

令和3年度(2021年度)  
東北大学大学院環境科学研究科  
博士課程前期2年の課程 入試問題

(令和3年4月入学)  
〔一般選抜〕

英語  
環境・地理群

令和2年8月25日 13:00~14:30 実施

注意事項

1. 机の上には受験票, 筆記用具, 時計以外は置いてはいけません.
2. 合図があるまで問題冊子を開いてはいけません.
3. 試験時間は13:00から14:30までです.
4. 問題冊子1部, 解答用紙(3枚), 草案用紙(1枚)を配布します.
5. 問題は1.から4.まで計4問が出題されていますが, すべてを解答します.
6. 解答はすべて解答用紙に記入します.  
解答用紙の所定の欄に問題番号および受験記号番号を明記します. 氏名は記入しないこと. また問題によって解答用紙を別にします.
7. 問題冊子は持ち帰らないで下さい.

1 次の(1)~(5)の語句に最も意味が近い語をそれぞれ A)~D)から 1 つずつ選べ。

Choose an appropriate word of the closest meaning to each question from the list of A) to D).

(1) extremely small

- A) immature      B) indefinite      C) variable      D) minuscule

(2) place in a particular class or group

- A) classify      B) channel      C) divorce      D) clarify

(3) a long narrow stem of a plant

- A) branch      B) stalk      C) leaf      D) roots

(4) present or experienced to a severe or intense degree

- A) critical      B) unexpected      C) unbelievable      D) unusual

(5) scheme

- A) methodology      B) plan      C) theme      D) purpose

2 次の英文の空欄に適切な単語をそれぞれ A)~D)から 1 つずつ選べ。

Choose an appropriate word from the list of A) to D) to fill in the blank.

(1) The dean of the graduate school recently issued a major update to its \_\_\_\_\_ regulations on COVID-19.

- A) safe      B) safeties      C) safety      D) safely

(2) Please send all research papers \_\_\_\_\_ the Environmental Studies Lab. in Tohoku University to the library office immediately.

- A) from      B) during      C) out      D) toward

(3) Debate participants in the workshop must be able to defend their arguments on \_\_\_\_\_.

- A) their      B) themselves      C) they      D) their own



3. 以下の文章に関する (1) から (4) の問いに答えよ。

Answer the questions from (1) to (4) concerning the following paragraph.

Some aerosols increase atmospheric reflectivity, whereas others (e.g., particulate black carbon) are strong absorbers and also modify solar shortwave radiation. Indirectly, aerosols also affect cloud albedo, because many aerosols serve as cloud condensation nuclei or ice nuclei. a) This means that changes in aerosol types and distribution can result in small but important changes in cloud albedo and lifetime. b) Clouds play a critical role in climate because they not only can increase albedo, thereby cooling the planet, but also because of their warming effects through infrared radiative transfer. Whether the net radiative effect of a cloud is one of cooling or of warming depends on its physical properties (level of occurrence, vertical extent, water path and effective cloud particle size) as well as on the nature of the cloud condensation nuclei population. Humans enhance the greenhouse effect directly by emitting GHGs such as CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O and chlorofluorocarbons (CFCs). In addition, c) pollutants such as carbon monoxide (CO), volatile organic compounds (VOC), nitrogen oxides (NO<sub>x</sub>) and sulphur dioxide (SO<sub>2</sub>), which by themselves are negligible GHGs, have an indirect effect on the greenhouse effect by altering, through atmospheric chemical reactions, the abundance of important gases to the amount of outgoing longwave radiation such as CH<sub>4</sub> and ozone (O<sub>3</sub>), and/or by acting as precursors of secondary aerosols. Because anthropogenic emission sources simultaneously can emit some chemicals that affect climate and others that affect air pollution, including some that affect both, d) atmospheric chemistry and climate science are intrinsically linked.

(出展: IPCC, The Fifth Assessment Report of the Intergovernmental Panel on Climate Change)

(1) 下線部 a)が指しているものを具体的に説明せよ。

Explain the underlined part a) specifically.

(2) 下線部 b)を和訳せよ。

Translate the underlined part b) into Japanese.

(3) 下線部 c)は greenhouse effect に対してどのような役割を果たしているか、具体的に説明せよ。

Explain the role of underlined part c) to the greenhouse effect.

(4) 下線部 d)の理由を説明せよ。

Explain the reason of underlined part d).

4. 以下の文章を英語に訳しなさい。

- (a) ご質問の 1 番目については、さらに 2 種類の条件を変えた実験が必要となり、すぐにお答えすることが難しいです。2 番目については、時間がないので、このセッションの後、ロビーで議論させてください。
- (b) COVID-19 の世界的な流行は、ロックダウンに代表されるように人々の活動を厳しく制約することとなり、それによって地球温暖化ガスの排出量は大きく減少した。
- (c) この世界的な危機では、様々な部門の意思決定者は多くの生命に関わる迅速な判断を下す必要があるため、正確で時宜を得たデータを発信することが重要となる。