

平成 22 年度(2010 年度)

東北大学大学院理学研究科 地学専攻

博士課程前期 2 年の課程 入試問題

英語

平成 21 年 9 月 2 日 9:30~11:30 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。
試験時間は 9:30 から 11:30 までです。
3. 問題は I、II の 2 問で、受験者全員に共通の問題です。
4. 解答はすべて解答用紙に記入します。解答は大問 1 題ごとに 1 枚の解答用紙を使います。表に書ききれないときは裏も使います。解答用紙の所定の欄に受験番号・氏名・志望分野および問題番号を記入します。

問題 1 次の問 1 および問 2 に答えよ。

問 1 次の英文を和訳せよ。

In the middle of the 20th century, we saw our planet from space for the first time. Historians may eventually find that this vision had a greater impact on thought than did the Copernican revolution of the 16th century, which upset the human self-image by revealing that the Earth is not the centre of the universe. From space, we see a small and fragile ball dominated not by human activity and edifice but by a pattern of clouds, oceans, greenery, and soils. Humanity's inability to fit its activities into that pattern is changing planetary systems, fundamentally. Many such changes are accompanied by life-threatening hazards. This new reality, from which there is no escape, must be recognized and managed.

Fortunately, this new reality coincides with more positive developments new to this century. We can move information and goods faster around the globe than ever before; we can produce more food and more goods with less investment of resources; our technology and science gives us at least, the potential to look deeper into and better understand natural systems. We have the power to reconcile human affairs with natural laws and to thrive in the process. In this our cultural and spiritual heritages can reinforce our economic interests and survival imperatives.

(出典: Brundtland Report: United Nations World Commission on Environment and Development, 1987, From One Earth to One World: An overview by the World Commission on Environment and Development.)

(参考) fragile: こわれやすい、edifice: 大建築物、investment: 投資、reinforce: 強め合う、imperatives: 規範

問 2 次の和文 (a) および (b) を英訳せよ。

(a) 地球上での人類の苦難にみちた長い進化の過程で、人は科学技術の加速度的な進歩により、自らの環境を無数の方法と前例のない規模で変化させる力を得る段階に達した。

(b) 世界的温暖化の影響力は、氷河の収縮を加速させ、溶けた氷河はチベットの湖を拡大させてきた。

(参考) 苦難にみちた: tortuous、前例のない: unprecedented

問題Ⅱ 次の文章を読み、問1および問2に答えよ。

The earth is composed of higher-density, mostly solid material. Our best information about the nature of this material comes from the rocks at the surface. (a)Drilling on the land and in the sea has allowed us to directly observe the earth to depths of about 9150 m, and analysis of the products of volcanism gives us some ideas of the temperature gradient and rock material down to 200 to 250 km.

Exactly how the earth came to be layered will probably forever remain a mystery. (b)Some geophysicists believe that density layering occurred quickly, as a result of the complete melting of the entire proto-earth, shortly after it came into being in the solar system. In the molten state, the heavier materials could, under the influence of gravity, easily make their way toward the center of the earth, and lighter ones would tend to move outward. Some of the heat needed to produce melting could have come from decay of radioactive isotopes, which were more abundant initially, and some may have been released during gravitational compression of an initially larger, low-density proto-earth into the smaller, more-dense earth we know. (1)しかし、多くの地球科学者は、そのような熱源は地球を完全に溶かすのには不十分であろうと考えている。

Raymond Siever and Franc Press, two prominent American geoscientists, have called the process of density layering and the movement of iron to the center of the earth the “iron catastrophe.” (c)They believe that it may be the most important earth-shaping event that has ever happened. When it occurred, the earth not only became density stratified, but volatile substances, particularly water, were brought from the depths to form our oceans directly and, through a partial dissociation of water, to produce indirectly one of the principal requisites of life-oxygen.

(出典： E.E. Larson & P.W. Birkeland (1982) Putnam's Geology, Oxford University Press から抜粋、一部改変)

(参考) proto-earth:原始地球、 stratify:層を成す、 dissociate:解離する、 requisite:不可欠なもの

問1 下線部(a)～(c)を和訳せよ。

問2 下線部(1)を英訳せよ。