

平成 30 年 度

試 験 問 題 ②

学 科 試 験

(9 時 ~ 12 時)

【注 意】

1. 試験開始の合図があるまで、この問題冊子の中をみてはならない。
2. 試験教科、試験科目、ページ、解答用紙および選択方法は下表のとおりである。

教 科	科 目	ペー ジ	解 答 用 紙 数	選 択 方 法
数 学	数 学	1 ~ 12	2 枚	数学、英語は必須解答とする。 理科は左の3科目のうちから1科目を選択せよ。
英 語	英 語	13 ~ 16	3 枚	
理 科	化 学	17 ~ 28	2 枚	
	生 物	29 ~ 44	2 枚	
	物 理	45 ~ 54	1 枚	

3. 監督者の指示に従って、選択しない理科科目を含む全解答用紙(10枚)に受験番号と選択科目(理科のみ)を記入せよ。
 - ① 受験番号欄に受験番号を記入せよ。
 - ② 理科は選択科目記入欄に選択する1科目を○印で示せ。

上記①、②の記入がないもの、および理科2科目または理科3科目選択した場合は答案全部を無効とする。
4. 解答はすべて解答用紙の対応する場所に記入せよ。
5. 問題冊子の余白を使って、計算等を行ってもよい。
6. 試験開始後、問題冊子の印刷不鮮明、ページの落丁・乱丁および解答用紙の汚れ等に気づいた場合は、手を挙げて監督者に知らせよ。
7. 解答用紙はいずれのページも切り離してはならない。
8. 解答用紙は持ち帰ってはならない。問題冊子は持ち帰ってよい。

—余 白—

(このページに問題はありません)

英 語

I. 次の英文を読んで、設問に答えよ。(*印の語には注がある。)(90点)

Plants will release far less extra CO₂ in a warming world than previously assumed, (1)giving humans a bit more room in the fight against climate change, scientists reported recently. Despite this good news, efforts to reduce greenhouse-gas* emissions* must still be increased to avoid severe climate impacts, the researchers cautioned.

Earth's plants and soil microbes* absorb and release huge quantities of heat-trapping* CO₂, the main cause of global warming. Over the course of a year, land-based plants emit — in a process called (2)respiration — 117 to 118 billion tons of carbon* into the atmosphere, six times as much as humans release by burning fossil fuels*. At the same time, through photosynthesis*, they absorb about 120 billion tons. This 2-3 billion ton surplus makes the land-based plant kingdom a “net sink” for CO₂ that removes up to 30 percent of human-generated carbon pollution from the air.

However, there's a problem: when air temperatures climb, plants start to release extra CO₂ with no change in the amount absorbed. “All it would take is for global respiration to increase by 3 percent to shift the land surfaces from a ‘sink’ to a ‘source’, — Peter Reich, lead author of the study and a professor at the University of Minnesota, said. Earlier experiments had shown that leafy trees exposed to a temperature increase of 3-4 degrees would quickly begin to pump out an additional 20 percent of CO₂ or more.

In December, the world's nations agreed in Paris to hold the rise in global surface temperatures to “below 2 degrees,” but (3)we are currently on track for an increase possibly twice that size by century's end.

Computer models used by climate scientists to project changes in greenhouse gas emissions assume respiration — the output of CO₂ — increases over the long-term the same way it does over the course of a few hours, Reich said. However, nobody had bothered to check if (4)this was actually true. To find out, Reich and colleagues set up a

heated environment in the wild in 2009 for some 1,200 trees that included the 10 dominant North American temperate-zone* species. In an experiment lasting five years, they kept temperatures at 3.4 degrees above seasonal averages. To their surprise, the researchers discovered that — over the long term — all 10 species adapted to their new conditions: CO₂ output increased by only five percent rather than the 23 percent predicted under earlier models. “Adaptation eliminated 80 percent of the increase,” Reich said.

This suggests that “the associated increase in atmospheric CO₂ concentrations from global warming may be much less than anticipated.” Though significant, this does not lessen the pressure to cut carbon pollution, he warned. “The problem we created in the first place with our greenhouse gas emissions still exists,” Reich said.

Pierre Freidlingstein, a climate modeling expert at the University of Exeter in England, said the study did, indeed, show that leafy trees adjust to warming temperatures. However, he cautioned that the implications may be less important than advertised. “This paper is not a game changer” when it comes to global warming, he said. While Earth’s living forests take up more CO₂ than they give off, cutting down forests is (5) a double threat: Trees release stored-up CO₂ when cut down and burned, and reducing the surface area covered by forests means fewer plants remain to absorb CO₂. An area of forests twice the size of France has been lost in the last 25 years, mainly to expanding agriculture and urbanization.

注

greenhouse-gas* 温室効果ガス

emissions* 放出, 排出

microbes* 微生物

heat-trapping* 熱を閉じ込める

carbon* 炭素

fossil fuels* 化石燃料 (石油, 石炭など)

photosynthesis* 光合成

temperate-zone* 温帯

設問

1. 下線部 (1) は具体的にどのようなことを指すのか, 日本語で記せ. (20 点)
2. 下線部 (2) の “respiration” がこの記事の中で用いられている意味を, 日本語で記せ. (10 点)
3. 下線部 (3) の指す内容を具体的に日本語で記せ. (20 点)
4. 下線部 (4) の指す内容を日本語で記せ. (20 点)
5. 下線部 (5) の指す内容を日本語で記せ. (20 点)

II. Write approximately 120 words in English about how you believe global warming will affect Japan in the future. This task will be marked on both content and English language. (別紙解答用紙IIの様式にしたがって論述せよ。) (40 点)

III. Write about your best friend or classmate in English in approximately 80 words. This task will be marked on both content and English language. (20 点)

