

平成25年度

11時20分～12時50分

英 語

問 題 用 紙 1 ～ 7 頁

解 答 用 紙 1 頁

注 意 事 項

1. 試験開始の合図〔チャイム〕があるまで、この注意をよく読むこと。
2. 試験開始の合図〔チャイム〕があるまで、この問題の印刷されている冊子を開かないこと。
3. 試験開始の合図〔チャイム〕の後に問題用紙ならびに解答用紙の定められた位置に受験番号、氏名を記入すること。
4. 解答はかならず定められた解答用紙のそれぞれ定められた位置に、問題の指示に従って記入すること。
5. 解答はすべて黒鉛筆を用いてはっきりと読みやすく書くこと。
6. 質問は文字に不鮮明なものがあるときにかぎり許される。
7. 問題に、落丁、乱丁の箇所があるときは手をあげて交換を求めること。
8. 試験開始後60分以内および試験終了前10分間は、退場を認めない。
9. 試験終了の合図〔チャイム〕があったとき、ただちに筆記用具を置くこと。
10. 試験終了の合図〔チャイム〕の後は、問題用紙および解答用紙はすべて本表紙を上にして、通路側から解答用紙、問題用紙の順に並べて置くこと。いっさい持ち帰ってはならない。なお、途中退場の場合は、すべて裏返しにして置くこと。
11. その他、監督者の指示に従うこと。

受験番号		氏 名	
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以下の [A] 及び [B] は、それぞれニューカレドニアカラスに対して行った実験である。それぞれの英文を読み、問題に答えなさい。

[A]

The New Caledonian crow is one of the few birds that searches for food with twigs, a form of tool use. Now, three English researchers have discovered that one such crow, a captive female, has gone a step further. To obtain out-of-reach food, the crow repeatedly took a piece of straight wire and bent it to create a hook. New Caledonian crows living in the wild do create hooked tools from twigs or small branches, but this captured crow did something very different. "To our knowledge, there are no confirmed reports of any animal making a hook out of unnatural material, such as wire, to solve a new problem," said one of the researchers. "The surprising thing about our crow is that, faced with a new problem, she worked out a new solution by herself," he continued. "In the wild, New Caledonian crows make hooks by working on twigs, but they live in social groups and follow age-old techniques in response to problems that the species may have been exposed to for thousands of years."

The crow, named Betty, was caught as a young bird in Yat , New Caledonia, in March 2000. Since then, she has shared a large indoor room and a small outdoor birdcage with a male crow, Abel (Abel spent ten years in a New Caledonia zoo). An opening leads from the indoor room to a testing area. (a)Betty's toolmaking abilities were discovered by accident during an experiment in which she and Abel had to choose between a hooked and a straight wire for retrieving small pieces of their favorite food. When Abel took the hooked wire, Betty bent the straight wire into a hook and used the tool to remove the piece of meat from a test tube. This experiment was the first time the crows had been given a wire.

The researchers then designed (b)a new experiment to test Betty's surprising behavior systematically. They placed one straight piece of wire on top of the tube and waited for either crow to try retrieving the food. In her ten successful tries, Betty bent the wire into a hook nine times. Abel retrieved the food once, without bending the wire. Betty almost always tried to get the food with the straight wire first. She then made hooks of varying shapes by sticking one end of the wire under some sticky tape, or by holding it in her feet, while pulling the other end with her beak.

The researchers say that Betty's creation of hooks cannot be explained as random or



unplanned behavior that has been strengthened through successful use. And since she had no other crows to model, no training with flexible objects, and very limited experience with wire before the experiment, they see her actions as (A). “To solve a new problem, she did something she had never done before,” said one of the researchers. “Naturally, she must have used skills she acquired doing other tasks in the past, but she showed the ability to solve a new problem in a creative way by using her experience. Betty’s accomplishment—modifying objects with intention into tools without earlier experience—is almost unknown in the animal world.”

〔1〕 下線部 (a) を日本語に訳しなさい。

〔2〕 下線部 (b) の具体的な内容と、その結果を述べなさい。

〔3〕 空所 (A) に入る最も適切な英語を、選択肢から選び、記号で答えなさい。

(ア) creative and systematic

(イ) wild and essential

(ウ) critical and scientific

(エ) potential and surprising

(オ) unique and purposeful



[B]

New Caledonian crows are known for their intelligent and creative use of tools, such as twigs, which they use to fish nutritious insects out of holes and cracks. In (a) this study, psychologists examined the recognition skills of the famously clever New Caledonian crows. Scientists captured ten wild birds and placed them in large cages in order to record their behavior in response to mirrors.

(b) カラスは皆、あたかも別のカラスを見ているかのように、鏡に映った自分の姿に反応した; the birds made rapid head movements, raised their tails and even attacked the reflection. The head researcher said (c) the crows' strong reaction to their mirror image "was not surprising." He explained that an animal usually has frequent exposure to mirrors before it begins to display an understanding that the image it is seeing is itself. When the crows moved away from the mirror and lost sight of their reflection, they frequently searched behind the mirror to locate the "other" bird. The researchers point out that similar reactions have been recorded in primate infants and two-year-old children. (d) The second part of the experiment, though, showed some surprising findings. The scientists designed a task to test whether the crows could use mirrors to locate pieces of meat that were hidden from direct view. They placed a mirror on the ground and a perch* above that mirror. Then, they hung the meat underneath the perch so that the crows would see the reflection of the meat in the mirror.

These tested crows appeared to understand how the meat's reflection was related to its location. "We were amazed at how quickly the crows learned to use a mirror reflection to locate hidden food. Usually, it takes longer for an animal to start using the characteristics of mirrors to find otherwise unseeable objects," the researchers said. Some of the crows were more skillful than others. One of the researchers suggested that the difference in ability proved that they were not using their sense of smell to find the food. Importantly, the best crow was not able to find the food when the mirror was turned over, thus removing the reflection. This showed that the crows were probably solving the problem by relying only on the visual information available in the mirror. The results put the birds in an elite group of species—which includes primates and elephants—known to be able to process mirror information.

Previous studies have shown that African grey parrots, great apes, dolphins, monkeys and Asian elephants all share the ability to process mirror information. (A) they say the New Caledonian crows are unique in the group (B) they are wild animals. According



the researchers, the other tested animals are usually kept in environments such as a zoo or an aquarium. (C) it is difficult to know how much of their problem solving skill comes from their experience and training with humans and how much would develop naturally in the wild.

注) perch* 止まり木

〔1〕下線部 (a) を具体的に説明しなさい。

〔2〕下線部 (b) の日本語を英語に訳しなさい。

〔3〕下線部 (c) に関して、研究者がこのように述べた理由を答えなさい。

〔4〕下線部 (d) が示す内容を2つあげなさい。

〔5〕空所 (A) ～ (C) に入る最も適切な英語を、選択肢から選び、記号で答えなさい。
(文頭にくるものも、すべて小文字で表記してある。)

(ア) because

(イ) besides

(ウ) but

(エ) therefore

(オ) unless

(カ) while

〔6〕[A] 及び [B] の両方の内容を基に、最も適切なものを選択肢から1つ選び、記号で答えなさい。

(ア) 野生で集団生活をするニューカレドニアカラスの方が、捕獲されたものよりも、様々な道具を使いこなすことができる。

(イ) 野生のニューカレドニアカラスとしての能力を発揮できる状況は、限られている。

(ウ) ニューカレドニアカラスは、小枝や鏡など道具を使った遊びを通して、知性を高めている。

(エ) ニューカレドニアカラスは、ある状況下での経験を、環境に適応するために短期間で工夫する能力がある。

(オ) ニューカレドニアカラスは、道具を工夫して使うことにおいて、鳥類カラス科の中では、知性が高く、エリートである。



2 次の英文を読み、問題に答えなさい。

Half of all plant-based medicines are derived from plants in tropical rain forests around the world. In fact, 70% of medicines for cancer come from rain forest plants. Aspirin and many other drugs come from rain forest plants, too. These plants are valuable in that they are composed of unique chemicals that have been synthesized (A) millions of years. The wide diversity of plant species found in rain forests provides scientists a great resource for many new medicines. However, scientists have tested only one percent of rain forest plants.

How are plants in the rain forest used to make drugs? When a plant with possibilities is discovered in the rain forest, it is harvested and then analyzed for its chemical structure. Chemical compounds are extracted from the plant and broken (B) into components that are scientifically investigated (C) their potential use. Chemists compare the molecules in the tropical plant compound to the molecular structure of other known chemicals. The plant molecules may be altered to produce the required effect.

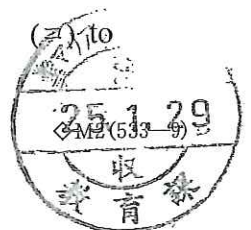
Even if the plant molecules have potential as a drug, the plants might not be available (D) quantities sufficient to produce enough of the necessary chemicals to make a medicine. Or, in some cases, there is enough of a particular compound, but it has some toxic side effects. In such cases, drug development companies are using synthetic support to further examine the chemicals they need from the rain forest plant. The natural product from the rain forest plant is used as a model and then modified to reduce toxicity and/or improve the potency of the compound. (E) a result of this process, new chemicals can be developed to be used as a medicine.

The process of getting a plant from the rain forest to the market as a safe and effective drug is long and costly. It could cost a company more than \$800 million and take as many as 12 years to produce a successful drug. For every 10,000 to 20,000 tropical plant compounds discovered and tested, only one is approved and makes it to the market.

〔1〕 空所(A)～(E)に入る最も適切な英語を選択肢から選び、記号で答えなさい。但し、同じ選択肢を重複して使用してはならない。

(文頭にくるものも、すべて小文字で表記してある。)

- | | | | | |
|--------|--------|----------|----------|----------|
| (ア) as | (イ) at | (ウ) down | (エ) for | (オ) from |
| (カ) in | (キ) of | (ク) on | (ケ) over | (コ) to |



〔2〕 本文と内容が合致するものを、選択肢から2つ選び記号で答えなさい。

- (ア) Rain forests are precious because ingredients from tropical plants may have medicinal value.
- (イ) Only one percent of tropical plants have the potential to be produced as a medicine for treating cancer.
- (ウ) The key to producing a new medicine from a tropical plant is that some chemicals in the plant should cause toxic side effects.
- (エ) One of the conditions is that the amount available of the plants has to be large enough to produce a new medicine.
- (オ) Each plant-based drug may contain 10,000 to 20,000 chemical components which are carefully examined by scientists.

3 次の〔1〕～〔5〕には、それぞれ1箇所間違いがある。間違いのある箇所を記号で答えなさい。

- 〔1〕 The causes of (a)most of the (b)phenomena that we had to consider carefully (c)are required (d)more investigation.
- 〔2〕 The important fact we (a)should know (b)is that chlorine (Cl) is (c)harmful, not the substances (d)which it reacts.
- 〔3〕 The university (a)where you are going to study from now on (b)is locating in the city (c)which is famous for its beautiful (d)landscapes.
- 〔4〕 (a)Get more exercise (b)appears to (c)be the best way (d)to lose weight.
- 〔5〕 (a)Taking a walk along a hillside, I found (b)it (c)covering with beautiful flowers that (d)had never seen before.



4 次の英文の()に入る最も適切なものを枠内から選び、必要があれば正しい形に直して書きなさい。

[1] We spent the afternoon () an old castle.

[2] When we discussed how much our wedding was going to cost, it eventually () over 1 million yen.

[3] Students can wear what they like now. The principal of the school has () the school uniform.

[4] I gave her a present to () all the trouble I had caused.

[5] How could I have () such an obvious trick? I'm not usually taken in like that.

add up to	give away to
catch up with	look around
do away with	make up for
fall back	stand for
fall for	turn around

