

一 般 科 目

英 語

注 意 事 項

- 1 試験開始の合図があるまで、この問題用紙を開いてはいけません。
- 2 問題用紙は4ページで、解答用紙は2ページあります。試験開始の合図があつてから確かめなさい。
- 3 監督者の指示に従い、解答用紙の各ページに受験番号を記入しなさい。氏名を書いてはいけません。
- 4 文字などの印刷に不鮮明なところがあった場合は、手を挙げて監督者に知らせなさい。
- 5 解答はすべて解答用紙に記入しなさい。ただし、「総得点欄」「採点欄」「得点欄」に記入してはいけません。
- 6 問題用紙の余白は下書きとして利用してかまいません。
- 7 試験終了後、配付された問題用紙は持ち帰りなさい。

問題用紙

(英 語)

問題 1 次の英文は物質に関する説明です。下線部(1)から(5)について、文脈に最も合うように、[]内の要素を並べ替え、記号を用いて答えなさい。(※文末に注あり)

Example:

All of us can see [(a) nectar (b) bees (c) to gather (d) flying] in the garden.

Answer:

All of us can see [(b) - (d) - (c) - (a)] in the garden.

Imagine that you are cutting fabric to make a quilt. You cut a piece of fabric in half. Then, you cut each half in half again. Could you keep cutting the pieces in half forever? Around 400 BCE, a Greek philosopher named Democritus thought that you would eventually end up with a particle that could not be cut. He called this particle *atomos*, a Greek word meaning “(1) [(a) divided (b) able (c) be (d) to (e) not].” Aristotle, another Greek philosopher, disagreed. He did not believe that such a particle could make up all substances found in nature.

Neither Democritus nor Aristotle did experiments to test their ideas. It would be centuries before scientists tested these hypotheses. Within the past 200 years, scientists (2) [(a) come (b) agree (c) have (d) that (e) to] matter is made up of small particles. Democritus’s term *atom* is used to describe these particles.

An atom is (3) [(a) which (b) the (c) particle (d) into (e) smallest] an element can be divided and still be the same element. People used to think that atoms could not be divided into anything simpler. Scientists now know that atoms are made of even smaller particles. But the atom is still considered to be the basic unit of matter because it is the smallest unit that has the chemical properties of an element.

You cannot see individual atoms. But they make up everything you do see. The food you eat and the water you drink are made of atoms. Plants, such as moss, are made of atoms. Even things you cannot see are made of atoms. The air you breathe is made of atoms. There are many types of atoms that combine (4) [(a) different (b) in (c) make (d) to (e) ways] all substances.

You can use a light microscope to see the cells that make up a tiny moss leaf. But you cannot see the atoms that make up the substances in the cells. Atoms are so small that you cannot see them with an ordinary microscope. Only powerful instruments can make images of atoms. How small are atoms? Think about a penny. A penny contains about 2×10^{22} , or 20,000,000,000,000,000,000 atoms of copper and zinc. That’s (5) [(a) 3,000 billion (b) atoms (c) times (d) almost (e) more] than there are people living on Earth!

(adapted from *Science Fusion: Matter and Energy*)

注 fabric: 布地 BCE: 紀元前 Greek: ギリシアの

問題用紙

(英語)

問題 2 次の英文はセレンゲティ平原に関する説明です。下線部(1)から(5)に入れるのに最も適切なものを下の(a)から(e)の中から一つずつ選び、その記号で答えなさい。(※文末に注あり)

From the tiny mouse to the enormous elephant, how can the Serengeti support so much life?

How did the Serengeti become this way?

It all began with the formation of the Great Rift Valley.

More than twenty million years ago, the African continent began to split up. As East Africa and West Africa drifted apart, the earth's surface between them weakened. (1). Eventually, a long gash in the earth opened up: the Great Rift Valley. The valley runs from southeast Africa to the Middle East—more than three thousand miles!

As the earth's crust weakened and the Great Rift Valley deepened, a thick molten hot liquid called magma rose toward the surface. Magma forms in the earth's mantle. That's the layer just beneath the crust. When magma breaks the surface of the earth, it is called lava.

Volcanoes formed. They erupted violently, sending hot lava ash flying high into the sky. This ash settled over the Serengeti Plain. (2).

Today, there is just one active volcano in the area. The rest are dormant. They don't erupt. Ol Doinyo Lengai, or "Mountain of the God" in the Maasai language, stands more than ten thousand feet high. (3). When it rains, the ash becomes hard as concrete.

Volcanic activity beneath the earth's crust also led to the formation of the Serengeti's kopjes. Five hundred million years ago, well before the age of dinosaurs, hot liquid bubbles of granite began to rise up from the earth's mantle. As they reached the crust, they hardened into solid rock, with softer rock formed around it. Over time, the softer rock began to wear away from rain and wind. (4).

The Serengeti owes its fertile plains and rich variety of life to these ancient volcanic forces. The Serengeti Plain supports enormous herds of different animals, which in turn feed thousands of predators.

But as lush as its grasslands can be, when the rains stop, the Serengeti's grasses begin to disappear. (5).

(adapted from *Where Is the Serengeti?*)

- (a) And when the great herds' pastures dry up, they must move on—they must migrate—in search of food and water
- (b) The lava that erupts from this volcano turns white when it meets the air
- (c) The land began to crack and tear
- (d) Over millions of years, it turned into a rich soil, perfect for growing grasses
- (e) What are left over today are the granite kopjes

注 crust: 地殻 erupt: 噴火する gash: 深い割れ目 granite: 花崗(こう)岩 kopje: 小丘
lush: 青々と茂った molten: 熱で融(と)けた predator: 捕食動物

問題用紙

(英語)

問題3 次のデータに基づいて、下の英文の下線部(1)から(8)に入る最も適切な国名を表の中から選び、英語で記入しなさい。

Proportion of the population covered by at least a 4G mobile network

(unit: percent)

Countries	2015	2016	2017	2018	2019	2020	2021
Afghanistan	0.00	0.00	4.00	7.00	22.00	26.00	26.00
Belgium	99.89	100.00	100.00	100.00	100.00	100.00	100.00
Croatia	98.00	96.85	98.31	98.50	99.44	99.53	99.45
Denmark	99.99	100.00	100.00	100.00	100.00	100.00	100.00
Egypt	0.00	0.00	61.00	89.00	95.10	96.00	98.00
Finland	99.90	99.90	99.90	99.90	99.90	99.90	99.90
Ghana	23.00	34.86	34.86	34.86	67.65	67.65	67.65
Hungary	97.30	98.00	99.00	99.20	99.20	99.20	99.20
Indonesia	5.00	22.60	90.42	97.59	97.59	96.10	96.19
Japan	99.00	99.00	99.00	99.90	99.90	99.90	99.90

(adapted from data provided by UN Data Commons for the SDGs)

The table above shows the proportion of the population covered by at least a 4G mobile network for 10 countries. Figures are provided for the years 2015 through 2021.

Particularly in the first few years represented in the table, there is a very wide range of figures among some of the countries. In 2015 and 2016, two countries—(1) and (2)—had no 4G network coverage. On the other hand, two countries in the table—(3) and (4)—had complete 4G coverage from 2016 through 2021.

Nevertheless, despite the substantial gap between countries in 4G coverage—especially in the first few years indicated in the table—it is apparent that the overall trend is clearly toward increased coverage over time. This can be seen in the fact that (5) had just over one-twentieth the coverage of the country with the highest percentage in 2015; by 2017, its coverage was less than 10% lower than that of the country with the highest percentage of the population covered by at least a 4G network. Only two countries—(6) and Indonesia—saw a drop in coverage from one year to the next.

One additional interesting feature of the table is the degree to which countries had identical figures for multiple years in a row. The figures for Japan and (7) rose from 2017 to 2018, after which they remained exactly the same through 2021, while the coverage for (8) remained unchanged for all years indicated on the table.

問題用紙

(英語)

問題4 次のホッキョクグマに関する説明を読み、下の問いに答えなさい。(※文末に注あり)

Near the edge of the Arctic region of Canada, the short summer is rapidly disappearing. The sun is pale, and the brief days of fall are being chased away by a constant cold wind from the north. Along the western shore of the Hudson Bay, winter is beginning to close its grip and make this a very inhospitable environment. It's an icy cold region in which few animals or plants can survive.

One animal, though, actually (1) thrives in these freezing, lonely surroundings: the polar bear. Every year on the western edge of the Hudson Bay, polar bears hungrily wait for the freezing of the bay in order to begin their hunting season. Winter has the perfect weather for this huge white bear, which is the world's largest land carnivore and an animal that depends on the ice and cold for its survival. What is it about this remarkable and beautiful marine mammal that makes it particularly (ｱ) for such extreme temperatures?

According to Cam Elliot of the governmental group called 'Manitoba Conservation,' "Polar bears are built for winter. They're built for the cold." He then continues, "They're built for the wind." These warm-blooded mammals spend most of their lives on frozen seas, so they have adjusted to be able to handle the cold weather. The animals' thick fur protects and insulates them from the freezing winds. Polar bears also have short tails and small ears, both of which help to reduce heat loss. In addition, they are able to keep reserves of (2) blubber on their bodies. This aspect of their development has helped them to survive the Arctic in two ways. The heavy layer of fat helps to protect the animals from the cold, and it also allows them to live for long periods of time without eating.

Polar bears depend on the frozen ice packs covering large bodies of water in order to hunt and get their food. (ｲ), polar bears along the western shore of the bay don't enjoy the luxury of an uninterrupted winter. Elliot explains that the ice is not permanent in the area, which is why polar bears in this region are often seen on the land during the summer. "With the onset of summer and the warmer temperatures, all of Hudson Bay melts," he points out before adding, "Unlike the high Arctic, there's no permanent ice pack here. When the bay melts, the bears are (ｳ) to go to shore."

It is a (ｴ) life for the bears in this region. When the weather starts to turn cold again, large numbers of them gather around the coast of the bay, and can be seen along the shore. At this time, these typically private animals will interact in ways not completely understood by humans. They play or fight with each other, all the while waiting for the bay to freeze completely so that they can go back to the ice and their food source. Until (3) that happens, the bears are stranded on the shore, unable to go anywhere. It is at this time that polar bears and human beings have a chance to safely come into contact.

(adapted from *Polar Bears in Trouble*)

注 Arctic: 北極の inhospitable: 生存に適さない carnivore: 食肉目の哺乳類 insulate: 保護する, 隔離する
onset: 始まり interact: 交流する strand: 取り残す

問1 下線部(1)の意味に最も近いものを、下の(a)から(d)の中から一つ選び、その記号で答えなさい。

- (a) recovers (b) declines (c) flourishes (d) fails

問2 (ｱ)から(ｴ)に入れるのに最も適切なものを、それぞれ下の(a)から(d)の中から一つずつ選び、その記号で答えなさい。

- (ｱ) (a) suited (b) weak (c) inappropriate (d) hungry
(ｲ) (a) Immediately (b) Hopefully (c) Seriously (d) Unfortunately
(ｳ) (a) entitled (b) forced (c) inclined (d) willing
(ｴ) (a) historical (b) geographical (c) seasonal (d) peaceful

問3 下線部(2)と最も近い意味を持つ1語を本文中からそのまま抜き出なさい。

問4 下線部(3)の指す内容を日本語で説明しなさい。