

【問題用紙】

令和8年度 愛媛大学大学院農学研究科入学者選抜学力検査

(生物環境学専攻 環境保全学コース)

外国語

第 1 頁 (3 頁の内)

問1～3に答えよ。解答は解答用紙に記入すること。

問1. 次の英文 (1) ～ (10) を和訳せよ。

- (1) That suggestion should be rejected owing to the lack of evidence.
- (2) The room temperature was maintained at 20°C to prevent degradation of the chemicals.
- (3) The purpose of this study is to clarify the molecular weight distribution of this polymer.
- (4) Cells continually degrade organic compounds and synthesize new ones at the same time.
- (5) In chemical reaction, the step with the highest activation energy is called the rate-limiting step.
- (6) The fact is worth paying particular attention because of its implication on the validity of the assumption.
- (7) An expert is a person who has made all the mistakes which can be made in a very narrow field. -Niels Bohr-
- (8) Catalysis is the enhancement of the rate of a reaction by a compound not generally present in the chemical equation which describes the reaction.
- (9) It is estimated that the total mass of organic materials produced by green plants during the biological history on the Earth represents about 1% of the planet's mass.
- (10) Photosynthesis is the most important reaction in the many interesting photochemical processes known in biology; not only was the evolution of the Earth's atmosphere dependent on it, but also animal life derives energy from the Sun by taking plants.

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第 2 頁 (3 頁の内)

問 2. 次の英文の下線部を和訳せよ。

The packaging industry is the largest and fastest growing consumer of synthetic conventional plastic materials, which are highly dependent on fossil resources. Also, this industry, especially single-use plastics intended for food and beverages, is the main source of supplying waste plastics into the environment at an alarming rate creating a problem of microplastics, as polymers do not degrade but break down into smaller pieces, ending up in air, soil, water, as well as in living organisms. This has created a need for the development of green, abundant, and economic alternatives to petrochemical plastic-packaging materials such as bioplastics. The bioplastic industry is reported to be a young, innovative sector possessing great ecological and economic potential for a low-carbon, circular economy that utilizes resources more efficiently. The main functions of food packaging have been the same throughout history: hygiene and protection during transportation and storing. Modern technology and materials have introduced new functionalities to packaging because the selection and development of packaging materials can be a partial solution to the complex problems of food safety and reduce unnecessary food wastes. Many terms are used to describe packaging with new functions, and one of them is active packaging, which involves the use of polymers that act as supports for various active compounds that can be incorporated during the packaging manufacturing process.

(出典 : Characterization of Films Based on Cellulose Acetate/Poly(caprolactone diol) Intended for Active Packaging Prepared by Green Chemistry Principles. ACS Sustainable Chem. Eng. 10, 9141–9154, 2022)

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第 3 頁 (3 頁の内)

問 3. 次の英文を読んで、後の問いに答えよ。

Machine learning is a flexible set of tools for identifying patterns and relationships in complex data and for making decisions based on those data. ^①A machine learning model can allow a vehicle to drive autonomously or use ¹stool microbiome sequencing data to predict the presence of a disease. The experimental data collected in modern microbiology studies have reached a level of complexity where machine learning becomes necessary and an opportunity for tasks ranging from diagnostics in medicine to biomarker discovery.

^②Machine learning is a very broad discipline. It can be generally categorized as supervised machine learning, aimed at developing predictive models given training data where the answers are known, and unsupervised machine learning, aimed at grouping observations or creating simplified representations of major structures of the data. Examples for the former include inferring the antibiotic resistance profile of an isolate from its genome, learning whether and which components of human-associated microbial communities are involved with a given host condition or developing clinical decision support systems to recommend treatment options from pathogen or microbiome experimental data. ^③For unsupervised machine learning, applications range from grouping microbial genes with similar expression patterns to binning 16S rRNA gene amplicons into ²operational taxonomic units.

¹stool : 糞便、²operational taxonomic unit (OTU) : 操作的分類単位 (一定以上の類似度を持つ配列同士を1つの菌種のように扱うための操作上の分類単位)

(出典 : Asnicar, F., Thomas, A.M., Passerini, A. et al. Machine learning for microbiologists. Nat. Rev. Microbiol. 22, 191–205, 2024 を一部改変)

- (1) 下線部①の機械学習モデルにより実施可能な例について日本語で2つ説明せよ。
- (2) 下線部②の機械学習の2つの分類について日本語でそれぞれ説明せよ。
- (3) 下線部③を和訳せよ。