

受験番号

令和3年12月4日

地方独立行政法人大阪産業技術研究所 森之宮センター
研究員採用選考 英語試験問題

(注意)

英語問題は3問で3ページまであります。解答用紙は2ページまであります。

解答にかかる前に、ページが不足していないか、順序が正しくそろっているかを確かめてください。

解答は、別紙の解答用紙に記入してください。

問1 つぎの英文を和訳しなさい。

(1) Polylactic acid (PLA) and polyhydroxyalkanoate (PHA) are known as typical biodegradable polymers. PLA and PHA are polyesters that degrade when their ester linkage are broken. But the most common polyester, polyethylene terephthalate (PET), which is used for fiber and drink bottles, does not break down so easily. This is because of the aromatic rings in its backbone, which come from terephthalic acid. The rings impart structural properties make PET hydrophobic. Therefore, water is not easily taken in, and the hydrolysis reaction does not proceed.

(2) Discovery of the chemical elements has been a subject of prime importance in chemical research. In 1908, Japanese chemist Masataka Ogawa announced that he had discovered the 43rd element and named it nipponium (Np) after Japan (Nippon in Japanese). Recently some important evidence was found among the Ogawa's personal collection preserved by his family. Deciphering the X-ray spectra revealed that the measured spectra of the nipponium sample that Ogawa brought from University College, London clearly showed the presence of the element 75 (rhenium). Thus was resolved the mysterious story of nipponium, which had continued for almost a century. It was concluded that nipponium discovered by Ogawa was identical to rhenium, which was unknown in 1908.

問 2 次の文章を英訳しなさい。

(1) 薄層クロマトグラフィーは非常に簡便で経済的な分析手法です。そのため、混合物の成分の定性分析に広く用いられています。有機合成実験の反応の追跡にも利用されています。

(2) 分子軌道計算結果を基に化合物を設計し合成しました。化合物は種々の分光分析法で確認しました。その化合物はアミノ酸に対して高い親和性を示します。

※分子軌道計算：molecular orbital calculation, アミノ酸：amino acid

(3) 大阪産業技術研究所森之宮センターは大阪城の東側に位置します。JR 森ノ宮駅から徒歩 10 分です。近くにコンビニエンスストアもあります。約 80 人の研究者が働いています。大阪の産業を科学技術で支援しています。

※大阪産業技術研究所：Osaka Research Institute of Industrial Science and Technology

問 3 以下の文章 Q1-3 は、現象、物質、物質の状態などについての定義である。相当する語句を英語で記入しなさい。Q4-7 は、分析技術または原理について説明されている。最も適当な語句を次ページのカンマで区切った語群から番号で選択しなさい。

Q1. A chemical species or molecular entity having an available pair of electrons capable of forming a covalent bond with a hydron (proton) or with the vacant orbital of some other species.

Q2. Polymer that exhibits an optical effect brought about by electromagnetic radiation such that the magnitude of the effect is not proportional to the irradiance.

Q3. To direct current, the potential difference divided by the current when there is no electromotive force in the conductor.

Q4. A technique in which the difference in energy inputs into a substance (and/or its reaction product(s)) and a reference material is measured as a function of temperature whilst the substance and reference material are subjected to a controlled temperature programme.

- Q5.** Any analytical technique which involves the generation and evaluation of secondary electrons (and to a lesser extent back scattered electrons) by a finely focused electron beam (typically or less) for high resolution and high depth of field imaging.
- Q6.** A separation technique in which separation mainly according to the hydrodynamic volume of the molecules or particles takes place in a porous non-adsorbing material with pores of approximately the same size as the effective dimensions in solution of the molecules to be separated.
- Q7.** A technique in which the mass of a substance (and/or its reaction product(s)) is measured as a function of temperature whilst the substance is subjected to a controlled temperature program.

選択肢

- ①laser Raman microanalysis, ②size-exclusion chromatography,
③magnetic resonance imaging, ④thermogravimetry,
⑤differential scanning calorimetry, ⑥scanning electron microscopy,
⑦electron spectroscopy for chemical analysis, ⑧pyrolysis-gas chromatography