[英語] (全6題)

(注意) 問題ごとに別々の解答用紙を用いること

[問題1]

次の文章はFlemingのペニシリン発見の物語である．文章を読み下線(a)～(c)の部分を和訳せよ．

In 1922 Fleming serendipitously discovered an antibiotic that killed bacteria but not white blood cells. While suffering from a cold, Fleming made a culture from some of his own nasal secretions. As he examined the culture dish, filled with yellow bacteria, a tear fell from his eye into the dish. The next day when he examined the culture, he found a clear space where the tear had fallen. **(a)** His keen observation and inquisitiveness led him to the correct conclusion: the tear contained a substance that caused rapid destruction of the bacteria, but was harmless to human tissue. The antibiotic enzyme in the tear he named lysozyme. It turned out to be of little practical importance, because the germs that lysozyme killed were relatively harmless, but this discovery was an essential prelude to that of penicillin, as we shall see.

In the summer of 1928, Fleming was engaged in research on influenza. While carrying out some routine laboratory work that involved microscopic examination of cultures of bacteria grown in petri dishes (flat glass dishes provided with covers), Fleming noticed in one dish an unusual clear area. **(b)** Examination showed that the clear area surrounded a spot where a bit of mold had fallen into the dish, apparently while the dish was uncovered. Remembering his experience with lysozyme, Fleming concluded that the mold was producing something that was deadly to the Staphylococcus bacteria in the culture dish. Fleming reported.

(c) But for the previous experience with lysozyme, I would have thrown the plate away, as many bacteriologists must have done before. It is also probable that some bacteriologists have noticed similar changes to those noticed by me, but in the absence of any interest in naturally occurring antibacterial substances, the cultures have simply been discarded. Instead of casting out the contaminated culture with appropriate language, I made some investigations.

注. culture: 培養菌
lysozyme: リゾチーム (加水分解酵素の一種)

[問題2]

次の英文を和訳せよ．

It is important to understand the particular significance of words used in the description of scientific systems and their models. The apparently simple terms 'pure substance', 'mixture' and 'solution' often cause problems for new students. We all think we know what the word 'mixture' means, but even as used by the chemists this term is rather ambiguous. One meaning is that it is a blend at an unspecified level of subdivision of two or more pure substance not linked by chemical bonds: not a compound. You can separate a 'mixture' of iron filings and sulfur powder with the aid of the magnet, but not in the iron and sulfur in the compound iron sulfide.

[問題3]
次の英文を和訳せよ.

The properties of a protein are largely determined by its three-dimensional structure. One might naively suppose that since proteins are composed of the same 20 types of amino acid residues, they would be more or less alike in their properties. Indeed, denatured (unfolded) proteins have rather similar characteristics, a kind of homogeneous "average" of their randomly dangling side chains. However, the three-dimensional structure of a native (physiologically folded) protein is specified by its primary structure so that it has a unique set of characteristics.

注. folded: 折り畳まれた

[問題4]
次の１），２）の文章を英訳せよ.

１）物理的変化によって純物質の組成は決して変化しないが，化学的変化では性質や組成の変化が起こる.
２）溶液の沸点は溶媒の沸点より高く，凝固点は低くなる。これらの効果はいずれも，溶液の蒸気圧が純溶媒の蒸気圧より低いという事実に基づいている.

[問題5]
次の文章を英訳せよ.

過去10年の間に、物質の磁気的性質を調べるためにX線ビームを用いる手法を利用することが著しく増加してきている．このような研究はシンクロトロン(synchrotron)施設から，強度が強く，調整が可能で，偏光したX線ビームが利用できるようになったことによって押し進められている.

[問題6]
下の平面図形を50～100語の英文で説明せよ．その文章を読むことにより，この図形を見たことがない人でも図形をおおよそ再現できるように記述すること.