

平成 18 年度（2006 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 17 年 9 月 1 日 9 : 00 ~ 12 : 00 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 : 00 から 12 : 00 までです。
3. 問題は I、II、III の 3 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 題毎に解答用紙を別にします。  
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明記します。

問題 I 以下の英文の下線部①から④を和訳せよ。

As scientists began to discover striking examples of major climatic changes earlier in Earth's history, their curiosity naturally grew about what had happened and why. ①In the middle and late twentieth century, and especially in its last two decades, interest in the study of climate change and its causes grew enormously. The few amateur scientists and university professors who studied climate in relative isolation during the nineteenth century and the early twentieth have now been replaced by thousands of researchers with backgrounds in geology, physics, chemistry and biology working at universities and national laboratories and research centers throughout the world. Today climate scientists use aircraft, ships, satellites, sophisticated new biological and chemical lab techniques, and high-powered computers, among other methods, to carry out their studies.

Studies of climate are incredibly wide-ranging. They vary according to the part of the climate system being studied, including changes in air, water, vegetation, land surfaces, and ice. ②They vary according to the interval of time that is emphasized, from the long-distant geological past going back tens of millions of years or more to historical changes spanning the last several hundred years to changes examined with sophisticated instruments during just the last few decades. Climate studies also vary by the techniques used, including physical and chemical measurements of the properties of air, water, and ice and of life-forms fossilized in rocks; biological or botanical measurements of the myriad shapes of life-forms; and computer simulations to model the behavior of air, water, and vegetation.

③This huge diversity of studies also covers a broad array of scientific disciplines. Some studies are directed solely at improving our understanding of the modern-day climate system: meteorologists study the circulation of the atmosphere, oceanographers explore the circulation or chemistry of the ocean, chemists investigate the composition of the atmosphere, glaciologists measure the behavior of ice, and ecologists analyze life-forms on land or in the water.

Other scientists study changes in climate or climate-related phenomena in Earth's recent or more distant past: geologists explore the broader aspects of Earth's history; geophysicists investigate past changes in Earth's physical configuration (continents, oceans, mountains); geochemists analyze past chemical changes in the ocean, air, or rocks; paleoecologists study past changes in vegetation and their role in the climate system; climate modelers evaluate possible causes of climate change; and historians comb archives for writings that will enable them to reconstruct past climates.

④In recent decades, studies of Earth's climatic history have begun to cross the traditional disciplinary boundaries and merge into an interdisciplinary approach referred to as "Earth system science" or "Earth system history." Such efforts recognize that the many parts of

Earth's climate system are interconnected, so that investigators of climate must look at all the parts in order to understand the whole.

出典 : W. F. Ruddiman (2001): Earth's Climate: Past and Future. W. H. Freeman and Company.

(参考) meteorologists : 気象学者、 disciplinary : 学問分野

**問題Ⅱ** 以下の英文を読み問1から問3に答えよ。

The three most widely used high-tech words in China now are “computer,” “gene,” and “nanometer,” according to the China Association for Science and Technology. The ability to utter these words, of course, does not guarantee that the speaker understands their meanings and implications. I witnessed an episode that illustrates the point. A news reporter asked a woman he was interviewing for a story about nanotechnology if she had ever heard the term “nanometer.” “Yes,” the lady answered. But when the reporter asked her what she thought the word meant, the woman replied that it might denote a special kind of rice. She was in fact drawing upon her knowledge of the language. In Chinese, the word for “meter” has two meanings: One refers to the unit of length, and the other means rice. The woman’s misunderstanding of the term “nanometer,” in this case, is more amusing than concerning. But as nanoscience and nanotechnology become ever more consequential in our lives, we in the scientific community need to better inform and educate the public about the transformations this new nano era is likely to bring.

Along with its fast economic growth, China has embraced a national strategy for rejuvenating the country through education and science and technology. This strategy attaches importance to both fundamental research and the development of technologies that are critical to social and economic development. Among the fields that have enjoyed particularly rapid development in China in the past decade are nanoscience and nanotechnology. These terms refer to the growing knowledge base and technical framework for understanding and manipulating matter on nanometer scales ranging from the atomic to the cellular. Like many other countries, we in China expect that the development of nanoscience and nanotechnology will greatly affect many areas of scientific research and industrial development, and many aspects of everyday life. In time, we hope no one in China will think of rice when they hear the word “nanometer.”

出典 : Chunli Bai (2005) : Essays on Science and Society : Ascent of Nanoscience in China. Science, Vol. 309, Issue 5731, 61-63.

(参考) gene : 遺伝子、 strategy : 戦略、 rejuvenate : 活気づける

問1 インタビューされた女性の誤解について2行以内の日本語で説明せよ。

問2 中国は教育と科学技術でもって国を活性化させようとしている。具体的な方法を4行以内の英文で説明せよ。

問3 日本の事情と比較しながら著者に対する意見を8行以内の英文手紙としてまとめよ。

**問題Ⅲ** 以下の文章は、地球温暖化の原因に対する新たな仮説を論じた文章の一部である。下線部①から③を英訳せよ。

①人間の行動が気候に影響を及ぼし温暖化を引き起こしたのは、産業革命以降のことと考えられている。これは、石炭を燃やす工場や発電所から炭酸ガスが大気中に大量に放出されたからである。②しかし、炭酸ガスは農耕の発展により 8,000 年前には既に増加していた。それは、穀物栽培のために伐採された木が燃やされたり腐敗したために、炭酸ガスが大気中に放出されたからである。③この時代に森林伐採が続いたことは、裸地化した山腹から流出したシルトや粘土が、河川や湖に堆積していることから明らかである。

(参考) 裸地化する : denude