

平成26年度一般入学試験問題

外国語（英語）

【注意事項】

1. この問題用紙には答案用紙が挟み込まれています。試験開始の合図があるまで問題用紙を開いてはいけません。
2. 試験開始の合図があれば、問題用紙と答案用紙の受験番号欄に受験番号を記入して下さい。
3. 問題用紙には計5問の問題が英1～英8ページに記載されています。落丁、乱丁および印刷不鮮明な箇所があれば、手をあげて監督者に知らせ下さい。
4. 解答を答案用紙の指定された場所に記入して下さい。
5. 問題用紙の余白は下書きに利用しても構いません。
6. 問題用紙を持ち帰ってはいけません。

受験番号	
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〔問 1〕 英文[1][2][3]にある下線部(1)～(15)に入るように各語群にある単語を並べ替えなさい。

[1]

⁽¹⁾() () () () (), there will always be some uncertainty in prognosis. This uncertainty is difficult for patients ⁽²⁾() () () () () with. For patients, not knowing what the future will bring is psychologically difficult. Worrying about the future ⁽³⁾() () () () () enjoy the present. They may be ⁽⁴⁾() () () () () out whether things are getting better and therefore become hyperaware of any physical changes that occur. Families may spend a great deal of time acquiring information ⁽⁵⁾() () () () () () about what the future will bring and may focus excessively on the medical details. For both patients and family members, anxiety may increase.

- (1) 語群: do / matter / no / we / what
- (2) 語群: and / deal / families / their / to
- (3) 語群: ability / impede / may / their / to
- (4) 語群: by / consumed / figure / to / trying
- (5) 語群: an effort / in / learn / more / to

[2]

Nothing is quite as comforting as a warm cup of tea on a cold day, especially when shared with a friend. New research indicates that tea contains numerous beneficial constituents and suggests that ⁽⁶⁾() () () () () actually provide significant health benefits, especially if you choose green tea. But like coffee, tea contains a significant amount of caffeine (green tea contains less than black), which isn't healthy ⁽⁷⁾() () () () (). Fewer people in the United States are addicted to tea than to coffee, ⁽⁸⁾() () () () () nevertheless. If you brew it strong and drink numerous cups daily, you may be dependent on the caffeine it provides to ⁽⁹⁾() () () () (). You can test your dependency by skipping your daily dose (remember to skip the cola, chocolate, and coffee, too!). If you feel fine, then you're in control of your caffeine intake. If you experience withdrawal symptoms, you need to ⁽¹⁰⁾() () () () ().

- (6) 語群: a day / a few / cups / enjoying / may
- (7) 語群: amounts / if / in / large / taken
- (8) 語群: addictive / be / but / can / tea
- (9) 語群: day / power / through / you / your
- (10) 語群: back / cut / find / to / ways

[3]

Plants produce flowers for one reason only—to attract pollinators, such as bees, butterflies and other insects, which go from flower ⁽¹¹⁾() () () () () a nutritious meal of nectar and pollen. As they feast, their bodies get dusted with the plant's powdery pollen—fine grains containing sperm cells produced by the male part of the flower. When the insect alights on another plant, some of the pollen on its body brushes off and finds its way to the female part of a new flower, ⁽¹²⁾() () () () (). The result is seed and the next generation of plants.

Scent acts as a long-range signal carried on the wind and, once on the final approach to a flower, an insect is guided in by a barrage of visual clues, such as color and shape. Flowers ⁽¹³⁾() () () () () of scents to attract insects. Once an insect learns that ⁽¹⁴⁾() () () () () with a reward, it just ⁽¹⁵⁾() () () (). Floral scents sometimes mimic an insect's pheromones (the chemicals used to attract a mate for reproduction), in which case an insect might think it's in for more than just a meal.

(11) 語群: flower / in / of / search / to

(12) 語群: enabling / fertilization / place / take / to

(13) 語群: a / evolved / have / range / vast

(14) 語群: a / associated / is / particular / smell

(15) 語群: back / coming / for / keeps / more

〔問2〕 空所に入る最もふさわしい語句を(ア)～(オ)から選びなさい。

(1) My co-worker looked different because his hair was shorter, with the front () to the side.

(ア) sweeps (イ) swept (ウ) had swept (エ) is sweeping (オ) was swept

(2) I widened my (), impressed by what my friends had done for me.

(ア) arms (イ) back (ウ) eyes (エ) mouth (オ) neck

(3) () more relaxing than taking a hot spring bath after a long hike in the mountains?

(ア) Are you (イ) How is (ウ) Is it (エ) What could be (オ) Who has a

(4) My heart was () as I pictured the worst of what might happen.

(ア) beating (イ) functioning (ウ) racing (エ) stopping (オ) working

(5) There wasn't () in talking my father into buying a new car.

(ア) any point (イ) a lot (ウ) many hours (エ) much care (オ) some chance

(6) The patient has been having some chest pains off and on for more than a month, but today they're not going ().

(ア) away (イ) in (ウ) out (エ) round (オ) through

(7) () the while, he was waiting around to seize the opportunity.

(ア) All (イ) But (ウ) None (エ) Once (オ) Worth

(8) We () a glimpse of the shooting star in the sky last night.

(ア) can catch (イ) catch (ウ) caught (エ) caught (オ) have been catching

(9) My mother was always worried about something or ().

(ア) else (イ) less (ウ) like (エ) nothing (オ) other

(10) () it's only hours before the deadline, I still have much data processing to complete.

(ア) Consequently (イ) Even though (ウ) However (エ) Since (オ) Unless

[問3] 次の英文を読んで、下記の設問に答えなさい。

Our bodies change as we age. Looking stooped, for example, is a common sign of ageing. Most medieval pictures of the old show a bent back and a stick, and this continued into the twentieth century. In ancient Roman times, Virgil complained that “all the best days of life slip away from us poor mortals first: illness and dreary old age and pain sneak up, and the fierceness of harsh death snatches us away.” Plutarch too had a gloomy image of old age, likening it to autumn. When children are asked how they can tell when people are growing old, they list physical attributes. Here we look at the major and minor physical health changes that are linked to ageing.

Ageing is not a disease, but is a multi-factorial process that leads to the progressive loss of functions. ^(ア)We are all too well aware of normal bodily changes as we age. We initially get a bit slower and then a little grey and bald, and then wrinkles come and memory goes. Cross-sectional studies of ageing tend to depict an essentially smooth and progressive decline of physiological function with increasing chronological age. However, although the young have high functional values and the very old low, between these limits values are widely scattered. There is no simple linear relation between age and functionality. ^(イ)When I meet some old friends whom I have not seen for some time I sometimes say, “Shall we start at the top or the bottom?” We then tell about the pain in our foot, and work up the body to describe how our brain has declined.

One of the fairy tales collected by the Brothers Grimm in the early nineteenth century, “The Old Hound,” illustrates changes brought about by age:

A hound who had served his master well for years, and had run down many a quarry in his time, began to lose his strength and speed owing to age. One day, when out hunting, his master startled a powerful wild boar and set the hound at him. ^(ウ)The latter seized the beast by the ear, but his teeth were gone and he could not retain his hold; so the boar escaped. His master began to scold him severely, but the hound interrupted him with these words, ^(エ)“My will is as strong as ever, master, but my body is old and feeble. You ought to honor me for what I have been instead of abusing me for what I am.”

Another of Grimms’ fairy tales, “The Duration of Life,” collected from a peasant in his field in 1840, presents a pessimistic outcome but adds a playful teleological explanation:

When God created the world he gave ^(オ)the ass, the dog, the monkey and man each a life-span of thirty years. The ass, knowing that his was to be a hard existence, asked for a shorter life. God had mercy and took away eighteen years. The dog and the monkey similarly thought their prescribed lives too long, and God reduced them respectively by twelve and ten years. Man, however, considered the thirty years assigned to him to be too brief, and he petitioned for a longer life. Accordingly, God gave him the years not wanted by the ass, the dog, and the monkey. ^(カ)Thus man lives seventy years. The first thirty are his human years, and they quickly disappear. Here he is healthy and happy; he works with pleasure, and enjoys his existence. The ass’s eighteen years follow. Here one burden after the other is laid on him; he carries the grain that feeds others, and his faithful service is

rewarded with kicks and blows. Then come the dog's twelve years, and he lies in the corner growling, no longer having teeth with which to bite. And when this time is past, the monkey's ten years conclude. Now man is weak headed and foolish; he does silly things and becomes a laughing stock for children.

There are few if any organs in our body that do not decline in their function with age, and many deaths are due to age-related illnesses. ^(キ)But not everything is bad news. A major study by ELSA (English Longitudinal Study of Ageing) in the UK is designed to find out about the health of the elderly, and participants are interviewed every two years. It is encouraging and impressive that 60 per cent of those aged 80-plus describe their health as good to excellent. But that does mean that 40 per cent have health problems. The study also found that while arthritis is age-related, joint pain and back pain were not, and were no more common among the elderly than the young.

- (1) 下線部(ア)にある normal bodily changes について本文にある具体例を示しながら、和訳しなさい。
- (2) 下線部(イ)を和訳しなさい。
- (3) 下線部(ウ)が示すものは何か、日本語で書きなさい。
- (4) 下線部(エ)を和訳しなさい。
- (5) 下線部(オ)にある 3 つの動物の名前を日本語で記して、結果的に寿命がそれぞれ何年になったか、数字で答えなさい。
- (6) 下線部(カ)にある人間はどのような人生を年齢ごとにたどるのか、日本語で説明しなさい。
- (7) 下線部(キ)の理由を日本語で説明しなさい。

〔問 4〕 次の英文を読んで、下記の設問に答えなさい。

In 1959, Professor Frank Johnson invited me to work at his Princeton laboratory owing to my success in *Cypridina* work. In September 1960, shortly after my arrival at Princeton, Dr. Johnson asked me if I would be interested in studying the bioluminescence of the jellyfish *Aequorea*. I was strongly impressed by his description of the brilliant luminescence and the abundance of the jellyfish at Friday Harbor in the state of Washington. I agreed to study the jellyfish.

Early in the summer of 1961, we traveled from Princeton, NJ, to Friday Harbor, WA, driving 5,000 kilometers. Friday Harbor was a quiet, peaceful small village at the time. The jellyfish were abundant in the water. At the University of Washington laboratory there, we carefully scooped up the jellyfish one by one using a shallow dip net. The light organs of *Aequorea aequorea* are located along the edge of the umbrella, which we called a ring. The ring could be cut off with a pair of scissors, eliminating most of the unnecessary body part.

At the time, it was a common belief that the light of all bioluminescent organisms was produced by the reaction of luciferin and luciferase. Therefore, we tried to extract luciferin and luciferase from the rings of the jellyfish. We tried every method we could think of, but all our efforts failed. After only a few days of work, we ran out of ideas.

I was convinced that the cause of our failure was the luciferin-luciferase hypothesis that dominated our mind. I suggested to Dr. Johnson that we forget the idea of extracting luciferin and luciferase and, instead, try to extract a luminescent substance whatever it might be. However, I was unable to convince him. Because of the disagreement on experimental method, I started to work alone at one side of a table, while, on the other side, Dr. Johnson and his assistant continued their efforts to extract a luciferin. It was [ア] situation.

Since the emission of light means the consumption (loss) of active bioluminescent substance, the extraction of bioluminescent substances from light organs must be performed under a condition that reversibly inhibits the luminescence reaction. Therefore, I tried to reversibly inhibit luminescence with various kinds of inhibitors of enzymes and proteins. ^(イ)I tried very hard, but nothing worked. I spent the next several days soul-searching, trying to find out something missing in my experiments and in my thought. I thought day and night. I often took a rowboat out to the middle of the bay to avoid interference by people. One afternoon, an idea suddenly struck me on the boat. It was a very simple idea: "Luminescence reaction probably involves a protein. If so, luminescence might be reversibly inhibited at a certain pH."

I immediately went back to the lab and tested the luminescence of light organs at various pHs. I clearly saw luminescence at pH 7, 6 and 5, but not at pH 4. I ground the light organs in a pH 4 buffer, and then filtered the mixture. The cell-free filtrate was nearly dark. But it regained luminescence when it was neutralized with sodium bicarbonate. The experiment showed that I could extract the luminescence substance, at least in principle.

^(ウ)But a big surprise came the next moment. When I threw the extract into a sink, the inside of the sink lit up with a bright blue flash. The overflow of an aquarium was flowing into

the sink, so I figured out that seawater had caused the luminescence. Because the composition of seawater is known, I easily found out that Ca^{2+} activated the luminescence. The discovery of Ca^{2+} as the activator suggested that the luminescence material could be extracted utilizing the Ca-chelator EDTA, and we devised an extraction method of the luminescent substance.

During the rest of the summer of 1961, we extracted the luminescent substance from about 10,000 jellyfish. After returning to Princeton, we purified the luminescent substance and obtained a few milligrams of purified protein. The protein emitted blue light in the presence of a trace of Ca^{2+} . We named the protein aequorin. Aequorin was the first example of photoproteins discovered. During the purification of aequorin, we found another protein that exhibited a bright green fluorescence. ^(x)It was only in a trace amount, but we purified this protein too, and called it "green protein." The protein was renamed "green fluorescent protein" by Morin and Hastings (1971).

(1) 空所[ア]に入るのはどれか、ひとつ選びなさい。またその理由を日本語で説明しなさい。

- ① an amazing, thrilling
- ② an awkward, uncomfortable
- ③ a committed, rewarding
- ④ a spectacular, inspiring
- ⑤ a tedious, mundane

(2) 下線部(イ)を和訳しなさい。

(3) 下線部(ウ)を和訳しなさい。

(4) 下線部(エ)を和訳しなさい。

〔問 5〕 下線部(1)、(2)を英訳しなさい。

森には、二つの大きな作用があります。⁽¹⁾一つは、水の流れを緩和する作用です。一度に激しく降った雨水を、根を張った土壤中に保つことによって、川や地下にゆっくりと流し出す作用です。もう一つは、葉から空中へ蒸発させる作用です。これは木があることによって水が消費されるという現象です。蒸発する水を「緑の水」、ゆっくりと川へ流れる水を「青の水」と呼ぶそうです。森の中の水の動きを研究するのは、森林水文学という分野です。日本には森が多いのですが、この分野の研究者は少ないようです。

人工林の管理ができていない場合、木が多いために蒸発量が多くなります。また、根が表にむき出しになって、保水能力が低くなります。つまり、緑の水が多く、望ましい青の水が少なくなります。⁽²⁾日本の森をどのように維持していくべきか、一〇〇年先、一〇〇〇年先をみすえて、国としての策を立てる必要があるでしょう。