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A 英語問題

注意

1．試験開始の指示があるまでこの問題冊子を開いてはいけません。
2．解答用紙はすべてＨＢの黒鉛筆またはＨＢの黒のシャープペンシルで記入することになっています。ＨＢの黒鉛筆・消しゴムを忘れた人は監督に申し出てください。（万年筆・ボールペン・サインペンなどを使用してはいけません。）
3．この問題冊子は16ページまでとなっています。試験開始後，ただちにページ数を確認してください。なお，問題番号はⅠ～Ⅴとなっています。
4．解答用紙にはすでに受験番号が記入されていますので，出席票の受験番号が，あなたの受験票の番号であるかどうかを確認し，出席票の氏名欄に氏名のみを記入してください。なお，出席票は切り離さないでください。
5．解答は解答用紙の指定された解答欄に記入し，その他の部分には何も書いてはいけません。
6．解答用紙を折り曲げたり，破ったり，傷つけたりしないように注意してください。
7．この問題冊子は持ち帰ってください。

マーク・センス法についての注意

マーク・センス法とは，鉛筆でマークした部分を機械が直接よみとって採点する方法です。

1．マークは，下記の記入例のようにＨＢの黒鉛筆で枠の中をぬり残さず濃くぬりつぶしてください。
2．１つのマーク欄には１つしかマークしてはいけません。
3．訂正する場合は消しゴムでよく消し，消しくずはきれいに取り除いてください。

マーク記入例：

A	1	2	3	4	5
	○	○	●	○	○

（３と解答する場合）

I．次の文を読み，下記の１～10それぞれに続くものとして，本文の内容ともっともよく合致するものを，各イ～ニから１つずつ選び，その記号を解答用紙の所定欄にマークせよ。

Sometime in mid-2007, the world's demographic scales tipped. Only a century earlier, urbanites represented just over 14 percent of humanity. But by 2007, a majority of the world's people lived in cities, and more are on the way. Over the coming decades, cities will absorb all predicted global population growth. According to the U.N. Population Division, there will be 6.4 billion urban dwellers by 2050—as many people as lived on the entire planet in 2004.

That stark reality leads to another: feeding this new urban world with an old agricultural model could be a recipe for environmental ruin—and human misery. The cost of growing food on large plots of land far away from cities and transporting it to the urban masses has begun to outweigh its benefits. Not only is the carbon footprint of such a system huge, but more often than not traditional farming has been a disaster for natural ecosystems and wildlife. And then there's the problem of space. Already, over 80 percent of the world's farmable land is in use—some of it highly worn out. Add the 2.5 billion people who are likely to join us on the globe by 2050, and there's simply not enough room to keep farming the way we have been.

In response, Dickson Despommier, a professor of public health at Columbia University, wants to turn the old system on its head. For the past decade, Despommier has been cultivating a vision of farms filling glass-and-steel towers the size of a city block and 30 stories high. Just one high-rise farm, he has calculated, could feed 50,000 people 2,000 calories a day all year round. Scale that up, and skyscrapers could produce enough food to feed everyone in Manhattan in a space roughly one-fifth the size of Central Park.

Despommier's ideas are a far cry from the backyard chicken cages and vacant-lot community gardens that are most frequently promoted by urban-agriculture advocates. But he passionately believes that if we think differently about food production, the big cities of the future might just be able to feed themselves.

His optimism, however, didn't come automatically. In 1999, students in one of Despommier's classes decided to explore the potential of rooftop agriculture in New York City. The results of their calculations were depressing: even if all of the

city's residential rooftops were converted to rice fields, the resulting crop would provide only two percent of Manhattan residents' caloric needs.

"Why don't we just put the farms inside the buildings?" Despommier recalls saying. It was a throwaway remark at the time. "But the more I thought about it, the more appealing that solution became."

A 30-story building may not sound like much space compared to acres of rolling Kansas wheat, but the year-round indoor growing season quickly multiplies yields—two crops of tomatoes per year, three crops of wheat, even ten crops of strawberries. Plus, vertical farming is a chance to play a giant agricultural video game: dwarf varieties of wheat and corn can be planted at twice the density of standard field crops, and trays of plants can be stacked two, three, or sometimes five layers deep per floor. The harvest adds up fast.

Despommier cites a long list of vertical farming's potential benefits. Farmers would no longer be vulnerable to droughts, floods, or storms—a particular advantage in a world affected by climate change. There would be no further need to burn fossil fuels for plowing, harvesting, or shipping food long distances to market. Streams and rivers would run clear, free from pesticide and fertilizer runoff.

"The very best reason for indoor farming is that you save outdoor land for something else," Despommier says. Vertical farming could shrink the physical footprint of agriculture by upwards of 95 percent—for every acre of land farmed indoors, he has estimated, 10 to 20 acres of current farmland could go wild. Fields would return to forests, absorbing huge quantities of carbon as an added bonus.

The basic idea of growing food indoors is nothing new—the first greenhouses were built in the thirteenth century. And today's greenhouses, of course, often have massive carbon footprints. But Despommier is doing more than just stacking greenhouses on top of one another. Instead, he's orchestrating an ecosystem in which energy, water, and nutrients would be recycled from floor to floor.

On one floor of a vertical farm, you might find a kind of indoor wetland, with cattails and sawgrass to filter used water. The purified water would be piped off to other floors to provide water to small animals and to water crops. Most of the crop plants would likely be grown hydroponically, with their roots sunk directly in water, or aeroponically, suspended in the air and enveloped in a nutrient-rich mist. These

technologies use up to 90 percent less water than soil-based agriculture. To make the system even more water-efficient, a network of pipes would collect water released by the plants so that it could be recycled again.

Each floor of the tower would have specific temperature, humidity, nutrient, and light conditions tailored precisely to each crop. The heat on one floor would be turned up to grow tomatoes and peppers and turned down on another to nurture cabbage and kale. Nutrients would come from sterilized, dried, and powdered wastewater solids; highly efficient LEDs would supplement natural sunlight. A positive-pressure system much like the ones in hospitals would keep out diseases and insects.

The energy to run all these systems could come from wind, solar, or geothermal sources where possible. Elsewhere, waste—including the uneatable portions of crop plants—could be burned for energy or digested into methane.

Not all indoor farms, moreover, would have to be massive. "I'm imagining farms attached to restaurants, schools, hospitals, or on the tops of apartment buildings," Despommier says. A one-story, one-acre rooftop structure could yield the equivalent of 16 acres of field-grown produce.

One hurdle, however, is cost. To build a small experimental farm—say, 5 or 10 stories—from scratch would cost somewhere between $20 and $50 million, Despommier believes. Yet consider this: a smaller indoor farm at Cornell University has been able to grow 68 heads of lettuce per square foot per year. At $2.50 per head, that's as much as $170 per cultivated square foot per year—or millions of dollars per farm floor.

Still, the potential revenues haven't been enough to draw a flood of investors. Despite widespread interest in the concept, no high-rise farms exist yet. But they're getting closer. One of the most promising operations is taking root in Chicago, where John Edel is pioneering the kind of for-profit/nonprofit/academic partnership that could make vertical farming workable, at least at first. Last year, Edel began working with professors and students from the Illinois Institute of Technology to establish a small test farm in the basement of his Chicago Sustainable Manufacturing Center. If all goes according to plan, the first vegetables should be ready for harvest by Thanksgiving.

1. One idea of the first paragraph is that

イ. the number of cities will increase rapidly.

ロ. it's difficult to predict future population trends.

ハ. the world's population will peak at 6.4 billion.

ニ. future population growth will be focused in cities.

2. The passage mentions all the following problems with the old agricultural model EXCEPT that

イ. transporting food from the country to the city is costly.

ロ. young people are no longer interested in farming careers.

ハ. the world is running out of land to grow crops on.

ニ. traditional farms are harmful to the environment.

3. One aim of Dickson Despommier's plan is to

イ. produce food for people all year round.

ロ. plant outdoor crops on vacant lots.

ハ. build high-rise farms in Central Park.

ニ. rely on existing skyscrapers to produce food.

4. The underlined word "throwaway" (paragraph 6) is closest in meaning to

イ. brilliant.

ロ. casual.

ハ. fortunate.

ニ. rude.

5. The author compares a 30-story building to the Kansas wheat fields (paragraph 7) in order to make the point that vertical farming will

イ. not be as natural as outdoor farming.

ロ. be unable to produce certain kinds of crops.

ハ. have a higher yield than most people realize.

ニ. require the skills of computer gaming.

6. Vertical farms would be especially useful in response to climate change because such farms

イ. do not require the use of fuel.

ロ. are not affected by patterns of rainfall.

ハ. depend upon stable weather patterns.

ニ. are not affected by changing food prices.

7. The underlined word "orchestrating" (paragraph 10) is closest in meaning to

イ. arranging.

ロ. funding.

ハ. predicting.

ニ. questioning.

8. In Despommier's vertical farm,

イ. different floors of the building would be independent of each other.

ロ. most crop plants would be grown in soil.

ハ. different floors of the building would share water and energy.

ニ. most crop plants would not need to be watered.

9. One theme of the passage is that

イ. current agricultural practices are efficient and reliable.

ロ. vertical farms will make it difficult for farmers to earn a profit.

ハ. more people should move to the country to relieve pressure on cities.

ニ. population growth demands a new approach to food production.

10. The most appropriate title for this passage is

イ. Is Agriculture Harmful to the Environment?

ロ. The Evolution of Modern Skyscrapers.

ハ. Can Cities Feed Us?

ニ. Farming Traditions in the United States.

Ⅱ．次の文を読み，下記の１～10それぞれに続くものとして，本文の内容ともっともよく合致するものを，各イ～ニから１つずつ選び，その記号を解答用紙の所定欄にマークせよ。

A staple of every bathroom, soap has served a variety of cleansing and medicinal purposes since its discovery. It has been in and out of fashion, praised as a symbol of refinement by some cultures while criticized as an unnecessary luxury by others.

About four thousand years ago, the Hittites of Asia Minor cleaned their hands with the ash of the soapwort plant suspended in water. In the same era, the Sumerians in Ur made alkali solutions to wash themselves. Technically, neither of these preparations was soap, though close to the actual product, which was developed in 600 B.C. by the seafaring Phoenicians. In the process that today is known as saponification, the Phoenicians boiled goat fat, water, and ash high in potassium carbonate, permitting the liquid to evaporate to form solid, waxy soap.

Over the next twenty centuries, the fortunes of soap would follow closely the cultural beliefs about cleanliness—and religion. During the Middle Ages, for example, when the Christian Church warned of the evils of exposing the flesh, even to bathe, production of soap virtually came to a halt. And when medical science later identified bacteria as a leading cause of disease, soap production soared. Throughout all those years, soap, variously scented and colored, was essentially the same product as that developed by the Phoenicians. Not until a factory accident in 1879 would a new and truly novel soap surface, so to speak.

One morning in 1878, Harley Procter decided that the soap and candle company founded by his father should produce a new, creamy white, delicately scented soap, one to compete with the finest imported Castile soaps of the day. As suppliers of soap to the Union Army during the Civil War, the company was suited to such a challenge. And Procter's cousin James Gamble, a chemist, soon produced the desired product. Named simply White Soap, it yielded rich bubbles, even in cold water, and had a smooth, even consistency.

Soap production began, and the product sold well. One day, a factory worker overseeing soap tanks broke for lunch, forgetting to switch off the master mixing machine. On returning, he realized that too much air had been whipped into the soapy mixture. Not wishing to be found out, he poured the mixture into hardening

and cutting frames as usual, and bars of history's first air-packed, floating soap were delivered to regional stores.

Consumer reaction was almost immediate. The factory was flooded with letters requesting more of the remarkable soap that could not be lost under dirty water because it bobbed up to the surface. Perceiving they were beneficiaries of a fortunate accident, Harley Procter and James Gamble ordered that all White Soap from then on be given an extra-long whipping.

White Soap, though, was too prosaic a label for such an innovative product. Thinking over a long list of possible names one Sunday morning in church, Harley Procter was inspired by a single word when the minister read the Forty-fifth Psalm: "All thy garments smell of myrrh, and aloes, and cassia, out of the ivory palaces, whereby they have made thee glad."

Ivory Soap debuted in October 1879, the same month that Thomas Edison successfully tested the incandescent light bulb—two events seemingly unrelated. But the clever businessman Harley Procter foresaw that the electric light would virtually snuff out his profitable candle trade, so he decided to heavily promote history's first floating soap.

In an effort to test Ivory's quality, Procter sent the soap to chemistry professors and independent laboratories for analysis. One report in particular impressed him. It stated that the soap had few impurities—only 56/100 of one percent. Procter turned the negative statement into a positive one, and purity became the hallmark of the company's campaign: Ivory Soap was "99 and 44/100 Percent Pure."

From a psychological standpoint, the phrase was a stroke of advertising genius, for the concepts of purity and floatability did much to reinforce each other—and to sell soap. To further dramatize the soap's purity and mildness, Procter introduced the "Ivory Baby," supplying shopkeepers with life-size cardboard display posters. Madison Avenue, then and now, claims that the campaign to persuade American home owners to purchase Ivory Soap was one of the most effective in the history of advertising.

As a young man, Harley Procter had promised himself that if he was a success in business, he'd retire at age forty-five. He became such a success because of the floating soap that he permitted himself the luxury of retiring a year early, at forty-four.

1. The cleaning materials developed by the Hittites and the Sumerians were different from actual soap because these materials

イ. were not solid.

ロ. did not actually clean anything.

ハ. were not bought or sold.

ニ. did not require the use of water.

2. One idea of the third paragraph is that

イ. medical science was slow to appreciate the health benefits of using soap.

ロ. people had to make their own soap during the Middle Ages.

ハ. social beliefs have had a big influence on the use of soap through the ages.

ニ. the contents of soap have changed greatly since Phoenicians first made it.

3. Harley Procter was motivated to create a new kind of soap in order to

イ. convince his father that he should be president of the company.

ロ. help his cousin, James Gamble, earn a living as a chemist.

ハ. satisfy the heavy demand for soap by the Union Army.

ニ. compete with foreign-made soaps being sold in America.

4. The passage suggests that the factory worker who forgot to turn off the mixing machine

イ. probably should have thrown away the soap when he got back from lunch.

ロ. did not tell anyone at first about the extra air in the mixture of soap.

ハ. understood consumer needs better than his superiors at the company.

ニ. did not get the credit he deserved for his discovery of floating soap.

5. The passage suggests that the new form of White Soap

イ. was quickly appreciated by consumers.

ロ. did not make the bathwater dirty.

ハ. looked and felt different from the earlier form of White Soap.

ニ. could not be easily produced in existing factories.

6. The underlined word "prosaic" (paragraph 7) is closest in meaning to

イ. abstract.

ロ. famous.

ハ. plain.

ニ. strange.

7. The author refers to Thomas Edison's invention of the incandescent light bulb because it

イ. greatly increased the demand for soap.

ロ. caused Procter to focus on selling soap.

ハ. was also discovered by accident.

ニ. inspired Procter to develop new products.

8. The underlined word "hallmark" (paragraph 9) is closest in meaning to

イ. hope.

ロ. possession.

ハ. suggestion.

ニ. symbol.

9. The passage suggests that the success of Ivory Soap was due to all of the following EXCEPT

イ. the name "Ivory Soap."

ロ. an effective advertising campaign.

ハ. views of the Christian Church toward cleanliness.

ニ. the fact that the soap floats in water.

10. The most appropriate title for this passage is

イ. A Brief History of Soap.

ロ. Harley Procter: An American Inventor.

ハ. The Business of Selling Soap.

ニ. How Failure Leads to Success.

Ⅲ. 次の1～6のそれぞれにおいて，下線部イ～ニのうち，英語表現上正しくないものを1つずつ選び，その記号を解答用紙の所定欄にマークせよ。

1. Rare (イ), if ever, do (ロ) revolutionary new inventions result (ハ) from the isolated (ニ) efforts of one individual.

2. Many techniques used to produce (イ) news online (ロ) are the same ones (ハ) founded in (ニ) traditional print media.

3. Multiple negation, as in (イ) "I didn't do nothing" as opposed with (ロ) "I didn't do anything," refers to (ハ) the use of more than one negative unit (ニ) in a sentence.

4. The people of this community will rather (イ) move away than let (ロ) the old-style politicians (ハ) back into (ニ) power.

5. Mary, a single (イ) mother of three children, has proven herself capable to balance (ロ) the responsibilities (ハ) of childrearing with (ニ) a career in advertising.

6. A boundless warm river, some (イ) 80 kilometers wide and 500 meters deep (ロ), the Gulf Stream follows into (ハ) the colder waters of (ニ) the western Atlantic.

Ⅳ. 次の空所(1)～(8)を補うのにもっとも適当なものを，それぞれ対応する各イ～ニから1つずつ選び，その記号を解答用紙の所定欄にマークせよ。

A.

Dad: Hello?

Alice: Hi, Dad! It's me.

Dad: Alice! (1)? Are you on your way home?

Alice: Well, I'm almost home. I'm at the train station.

Dad: Excellent. Dinner is almost ready, (2).

Alice: Actually, the thing is... I lost my umbrella, and it's raining pretty hard. Can you come and pick me up?

Dad: (3)? That's the third umbrella this month!

Alice: I'm really sorry! I think I left it on the train. I was tired... and the train was crowded... and I was listening to music.

Dad: (4).

Alice: I know, I know—it's my responsibility. I'll try to be more careful next time.

Dad: Okay, I'm on my way.

(1) イ. What do you think
ロ. How's everything
ハ. What have you done
ニ. How could that be

(2) イ. there's no problem here
ロ. so let's get going
ハ. and everything is a mess
ニ. so you'd better hurry

(3) イ. Are you kidding
ロ. How will this happen
ハ. Are you forgetting something
ニ. How will you get another

(4) イ. I sometimes lose my umbrella too

ロ. And it's the rainy season now

ハ. Those aren't the best excuses

ニ. No wonder you're late

B.

Gareth: Wish me luck! I'm off to climb Mount Fuji this weekend.

Seo-hyeon: Really? It's the middle of winter. (5)?

Gareth: Sure. I've been climbing mountains since I was a little kid.

Seo-hyeon: You have the proper gear, right? You'll need boots, an ice axe, oxygen tanks...

Gareth: Nah, that's for beginners.

Seo-hyeon: (6). I've heard that the peak is like ice this time of year.

Gareth: Have you ever done any climbing?

Seo-hyeon: Yes, I have. In fact, I climbed Mount Fuji last summer. (7).

Gareth: Well, maybe it wouldn't hurt to take along some climbing equipment.

Seo-hyeon: And do a few practice hikes to get used to the cold weather.

Gareth: Thanks for your advice.

Seo-hyeon: You're welcome. (8).

(5) イ. Have you ever faced a difficult challenge

ロ. Do you know of any reasons for this

ハ. Have you ever heard of such a thing

ニ. Do you know what you're getting into

(6) イ. But you're not a beginner

ロ. I'm not so sure about that

ハ. You have a point there

ニ. So, I guess you are prepared

(7) イ. It was dangerous even without the ice and snow

ロ. There was a beautiful view from the peak

ハ. I brought back souvenirs for all of my friends

ニ. You need to apply for a permit before you go

(8) イ. It's never too late to try a new challenge

ロ. It's important to enjoy the natural environment

ハ. It's better to be safe than sorry

ニ. It's a good idea to take one day at a time

V. 次の空所(1)～(6)それぞれにもっとも適当な1語を補い，英文を完成せよ。解答は解答用紙の所定欄にしるせ。

Andrew: I learned an interesting thing in biology class today. Even though we all have dreams at night, scientists still don't know (1) the actual purpose of dreams is.

Kazuki: Really? I learned in high school that dreams help with memory. They help us sort through the things we learned during the day, reinforcing the important things, and tossing out the unimportant. For example, whenever I'm studying for a test, if I study the night (2) and then sleep on it, I remember the material much better than if I only study on the day of the test and don't sleep on it.

Megumi: Maybe so, but if dreams are just for building memories, then why are they so strange and full of nonsense? I think dreams have another purpose: to help us be creative. (3) know the song "Yesterday" by Paul McCartney, right? Well, believe it or not, he dreamed the whole song. He woke up the next morning and wrote it all down.

Kazuki: That is hard to believe.

Megumi: McCartney also couldn't believe it—that the song was original. He thought he must have dreamed a song he already knew, so for several weeks he went around asking people if they'd ever heard the tune. But nobody (4)—the song really was original.

Kazuki: (5) that you mention it, I once read that Mary Shelley got the idea for her novel *Frankenstein* in a dream. And Einstein said he got some of his ideas from his dreams.

Andrew: Good job, guys. You've hit on two of the main theories of why we dream: memory consolidation and creativity. But that's all they are—just theories. Scientists can't prove it once and for all—at (6) not yet.

【以下余白】