swallowing and bending joints. “Even just the measurements of the babies’ heads are much smaller” than in other types of microcephaly, she said.

Beyond microcephaly, Dr. Rasmussen said, the authors concluded that Zika causes some other fetal brain problems, such as calcifications inside the skull. But much remains unknown, including whether Zika harms other organs, how likely it is that women infected with Zika will have brain-damaged babies, and ⑮ [extent / risk / the / to / varies / what] according to when in pregnancy the infection occurs.

Dr. Rasmussen said other brain defects may also be linked to Zika infection. “We do expect that this is likely to be the tip of the iceberg,” she said, “that there will be babies who won’t have the small head per se, but will have other types of brain defects.”

(New York Times, April 13, 2016. “Zika Virus Causes Birth Defects, Health Officials Confirm” by Pan Belluck and Donald G. McNeil Jr.)

1 Translate the underlined words and phrases marked ①, ④, ⑧, ⑩, and ⑪ into Japanese.

2 Fill in the blank marked (②) with the most suitable English word starting with the letter 'a'.

3 Fill in the blank marked (⑨) with the most suitable English word starting with the letter 'v'.

4 Change the form of the word in the parentheses marked (⑤), (⑦), and (⑬) to the most appropriate one.

5 Rearrange the words in the brackets marked ③, ⑥, ⑫, ⑭, and ⑮ to make correct sentences. On your answer sheet, write the word which comes to the * positions below.

③ [_____ * _____]

⑥ [_____ * _____]

⑫ [_____ * _____]

⑭ [_____ * _____]

⑮ [_____ * _____]