平成23年度　　〔試験時間　60分〕

L 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及び氏名を記入し，さらに受験番号・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だけが採点されます。

(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) 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。

1 次の英文は，2009年に発表された"Second Genesis: Life, but not as we know it"という雑誌記事の導入部です。これを読んで，下記の設問に答えなさい。

(57点)

When the Nobel prizewinning physicist Richard Feynman died in 1988, his blackboard carried the inscription, "What I cannot create, I do not understand." By that measure, biologists still have a lot to learn, because no one has yet succeeded in turning a chemical soup into a living, reproducing, evolving life form. We're still stuck with Life 1.0, the stuff that first quickened at least 3.5 billion years ago. There's been nothing new under the sun since then, as far as we know.

That looks likely to change. Around the world, several labs are (ア)drawing close to the threshold of a second genesis. Craig Venter, the pioneer of *genome-sequencing, is the name most frequently associated with the quest to breathe life into inanimate matter. His team at the J. Craig Venter Institute plans to remove the genome from an existing bacterial cell and replace it with one of their own design. If successful, this will indeed result in a novel life form.

There are, however, more ambitious attempts. The most ambitious of them do not even rely on the standard set of molecular parts, but seek to redesign a living system from first principles. One such effort is led by Steen Rasmussen of the University of Southern Denmark. Instead of modeling after the system used by existing cells — a watery soup of *biomolecules enclosed in an oily *membrane — his team uses biomolecules set into the surface of an oil droplet and is now trying to prove that its genome can reproduce itself while still attached to the droplet.

Meanwhile, a no-less profound search is on for a "shadow biosphere" — life forms that are unrelated to the life we know because they are descendants of an independent origin of life. We know for sure that life got going on Earth

once, so why couldn't it have happened twice? (イ) After all, many biologists now think that given the right conditions any sufficiently complex molecular soup (ウ) has a good chance of generating life if it stews long enough If that's so, it seems reasonable that life may have arisen on Earth not once, but several times New origins of life are unlikely today, because existing life would eat up any groupings of prebiotic molecules before they could edge over the threshold However, opportunities for the origin of life may well have existed for long periods on the early Earth Some of these origins may have been dead ends, out-competed by other life forms — but others could still be living among us, unnoticed

Skeptics doubt that shadow life could have passed unrecognized for so (エ) long, but Paul Davies at Arizona State University has a simple answer: we've never looked properly Such life would probably take the form of single-celled *microbes Given that fewer than one per cent of microbes have been cultured and described, there is plenty of room for shadow life to be living right under our noses

So the appearance of an "alien" organism seems imminent — we may find one that arose naturally, or engineer one in the lab Either way, it's a momentous step Until now, biologists have had to base their understanding of life on the plants, animals and microbes that surround us, which all share a common ancestor. (オ) That doesn't give much perspective

"When you have a single example, it's very hard to know whether it's (カ) representative," says Carol Cleland, a philosopher of science and astrobiologist at the University of Colorado "If you were an alien biologist who's interested in understanding what a mammal was, and all you had was zebras, it's very unlikely that you would focus on their *mammary glands, because only half the specimens have them You'd probably focus on the stripes, (キ) which are ubiquitous"

Discovering — or engineering — a second genesis wouldn't just broaden

our view of life. Alternative life forms could (あ) biotechnologists with fresh molecules and new functions that they could (い) to practical problems. A synthetic, made-to-order living system might even serve as a self-maintaining, self-improving, adaptable assembly line for producing everything from pharmaceuticals to petrochemicals. Around the world, in the lab and in the field, researchers are racing to (ク) (1 be 2 could 3 make 4 one 5 what) of science's most far-reaching breakthroughs.

(Notes)

genome：ゲノム(生物体を構成する細胞に含まれる染色体の一組。遺伝情報を含む。)

biomolecule：生(体)分子(生命を示す最小の物質)

membrane：膜組織

microbe：微生物

mammary gland：乳腺

(1) 下線部(ア)の意味として最も適当なものを下記の中から1つ選んで，その番号を**解答用マークシート**にマークしなさい。

1 demanding the reason for
2 giving up the idea of
3 moving towards the possibility of
4 questioning their ability to bring about

(2) 下線部(イ)の意味として最も適当なものを下記の中から1つ選んで，その番号を**解答用マークシート**にマークしなさい。

1 it is possible that it happened again
2 no wonder it never happened again
3 there will not be a second genesis
4 we should create a second genesis

(3) 次の英文が下線部(ウ)の言い換えとなるように，各空所に入れるのに最も適当なものを下記の中からそれぞれ１つずつ選んで，その番号を**解答用マークシート**にマークしなさい。

((a)) any sufficiently complex molecular soup ((b)) life

((a))

1 because it suits the circumstances

2 even though with confusion

3 if put in an appropriate environment

4 only if the needs of scientists are satisfied

((b))

1 is likely to produce

2 is not lucky enough to produce

3 will rarely create

4 would take a lot of luck to create

(4) 次の英文が下線部(エ)の言い換えとなるように，空所に入れるのに最も適当なものを下記の中から１つ選んで，その番号を**解答用マークシート**にマークしなさい。

People who doubt the existence of a shadow biosphere might argue that ( )

1 scientists have actually found some evidence of a shadow biosphere

2 scientists should learn more if they want to find evidence of shadow life

3 we should be able to find some evidence of shadow life in the near future

4 we would have found evidence of a shadow biosphere if there had been one

(5) 下線部(オ)の意味として最も適当なものを下記の中から1つ選んで，その番号を**解答用マークシート**にマークしなさい。

1 That creates a dislike for familiar creatures on Earth
2 That creates a lot of confusion to plants, animals, and microbes
3 That makes it less rewarding for scientists to find new life forms
4 That makes it more difficult for biologists to understand what life is

(6) 下線部(カ)の意味として最も適当なものを下記の中から1つ選んで，その番号を**解答用マークシート**にマークしなさい。

1 it is chosen through a democratic process
2 it is inferior in nature
3 it is obtained from similar places
4 it is typical of a category

(7) 下線部(キ)の言い換えとして最も適当なものを下記の中から1つ選んで，その番号を**解答用マークシート**にマークしなさい。

1 because only a few other mammals have them
2 because they are a characteristic found in every one of them
3 since their patterns are identical in all the females
4 since they are as common as the mammary glands

(8) 空所(**あ**)(**い**)に入れるのに最も適当なものを下記の中からそれぞれ1つずつ選んで，その番号を**解答用マークシート**にマークしなさい。ただし，同じものを2回用いてはいけません。

1 apply
2 multiply
3 reply
4 supply

(9) 下線部(ク)の(　　)内の語を文意が通るように最も適当な順序に並べ換え，並べた順序に従ってその番号を上から順に**解答用マークシート**にマークしなさい。

(10) 次の英文について，本文の内容に**一致する**ものには**正**を，**一致しない**ものには**誤**を，それぞれ**解答用マークシート**にマークしなさい。

(a) Steen Rasmussen's research as well as Craig Venter's will create a new life form if successful.

(b) The author argues that the discovery of a shadow biosphere will be more important than the creation of new life forms.

(c) Many biologists expect a second genesis to have happened recently if there had actually been one.

(d) The author admits that some of the life forms that may have arisen from a second genesis may not have survived.

(e) Paul Davies argues that shadow biospheres have not been found because a lot of life on Earth is still unexamined.

(f) Carol Cleland argues that discovering shadow biospheres would be easier if you were an alien biologist.

2 次の英文について，各空所に入れるのに最も適当なものを下記の中からそれぞれ1つずつ選んで，その番号を**解答用マークシート**にマークしなさい。ただし，同じものを複数回用いてはいけません。また，文頭に来る語も小文字で記してあります。 (18点)

Finally there is a simple solution to the growing problems of deforestation and the greenhouse effect — dropping millions of trees out of an aircraft

((1)) but it has come from The Lockheed Martin Aerospace Company, USA. The company has proposed to transform equipment installed in huge C-130 military transport planes for laying carpets of *landmines across combat zones, to plant trees in barren areas

A company named Areal Forestation Inc. has already been set up to market the idea. According to a spokesperson at Lockheed, "there are 2, 500 C-130 planes in 70 countries, so the delivery system for planting forests is widely available as ((2)), waiting for someone to hire them"

The promoters believe that with the new planting system, almost 900, 000 young trees can be planted in a day. The possibilities are amazing as ((3)), planting more than 3, 000 tree cones a minute in a pattern across the landscape Each cone contains a young tree and that's around 900, 000 trees in a day

The tree cones are pointed and designed to bury themselves in the ground at a uniform depth as if ((4)) They contain fertilizers and a material that soaks up surrounding moisture, watering the roots of the tree The containers are made of a kind of metal that *biodegrades immediately so that ((5)).

The argument is — a man on the ground can only plant 1, 000 trees a day, so if we are to combat global warming, ((6)). It is believed that the system will work in any area that used to contain trees and even in deserts

(Notes)

landmine：投下爆弾，地雷

biodegrade：生物分解される

1 airborne planting is probably the only way

2 most planes are lying on military air bases

3 planes can fly at 1, 000 feet

4 the idea may sound bizarre

5 the tree can put its roots into the soil

6 they had been planted by hand

3 次の英文の下線部(1)～(5)について，(　　)内の語または語句を文意が通るように最も適当な順序に並べ換え，並べた順序に従ってその番号を上から順に**解答用マークシート**にマークしなさい。ただし，文頭に来る語も小文字で記してあります。　(25点)

Vegetarians are people who do not eat meat, poultry, fish or any animal products.

People choose to be vegetarians for various reasons. The Buddhists of India (1) (1 animals 2 food 3 for 4 kill 5 refuse 6 to) because their religion teaches that they should not harm other living things (2) (1 animals 2 believe 3 is 4 killing 5 morally wrong 6 some). Many particularly object to the ways in which animals for slaughter are treated and to the conditions in which they are kept. Some people choose a vegetarian diet simply because they think (3) (1 avoid 2 eating 3 healthier 4 is 5 it 6 to) meat.

In a world where millions of people are starving, many choose to be vegetarians because they believe that producing meat is actually (4) (1 a 2 an inefficient 3 feeding 4 of 5 population 6 way) They say that it would be easier to feed all the people in the world by growing vegetables rather than using vital land to grow food for animals to support the meat-rich diets of wealthier countries. One person could live for five years off just one acre of land growing soya beans, while the same acre could only feed that person for four months (5) (1 barley 2 for 3 growing 4 if 5 to 6 used) feed a beef steer