

平成18年度 理学系研究科博士前期課程 入学試験問題
(分子科学専攻・冬募集)

英語

試験時間 : 10:30~12:00
配点 : 150点

【注意】

- (1) 問題冊子(1部)、問題1の解答用紙(1枚)、問題2の解答用紙(1枚)を配布する。手元に上記3種類が所定の枚数配布されていることを確認すること。
過不足がある場合には速やかに申し出ること。
- (2) 2枚の解答用紙の各々に受験番号と氏名とを必ず記入すること。
- (3) 問題1、問題2の解答をそれぞれ指定された解答用紙に記入すること。
なお、解答用紙の表面だけで書ききれない場合には裏面を使用すること。

1. 次の英文を読んで下記の設問に答えよ。

(a) Ozone is present in the upper atmosphere in the ozone layer, a band about 20 kilometers thick centered between 25 and 35 kilometers above the surface of the Earth. If all of it were collected and compressed to the atmospheric pressure characteristic of the Earth's surface, it would form a layer about 3 millimeters thick. The ozone is formed when the Sun's ultraviolet radiation is absorbed by molecules containing oxygen: oxygen atoms are driven out of those molecules and subsequently bond to O₂ molecules that they strike. Once it has formed, the ozone molecule absorbs more ultraviolet radiation at a different wavelength and is blasted apart. (b) Both processes, formation and decomposition of ozone, absorb radiation and hence help to protect the living organisms on the surface below. The absorption of ultraviolet radiation by the gas is so efficient that, at wavelengths near 250 nanometers, in the ultraviolet, only one part in 10³⁰ of the incident solar radiation penetrates the ozone layer. A being with eyes able to see only in 250-nanometer light would see the sky pitch black at noon.

The ozone hole is a region of depletion in the concentration of ozone. (c) Culprits include highly reactive chlorine atoms that are ejected from chlorofluorocarbons when they are high in the atmosphere and exposed to intense solar radiation. These atoms attack ozone molecules and strip out an oxygen atom, leaving ordinary oxygen. The resulting ClO molecules later collide with oxygen atoms produced by the impact of solar radiation on ozone molecules, and give up their oxygen atoms to form O₂ molecules. This step releases the chlorine atom, which can continue to cause its destructive havoc. Even a single chlorine atom can go on to kill thousands of ozone molecules.

culprits: 犯人、collide: 衝突する

問1 下線部(a)を日本語に訳せ。

問2 下線部(b)を日本語に訳せ。

問3 下線部(c)を日本語に訳せ。

2. 次の英文を日本語に訳せ

Chemistry has been called the science of what things are. Its intent is the exploration of the nature of the materials that make up our physical environment, why they possess the different properties that characterize them, how their intimate structure may be understood, and how they may be manipulated and changed. By far the greatest variety of materials that confront us are organic. At the dawn of the nineteenth century, when chemistry was just beginning, organic materials were understood as substances created by living organisms: wood, bone, cloth, food, medicines, and the intricate materials that made up our own bodies. Inorganic materials from the mineral world – salt, metals, rocks, glass – turned out to have simpler compositions and fitted into the early development of chemical theory more easily. Because of this and of men's natural awe of life, organic materials were believed to be possessed of a mysterious "vital force" and organic chemistry was thus separated in its path of evolution from inorganic chemistry. By the middle of the nineteenth century, however, the vital force theory was largely discredited by repeated preparations from mineral sources of "organic" compounds originally obtained only from living organisms.

intricate: 複雑な

natural awe of life: 自然への畏敬の念

discredit: 信用を落とさせる