

## 平成 20 年度入学者選抜学力検査問題

## 英 語

## 注 意 事 項

1. この冊子は、監督者から解答を始めるよう合図があるまで開いてはいけません。
2. 解答は解答用紙に書きなさい。解答用紙は 3 枚です。監督者から解答を始めるよう合図があったら、3 枚とも、まず最初に解答用紙の上部の所定欄に受験番号と座席番号を、また、下部の所定欄には座席番号をそれぞれ必ず記入しなさい。
3. 英語を選択科目として届け出た者のみが解答しなさい。それ以外の者が解答すると失格となります。
4. 法経学部を志望している者は I、II、III に解答しなさい。それ以外の者は I、II、III、IV (すべての問い) に解答しなさい。
5. この冊子は全部で 11 頁からなります。落丁、乱丁または印刷の不備なものがあったら申し出てください。
6. 解答用紙は、記入の有無にかかわらず、持ち帰ってはいけません。
7. この冊子は持ち帰ってかまいません。

I 次の文章を読み、本文の内容に基づいて以下の問いに答えなさい。問2以外は、すべて日本語で書きなさい。

Our weather is always changing and now scientists are discovering that our climate does not stay the same either. Climate, the average weather over a period of many years, differs in regions of the world that receive different amounts of sunlight and have different geographic factors, such as proximity to oceans and altitude.

Climates will change if the factors that influence them fluctuate. To change climate on a global scale, either the amount of heat that is let into the system changes, or the amount of heat that is let out of the system changes. For instance, warming climates are either due to increased heat let into the Earth's system or a decrease in the amount of heat that is let out of the atmosphere.

The heat that enters the Earth's system comes from the Sun. Sunlight travels through the atmosphere, heating up the land surface and the oceans. The warmed Earth then releases heat back into the atmosphere. However, the amount of sunlight let into the system is not always the same. Changes in the Earth's orbit over thousands of years and changes in the Sun's intensity affect the amount of solar energy that reaches the Earth.

Heat exits the Earth's system as the Earth's surface, warmed by solar energy, radiates heat away. However, certain gases in our atmosphere, called greenhouse gases, allow the lower atmosphere to absorb the heat radiated from the Earth's surface, trapping heat within the Earth's system. Greenhouse gases, such as water vapor, carbon dioxide, methane and nitrous oxide, are an important part of our atmosphere because they keep the Earth from becoming an icy sphere with surface temperatures of about -18 °C. However, over the past century or so the amounts of greenhouse gases within our atmosphere

have been increasing rapidly, mainly due to the burning of fossil fuels, which releases carbon dioxide into the atmosphere. Consequently, in the past one hundred years global temperatures have been increasing more rapidly than the historical record shows. Scientists believe this accelerated heating of the atmosphere is occurring because increasing amounts of these greenhouse gases are trapping more and more heat.

### Complicating Factors

There are many different factors that complicate this system, including the following, all of which have an influence on the Earth's climate. Some of these cause global warming to increase more rapidly, some may slow the process and others may even contribute to both effects.

#### Clouds

Clouds reflect sunlight, providing shade, which keeps the Earth's surface cool. However, the water vapor within clouds is a greenhouse gas. It traps heat in the atmosphere by bouncing energy back towards the Earth. Scientists still disagree about whether the net effect of cloud cover is to cool or warm the Earth. If global warming continues, there will be increasing levels of cloud cover in our atmosphere, which may have positive or negative effects.

#### Forest Fires

Wildfires release carbon dioxide, a greenhouse gas, into the atmosphere. By trapping heat, carbon dioxide contributes to the planet's warming. However, if a forest of similar size grows again, about the same amount of carbon dioxide that was added to the atmosphere during the fire will be removed. So, fires affect atmospheric CO<sub>2</sub> in the short term, but not in the long term.

### Volcanic Eruptions

- (e) Eruptions send ash particles into the atmosphere, blocking sunlight from reaching the Earth's surface and thus contributing to cooling. Ash from volcanoes can have a worldwide effect, as ash in the upper atmosphere is able to travel great distances. For example, Mount Pinatubo erupted in 1990, sending enough ash into the upper atmosphere to lower the Earth's average temperature for several years. However, volcanoes also release carbon dioxide, which, over millions of years, causes warming.

### Oceans

- (f) Heat is absorbed by ocean water and transported by currents worldwide. Due to their ability to absorb and broadly distribute heat, the oceans help to slow the process of temperature change in the atmosphere.

### People

- (g) Living things both produce and consume greenhouse gases, especially carbon dioxide. However, currently far more greenhouse gases are produced than consumed, contributing to global warming, because human activities use huge quantities of fuels that release carbon dioxide.

問 1 下線部(a)の climate について、本文ではどのように定義していますか。

問 2 次の英文は、第 1 段落から第 4 段落の要約です。(1)~(10)の空欄に入れるのに最も適切な単語を下の囲みの中から選びなさい。囲みの中の単語はそれぞれ 1 回しか使えません。

Climate changes on a ( 1 ) scale due to factors such as ( 2 ) above sea level and ( 3 ) from the sea. On a global scale, climate is changed by ( 4 ) in the amount of heat that goes in or out of the

atmosphere. Heat is provided by solar energy, which can vary in amount according to the Sun's ( 5 ) or the Earth's ( 6 ). This heat is then ( 7 ) back by the Earth into the atmosphere, where it may be ( 8 ) by greenhouse gases. Such gases are useful for ( 9 ) excessive cooling of the Earth but recently amounts have increased rapidly, leading to a ( 10 ) in global temperatures.

absorbing	distance	increase	orbit	rise
affected	fluctuations	increasing	preventing	save
amount	heat	intensity	regional	sphere
area	heating	keeping	regions	such
away	height	level	released	trapped

- 問 3 下線部(b)の科学者たちの考えは、どのようなものですか。
- 問 4 下線部(c)で雲のはたらきについて科学者たちの中で意見が一致していないと書かれていますが、どういう点が一致しないのですか。それぞれの根拠を含めて具体的に説明しなさい。
- 問 5 下線部(d)で長期的な影響を否定している理由について、具体的に説明しなさい。
- 問 6 下線部(e)の要因によって、地球の気候の変化にどのような結果がもたらされますか。その理由も含めて説明しなさい。
- 問 7 下線部(f)の要因によって、地球の気候の変化にどのような結果がもたらされますか。その理由も含めて説明しなさい。
- 問 8 下線部(g)の要因によって地球の温暖化が進むとされていますが、それはなぜですか。説明しなさい。

II

次の文章は人類の起源を遺伝子から探求する研究について述べたものです。本文をよく読んで以下の問いに答えなさい。解答はすべて日本語で書きなさい。なお、\*の印の付いた語彙は本文の後に注があります。

Scientific controversy continues and nowhere is it more apparent than in trying to answer the fundamental questions about human origins, or our roots. <sup>(1)</sup> The controversy exists between the traditional anthropologists\* and the molecular\* anthropologists. The molecular anthropologists propose that humans did not evolve slowly and gradually in different parts of the world (the view held by traditional anthropologists), but rather that the evolution from archaic\* to modern *Homo sapiens* occurred 140,000 to 290,000 years ago, probably from one group and probably in one place — Africa. The descendants\* of this group then migrated to other parts of the world 90,000 to 180,000 years ago.

Molecular anthropologists reached their conclusion based on evidence that indicates that all living humans can trace their mitochondrial DNA back to one woman. Mitochondria\* are self-replicating\* organelles\* with their own DNA. At the moment of conception\*, the sperm\* injects\* its nuclear DNA into the egg. The tail of the sperm, which contains mitochondria to fuel its movement, falls off. Thus all the mitochondria in the egg (and the DNA they contain) come from the mother. As stated by Mark Stoneking from the University of California, Berkeley, “Genes\* in the nucleus\* are inherited from both parents, but mitochondrial DNA is inherited only maternally, directly from the egg. <sup>(2)</sup> That means any change in the mitochondrial DNA can be due only to mutation\*. And we have a pretty good idea that the mutation rate is only 2 to 4 percent per million years.”

With this information in mind, Rebecca Cann and her colleagues at the University of Hawaii studied the placentas\* of 147 women from five geographical regions. The team used restriction enzymes\* to divide the

mitochondrial DNA into easily identifiable patterns. In comparing these patterns, they found 133 distinct types. How long did it take to produce these 133 types by mutation? Using the mutation rate of 2 to 4 percent per million years (this concept of a regular rate is considered controversial\* by some but accepted by most anthropologists), the team determined that Eve (scientists' name for the mitochondrial mother) must have lived 140,000 to 290,000 years ago.

Just think of the implications: Scientists are proposing that a common ancestor to whom we can all trace our mitochondrial DNA is a single woman, in a single place, who probably lived 140,000 to 290,000 years ago — our<sup>(3)</sup> 10,000th great-grand mother. As Stephen Jay Gould says, "It makes us realize that all human beings, despite differences in external appearance, are really members of a single entity that has had a very recent origin in one place. There is a kind of biological brotherhood that is much more profound than we ever realized."

It should be noted that the woman described was probably among the first group of modern humans, or their direct ancestors. By chance<sup>(4)</sup> she was the only woman who had at least one female descendant in every generation, so that her line of mitochondrial DNA continues until today. Where did this woman live?

Cann and her colleagues determined that the placentas from the African pool\* had the largest amount of diversity\* in their mitochondrial DNA. This suggests that the African population is probably the oldest. Also, studies of nuclear DNA point to the African origin, and the major fossil finds have been in Africa.

The dispute goes on. Recently, investigators have determined that the Neanderthal people are probably not direct ancestors of modern humans. This<sup>(5)</sup> conclusion is based on the technique of thermoluminescence which uses heat

and light to calculate the age of rocks. Using flint rocks found beside modern-appearing human skeletons discovered in caves in Israel, researchers have determined that the bones were about 92,000 years old, not the 35,000 to 40,000 years old previously believed. This finding indicates that modern humans were here before the earliest accepted dating of the Neanderthals, believed to be 35,000 to 40,000 years ago. Modern humans were here about 50,000 years before Neanderthals. What happened to the latter? This is obviously another story.

So our evolutionary tree is constantly being shaken. The evidence of these studies of mitochondrial DNA suggests that we are a relatively recent species, and our ancestral mother may be one woman who lived about 200,000 years ago in Africa. We are indeed all one great family.

(注)

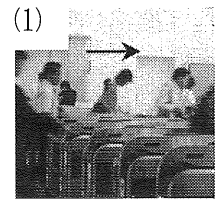
anthropologist	人類学者	molecular anthropologist	分子人類学者
archaic	古代の	mutation	突然変異
conception	受精	nucleus	細胞の核
controversial	議論の余地がある	organelle	細胞内小器官
descendant	子孫	placenta	胎盤
diversity	多様性	pool	集団(ここでは研究に協力してく れたアフリカ系の女性の集団を指す)
enzyme	酵素	self-replicating	自己を複製する
gene	遺伝子	sperm	精子
mitochondria	ミトコンドリア		

- 問 1 下線部(1)に挙げられている研究者の主要な見解の違いは何ですか。
- 問 2 下線部(2)は、文脈から考えて、どのような意味ですか。
- 問 3 下線部(3)はどういう意味ですか。わかりやすく説明しなさい。
- 問 4 下線部(4)で「偶然のことだが」と言っていますが、何が偶然なのですか。
- 問 5 下線部(5)の内容を説明しなさい。
- 問 6 下線部(6)はどういうことですか。

- Ⅲ 次の文章は日本における電車の乗り方を外国人に英語で説明するものです。あなたが外国人に電車の乗り方を教える立場に立って、空所に適切な英語表現を入れて文を完成させなさい。なお、(1)、(3)、(5)については写真を参照しつつ答えなさい。

### Buying your ticket

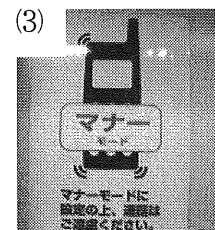
You can get your ticket from either a ticket machine or from the manned gate. The ticket machines take notes up to ten thousand yen. After you get your ticket, you can proceed through the ticket gate. Automatic gates can be found in most stations. Insert the ticket into the slot, \_\_\_\_\_ (1) \_\_\_\_\_ and pick up the ticket on the other side. If you insert an invalid ticket, the gate will close and an alarm will sound.



Another way to pay is with a pre-paid card. You can put money on the card and when you touch the panel on the ticket gate with the card, the machine will automatically deduct \_\_\_\_\_ (2) \_\_\_\_\_.

### On the train

Most passengers on Japanese trains are either reading, sleeping or using their mobile phones for sending messages, browsing the web or playing games. \_\_\_\_\_ (3) \_\_\_\_\_, however, is forbidden, except in the entrance sections of Shinkansen and limited express trains.



On the train, the next station and connecting lines are announced in Japanese. On Shinkansen and some

other lines frequently used by foreign visitors, the announcements are \_\_\_\_\_ (4) \_\_\_\_\_.

### **At the destination station**

The station names on platforms are written in kanji, hiragana and romaji (Roman letters). The signs also show the names of the previous and next stations. At your destination, leave the station in the same way as you entered. However, if you used a single ticket, you won't get your ticket back this time. If you did not pay the correct fare, you have to pay the difference at a "Fare Adjustment" machine before leaving through the gates. If \_\_\_\_\_ (5) \_\_\_\_\_, you can pay the difference at the manned gate instead.



- IV Describe all the information in the chart in English. Use only one sentence.  
Do not use “and” or “but.”

