

系所組別：地球科學系 甲、乙組

考試科目：科學英文

考試日期：0219、節次：1

※考生請注意：本試題 可 不可 使用計算機**1. Comprehension: (25%)**

The following paragraphs were extracts from: **Medical Geology** by R. B. Finkelman, H. Catherine, W. Skinner, G. S. Plumlee and J. E. Bunnell (http://www.agiweb.org/geotimes/nov01/feature_medgeo.html)

Every day we eat, drink and breathe minerals and trace elements, never giving a thought to what moves from the environment and into our bodies. For most of us this interaction with natural materials is harmless, perhaps even beneficial, supplying us with essential nutrients. However, for some, the interaction with minerals and trace elements can have devastating, even fatal effects. These interactions are the realm of medical geology, a fast-growing field that not only involves geoscientists but also medical, public health, veterinary, agricultural, environmental and biological scientists. Medical geology is the study of the effects of geologic materials and processes on human, animal and plant health, with both good and possibly hazardous results.

In its broadest sense, medical geology studies exposure to or deficiency of trace elements and minerals; inhalation of ambient and anthropogenic mineral dusts and volcanic emissions; transportation, modification and concentration of organic compounds; and exposure to radionuclides, microbes and pathogens.

The name of the discipline may be new, but the impacts of geologic materials on human health have been recognized for thousands of years. Mercury, cadmium and selenium levels were measured from preserved, 7,000-year-old human hair in the Karluk Archaeological Site in Kodiak, Alaska; although the health implications of these data are difficult to determine due to the possibility of addition or degradation over time. Inhaled soot particles were detected in preserved lung tissue from the Tyrolean Iceman, which is at least 5,000 years old. This person may have suffered from respiratory ailments after he inhaled tiny mineral crystals, including quartz grains.

Hippocrates and other Hellenic writers recognized that environmental factors affected geographical distributions of human diseases 2,400 years ago. And in 300 B.C., Aristotle noted lead poisoning in miners. Rocks and minerals have also been used for thousands of years to treat various maladies such as the plague, smallpox and fevers.

Scientists began investigating the links between geologic substances and processes and medical conditions 300 years ago. Several decades ago, however, medical geology fell out of favor to some extent in the United States because of perceptions by some influential people that geologists were overstepping their bounds and were dabbling dangerously with epidemiology. Now, through partnerships such as that between the U.S. Geological Survey and the National Institute of Environmental Health Sciences - and because funding agencies are beginning to demonstrate a recognition of the value in multidisciplinary research - the field is flourishing. Currently there are many collaborative investigations between geoscientists and biomedical and public health researchers worldwide, embracing a wide range of medical geology issues.

We present here three recent examples of medical geology studies that illustrate the impacts of minerals and trace elements on human health, and that also underscore the opportunities for geoscientists to make additional contributions to our society in this realm.

Please briefly answer the following questions : (5% each)

(背面仍有題目,請繼續作答)

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- Q1. What geological material that relates the earth environment to the health of human body?
- Q2. In a broad sense, what are the medical geology practitioners studying on?
- Q3. What evidence indicating that the 5000-year-old Iceman may have suffered from respiratory ailments?
- Q4. By whom and in what year that the element Lead was pointed out to be poisoning in miners?
- Q5. Why does the Medical Geology have been called a multidisciplinary science?

2. Translation: (45%)**(1) Please translate the following paragraph : (20%)**

Environmental geology, like hydrogeology, is an applied science concerned with the practical application of the principles of geology in the solving of environmental problems. It is a multidisciplinary field that is closely related to engineering geology and, to a lesser extent, to environmental geography. Each of these fields involves the study of the interaction of humans with the geologic environment, including the biosphere, the lithosphere, the hydrosphere, and to some extent the atmosphere. Environmental geology includes:

- managing geological and hydrogeological resources such as fossil fuels, minerals, water (surface and groundwater), and land use;
- studying the earth's surface through the disciplines of geomorphology, and edaphology;
- defining and mitigating exposure of natural hazards on humans;
- managing industrial and domestic waste disposal and minimizing or eliminating effects of pollution, and performing associated activities, often involving litigation.

(http://en.wikipedia.org/wiki/Environmental_geology)

(2) Please write in Chinese an idiom or a short sentence of your own then translate it into English (10%)**(3) Please translate the following two sentences :**

(a) 明天的歷史，寫在今天；凡走過的，必留下痕跡。(10%)

(b) 嘗試一下吧！「嘗試」也是一種學習。(5%)

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※考生請注意：本試題 可 不可 使用計算機**3. Composition: (30%)**

Global change refers to planetary-scale changes in the Earth system. The system consists of the land, oceans, atmosphere, poles, life, the planet's natural cycles and deep Earth processes. These constituent parts influence one another. The Earth system now includes human society, so global change also refers to large-scale changes in society. More completely, the term "global change" encompasses: population, climate, economy, resource use, energy development, transport, communication, land use and land cover, urbanization, globalization, atmospheric circulation, ocean circulation, the carbon cycle, the nitrogen cycle, the water cycle and other cycles, sea ice loss, sea-level rise, food webs, biological diversity, pollution, health, over fishing, and more.

(http://en.wikipedia.org/wiki/Global_change)

In your own idea of environmental effect, please write in English a short paragraph to describe :

“The Impact of the Global Change on (name your own idea of impact) and Solutions to It.”