平成 24 年度(2012 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 23 年 9 月 1 日　9:30～11:00　実施

注　意　事　項

１．　机の上には受験票、筆記用具、時計以外は置かないこと。
２．　携帯電話や音の出る機器などは、電源を切ってかばんの中に入れること。
３．　合図があるまで問題冊子を開かないこと。
４．　試験時間は９：３０から１１：００までである。
５．　問題はⅠ、Ⅱの２問で、受験者全員に共通の問題である。
６．　解答はすべて解答用紙に記入すること。解答は大問１題ごとに１枚の解答用紙を使うこと。表面に書ききれないときは裏面も使うこと。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すること。

問題Ⅰ　次の(1)、(2)の英文を全文和訳せよ。

(1)　Given the meteorite evidence that the Solar System formed 4600 million years ago, and that the Moon's youngest lavas are 3200 million years old, it is plain that the Moon remained geologically active for only a relatively short time after its formation. It is easy *now* to understand why the Moon should have had such a short geological life, while the Earth continues to be active. It is much smaller than the Earth – only about one-hundredth of the mass – and thus had initially a smaller total content of radioactive heat-producing elements. Furthermore, because it was so small, whatever heat was generated was lost much more quickly by radiation, because of the Moon's much larger surface area relative to its volume. This simple realization was a very important lesson for planetary scientists, and it has underpinned much subsequent thinking about the geological evolution of the terrestrial planets.

(2)　One method of assessing volcanic risk is through geological study and historical review of the past behavior of volcanoes, and the use of this information to outline possible future eruptive activity. This approach has worked for some well-studied volcanoes, especially those with a fairly regular cycle and style of activity. Two major problems with this approach are: (i) many of the most destructive eruptions of the past were caused by volcanoes that had been inactive for hundreds to thousands of years, and (ii) even well-documented historically active volcanoes show a wide variation in the characteristics of individual eruptions, and in the time between eruptions. Occasionally, previously unrecognized volcanic hazards such as lateral blasts or lethal gases from crater lakes occur with little or no warning.

（"Understanding the Earth" by G. C. Brown, C. J. Hawkesworth and R. C. L. Wilson (eds), Cambridge University Press (1992) より抜粋）

問題 II　次の文章をよく読み、問1～問3に答えよ。

The United Nations estimates that 1.5 billion people across the globe still live without electricity, and that three billion still cook and heat with primitive fuels like wood or charcoal.

There is no reliable data on the spread of (a)off-grid (b)renewable energy on a small scale, in part because the projects are often installed by individuals or tiny nongovernmental organizations. But Dana Younger, senior renewable energy adviser at the International Finance Corporation, the World Bank Group's private lending arm, said there was no question that the trend was accelerating. "It's a phenomenon that's sweeping the world; a huge number of these systems are being installed," Mr. Younger said.

…　中略　…

In Africa, nascent markets for the systems have sprung up in Kenya, Ethiopia, Uganda, Malawi and Ghana, said Francis Hillman, an energy entrepreneur who recently shifted his business from large solar projects to a greater emphasis on tiny rooftop systems. In addition to these small solar projects, renewable energy technologies designed for the poor include simple subterranean biogas chambers that make fuel and electricity from the manure of a few cows, and "mini" hydroelectric dams that can harness the power of a local river for an entire village.

('African Huts Far From the Grid Glow With Renewable Power', The New York Times, December 24, 2010 より抜粋、一部改変)

問 1　下線部(a)の off-grid とはどういう意味か、英語の語句で答えよ。

問 2　下線部(b)について、本文で挙げられている 3 つの手段を、英語の語句で答えよ。

問 3　下の文章は、本文の「中略」の部分の内容である。これを英訳せよ。

安価なソーラーパネルと、60 ワットではなくわずか 4 ワットの電力で部屋を明るくすることのできる高効率な LED 電球の出現によって、このような小さなソーラーシステムは現在、有用な電力を貧困層でも買える価格で供給している、と彼は指摘した。「内モンゴルの遊牧民のユルトの上にも太陽電池をみることができる」と、Younger 氏は言った。

(参考)内モンゴル:Inner Mongolia、 遊牧民:herders、 ユルト(移動式住居):yurt