

P 6 英 語

この冊子は、英語の問題で 1 ページより 9 ページまであります。

〔注 意〕

- (1) 試験開始の指示があるまで、この冊子を開いてはいけません。
- (2) 監督者から受験番号等記入の指示があったら、解答用マークシートに受験番号と氏名を記入し、さらに受験番号と志望学科をマークしてください。
- (3) 解答は、所定の解答用マークシートにマークしたものが採点されます。
- (4) 解答用マークシートについて
 - ① 解答用マークシートは、絶対に折り曲げてはいけません。
 - ② マークには黒鉛筆(HBまたはB)を使用してください。指定の黒鉛筆以外でマークした場合、採点できないことがあります。
 - ③ 誤ってマークした場合は、消しゴムで丁寧に消し、消しくずを完全に取り除いたうえ、新たにマークしてください。
 - ④ 解答欄のマークは、横 1 行について 1 箇所に限ります。2 箇所以上マークすると採点されません。あいまいなマークは無効となるので、はっきりマークしてください。
 - ⑤ 解答用マークシート上部に記載されている解答上の注意事項を、必ず読んでから解答してください。
- (5) 試験開始の指示があったら、初めに問題冊子のページ数を確認してください。ページの落丁・乱丁、印刷不鮮明等に気づいた場合は、手を挙げて監督者に知らせてください。
- (6) 問題冊子は、試験終了後、持ち帰ってください。

Read the following passage and answer the questions below. (70 points)

(1) "Hello! How are you doing?" Lyudmila Trut says, reaching down to open the door of a wire cage labeled "Mavrik." We're standing between two long rows of similar cages on a farm just outside the city of Novosibirsk, in southern Siberia, and the 76-year-old biologist's greeting is addressed not to me but to the cage's furry occupant. Although I don't speak Russian, I recognize in her voice the tone of maternal adoration that dog owners adopt when addressing their pets.

(2) Mavrik, the object of Trut's attention, is about the size of a Shetland sheepdog, with chestnut orange fur. He plays his designated role in turn: wagging his tail, rolling on his back, panting eagerly in anticipation of attention. In adjacent cages lining either side of the narrow, open-sided shed, dozens of canids do the same, yelping and clamoring in an explosion of fur and great excitement. "As you can see," Trut says above the din, "all of them want human contact." Today, however, Mavrik is the lucky recipient. Trut reaches in and picks him up, then hands him over to me. Cradled in my arms, gently biting my hand in his mouth, he's as docile as any lapdog.

(3) Except that Mavrik, as it happens, is not a dog at all. He's a fox. Hidden away on this overgrown property, surrounded by birch forests and barred by a rusty metal gate, he and several hundred of his relatives are the only population of domesticated silver foxes in the world. (Most of them are, indeed, silver or dark grey; Mavrik is rare in his chestnut fur.) And by "domesticated" I don't mean captured and tamed, or raised by humans and conditioned by food to tolerate the occasional petting. I mean bred for domestication, as tame as your neighborhood cat or your Labrador. In fact, says Anna Kukekova, a Cornell researcher who studies

the foxes, "they remind me a lot of golden retrievers, who are basically not aware that there are good people, bad people, people that they have met before, and those they haven't." These foxes treat any human as a potential companion, a behavior that is the product of arguably the most extraordinary breeding experiment ever conducted.

[4] It started more than a half century ago, when Trut was still a graduate student. Led by a biologist named Dmitry Belyaev, researchers at the nearby Institute of Cytology and Genetics gathered up 130 foxes from fur farms. They then began breeding them with the goal of re-creating the evolution of wolves into dogs, a transformation that began more than 15,000 years ago.

[5] With each generation of young foxes, Belyaev and his colleagues tested their reactions to human contact, selecting those most approachable to breed for the next generation. By the mid-1960s the experiment was working beyond what he could have imagined. They were producing foxes like Mavrik, not just unafraid of humans but actively seeking to bond with them. His team even repeated the experiment in two other species, mink and rats. "One huge thing that Belyaev showed was the timescale," says Gordon Lark, a University of Utah biologist who studies dog genetics. "If you told me the animal would now come sniff you at the front of the cage, I would say it's what I expect. But that they would become that friendly toward humans that quickly... wow."

[6] Miraculously, Belyaev had compressed thousands of years of domestication into a few years. But he wasn't just looking to prove he could create friendly foxes. [A] He had a hunch that he could use them to unlock domestication's molecular mysteries. [B] Domesticated animals are known to share a common set of characteristics, a fact documented by Darwin in *The Variation of Animals and Plants Under Domestication*. [C] Such traits tend to make

animals appear appealingly juvenile to humans. Their coats are sometimes spotted — piebald, in scientific terminology — while their wild ancestors' coats are solid. These and other traits, sometimes referred to as the domestication phenotype, exist in varying degrees across a remarkably wide range of species, from dogs, pigs, and cows to some nonmammals like chickens, and even a few fish. [D]

(7) Belyaev suspected that as the foxes became domesticated, they too might begin to show aspects of a domestication phenotype. He was right again: Selecting which foxes to breed based solely on how well they got along with humans seemed to alter their physical appearance along with their dispositions. After only nine generations, the researchers recorded young foxes born with floppier ears. Piebald patterns appeared on their coats. By this time the foxes were already whining and wagging their tails in response to a human presence, behaviors never seen in wild foxes.

(8) Driving those changes, Belyaev postulated, was a collection of genes that conferred a tendency to tameness — a genotype that the foxes perhaps shared with any species that could be domesticated. Here on the fox farm, Kukekova and Trut are searching for precisely those genes today. Elsewhere, researchers are delving into the DNA of pigs, chickens, horses, and other domesticated species, looking to pinpoint the genetic differences that came to distinguish them from their ancestors. The research, accelerated by the recent advances in rapid genome sequencing, aims to answer a fundamental biological question: "How is it possible to make this huge transformation from wild animals into domestic animals?" says Leif Andersson, a professor of genome biology at Uppsala University, in Sweden. The answer has implications for understanding not just how we domesticated animals, but how we tamed the wild in ourselves as well.

(Adapted from *National Geographic*)

(1) In paragraph (1), what does the underlined phrase "the cage's furry occupant" refer to?

- 1 Lyudmila Trut
- 2 Mavrik
- 3 one of the dog owners
- 4 the author of this essay

(2) According to paragraph (2), why did Trut have to speak "above the din"?

- 1 the place was noisy
- 2 the place was stinky
- 3 she got excited
- 4 she got frustrated

(3) In paragraph (2), which of the following items below is the closest in meaning to the underlined word "docile"?

- 1 not productive
- 2 fierce
- 3 not aggressive
- 4 dull

(4) Which of the following items best expresses the essential information in the underlined sentences in paragraph (3)?

- 1 "Domestication" here refers to the process whereby cats and dogs are caught and kept just for companionship.
- 2 Animals with the ability to carefully discriminate the nature of human beings can be easily "domesticated."
- 3 "Domestication" here refers to the purposeful breeding of animals in order for them to be able to live with human beings.
- 4 Animals can soon be "domesticated" if they are rightly set in a breeding experiment in which food plays an important roll.

(5) According to paragraph [3], which of the following items is NOT true of the domesticated silver foxes?

- 1 The color of their fur is not always silver.
- 2 They are not as friendly toward human beings as golden retrievers generally are.
- 3 Their population is limited and you can see them only on the farm.
- 4 Thanks to the breeding experiment, they can now get along well with human beings.

(6) Which of the following items is NOT stated in paragraph [4]?

- 1 The long process of evolution was supposed to be tracked by the experiment.
- 2 Before the start of the experiment, many foxes were taken from a distance.
- 3 Fifteen thousand or more years ago, there were not big differences between wolves and dogs as there are today.
- 4 Dmitry Belyaev was in charge of the experiment.

(7) Which of the following items can be best implied by the contents of paragraph [5]?

- 1 Gordon Lark's original anticipation was that foxes could hardly become friends with human beings.
- 2 Until the mid-1960s the outcome of the experiment had been poor and unsuccessful.
- 3 The same experiment in the other animals helped demonstrate the astonishing speed of the foxes' domestication.
- 4 Belyaev and his colleagues did the breeding experiment for the next generation of biologists.

- (8) In which of the blank spaces [A], [B], [C], or [D] in paragraph (6) would the following sentence best fit? Mark your answer choice with either A, B, C, or D.

They tend to be smaller, with floppier ears and curlier tails than their untamed progenitors.

- (9) The following are the definitions for the two underlined words phenotype and genotype in paragraphs (6), (7), and (8). For each word, choose the right word or phrase that best describes the meanings.

(a) **Phenotype:** the physical and biochemical characteristics of an organism as determined by the () of its genetic constitution and the environment.

- 1 interaction
- 2 devotion
- 3 independence
- 4 recognition

(b) **Genotype:** the () of an individual organism or group of organisms with reference to a single trait, set of traits, or an entire complex of traits.

- 1 reproductive strength
- 2 identical cells
- 3 genetic makeup
- 4 physical constitution

- (10) In paragraph (8), which of the following items below is the closest in meaning to the underlined phrase "delving into" in the passage?

- 1 trying hard to find out the new and detailed information on
- 2 refraining from handling
- 3 trying hard to make sure the common belief on
- 4 refraining from reproducing

(11) Which of the following items best describes the essential meaning of the underlined sentence at the end of paragraph (8)?

- 1 To understand the process of animal domestication can be a clue to track the process of human evolution.
- 2 Without knowing the skills our ancestors used to tame wild animals, we cannot control ourselves properly.
- 3 It is important for us to get along well with animals, tamed or not tamed, so that we can make a proper understanding of human beings.
- 4 Before we discover how to tame wild animals, all we have to understand is how wild we are and how difficult it is to calm ourselves down.

(12) Look again through the essay. Then, for each of the following items, mark your answer choice with either T, if it is true, F, if it is false, or NS, if it is NOT stated.

- 1 For Dmitry Belyaev, the domestication experiment was the most successful achievement in his life.
- 2 Darwin's *The Variation of Animals and Plants under Domestication* is the first documentation of the process of the domestication of animals.
- 3 Belyaev doubted the idea that changes in foxes' characteristics affects their appearance.
- 4 The research of Kukekova and Trut has been moved forward rapidly by the latest progress in genome sequencing.

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A. Use the words in each () to make the best possible sentence and mark your answer for **the 2nd** and **the 4th** positions.

B. Then choose one answer from the items (a)~(c) that best explains the meaning of each sentence. (30 points)

1. Jason is no (1 a president 2 fit 3 than 4 to be 5 more) a high school student.

(a) If Jason becomes a president, he will be very famous among the young.

(b) Jason is the last person people wish to be a president.

(c) Growing up to be a president has been Jason's dream since he was in high school.

2. The firefighters (1 that 2 live 3 might 4 my parents 5 seriously injured 6 so 7 were).

(a) My parents survived through the firefighters putting their lives at great risk.

(b) The firefighters' efforts to save my parents were in vain.

(c) My parents are not sure whether the firefighters are still alive.

3. I can't (1 all 2 with 3 dishes 4 these 5 to 6 wash 7 go out).

(a) It is hard to carry all of these plates with me.

(b) I'll have to do the dishes before I leave home.

(c) I must get going without cleaning up the kitchen.

4. Seldom (1 as 2 warm as 3 London 4 is 5 it) is today.

(a) London is uncommonly cool today.

(b) The weather in London is exceptionally mild today.

(c) Today, London's weather is what it usually is at this time of year.

5. There's (1 Kate 2 denying 3 is 4 no 5 very competent
6 that).

(a) Kate is not as able a person as her coworkers believe.

(b) The rumor has it Kate refuses to make any effort to be efficient.

(c) Almost everyone admits that Kate is capable and skilled.