〔大学院医薬理工学環博士後期課程〕（外国人留学生特別入試）
[Graduate School of Pharma-Medical Sciences] (Doctoral Course)

R7.8.22実施

応用和漢医薬学プログラム(Applied Natural Medicine)

科目名(Subject) 外国語 (英語) (Foreign Language (English))　受験番号(Examinee's No.)

分野名 (Educational Area)
神経機能学 (Neuromedical Science)　氏 名(Name)

（裏面にわたる場合は，この線より下に解答すること。）
(If your answer is longer than the space provided, you can write on the back of this page, but please write below this line.)

Title: Elite male faculty in the life sciences employ fewer women

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(Reference: modified, *Proc Natl Acad Sci U S A* 2014;111(28):10107-10112.)

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Q1:

Please describe why authors concluded as "**Elite male faculty in the life sciences employ fewer women**" from figures A and B. Be sure to explain based on data in these figures.

Q2:

What are the criteria of the most prestigious laboratories in this survey?

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Title: Elite male faculty in the life sciences employ fewer women

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Q1:

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解答例：下記の内容が読み取れていればよい。配点　70 点

All male PIs employs about 36% female postdocs (Fig. 1A). This value is lower than a value in laboratories headed by women, who employed about 46% female postdocs (Fig. 1B).

Male PIs who were funded by HMI, were elected to the NAS, or had won a major research award employ significantly fewer female postdocs than the corresponding pool of other male PIs (Fig. 1A). On the other hand, there are no differences the percentage of employed female postdocs between elite and non-elite female PIs.

Q2:

What are criteria of the most prestigious laboratories in this survey?　配点 30 点

解答例：

PIs are individuals who were funded by the Howard Hughes Medical Institute (HHMI), were members of the National Academy of Sciences (NAS), or had won at least one of seven different major research awards (e.g., the Nobel Prize or the National Medal of Science).

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科目名(Subject)
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(If your answer is longer than the space provided, you can write on the back of this page, but please write below this line.)

[1] Describe an overview of the research of your master thesis (objectives, findings, and the significance of the results).

[2] Describe remaining issues in your master thesis research, which should be further clarified.

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[1] Describe an overview of the research of your master thesis (objectives, findings, and significance of the results).
（訳）あなたが修士論文で取り組んだ研究について、その概要（目的、わかったこと、意義）を記載しなさい。
配点 50 点
それぞれが整理して書かれているかどうか

[2] Describe remaining issues in your master thesis research, which should be further clarified.
訳）あなたの修士論文研究において、さらに明らかにすべきだったが解決されずに残された課題について書きなさい。
配点 100 点
大きな研究ゴールを理解した上で、自身の研究結果を客観的に俯瞰的に評価し、やり残した課題や limitation を考えているか。それらの解決策を広い視野で想定できているか。

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分野名(Educational Area)
Natural Products & Drug Discovery

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1. Read the following text and answer the questions in English.

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(from Science 344 (6189):1314, 2014)

1. Why did the author feel the need to be reminded that their job as a graduate student is "really cool"?

2. What does the conversation about the butane torch reveal about the difference between how scientists and non-scientists view scientific work?

3. Do you agree with the author's conclusion that doing science is "cool"? Why or why not? Support your answer with examples from the text or your own experience.

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1. Read the following text and answer the questions in English.

(from Science 344 (6189):1314, 2014)

1. Why did the author feel the need to be reminded that their job as a graduate student is "really cool"?
【出題の意図(Intention of the question)】
内容を理解しているかを評価する。
【解答例（Sample Answer】
The author felt the need to be reminded because they were in a "research rut" near the end of their fourth year in graduate school. They had lost motivation and enthusiasm for their work. However, a weekend trip with old friends helped them realize that their scientific work, which includes using torches and doing experiments, is actually impressive and exciting to people outside the lab.

2. What does the conversation about the butane torch reveal about the difference between how scientists and non-scientists view scientific work?
【出題の意図(Intention of the question)】
内容の解釈や意図を理解できているかを評価する。
【解答例（Sample Answer】
The conversation shows that non-scientists are fascinated by the tools and visible aspects of lab work, such as using torches or making ice cream with liquid nitrogen. In contrast, scientists often find interest in more technical aspects, like NMR or data analysis. The conversation highlights how what seems routine to scientists can appear exciting and impressive to others who don't work in the field.

3. Do you agree with the author's conclusion that doing science is "cool"? Why or why not? Support your answer with examples from the text or your own experience.
【出題の意図(Intention of the question)】
内容を理解・解釈した上で意見を述べることができるかを評価する。
【解答例（Sample Answer】
Yes, I agree that doing science is "cool." The author gives several examples that show how hands-on and creative scientific work can be. They talk about using torches, liquid nitrogen, and solving problems in new ways. Science also allows people to learn constantly and work with smart, passionate colleagues. From my experience, doing experiments and discovering something new is both exciting and rewarding.

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(If your answer is longer than the space provided, you can write on the back of this page, but please write below this line.)

Answer the following questions in English.

1. The rapid progress of "Computational Science" has led to its widespread adoption in pharmaceutical research. Share your opinion on its impact, highlighting both the potential benefits and possible limitations.

2. Provide a concise summary of your previous research achievements, and discuss your future research goals, including your intended approach and the rationale behind it.

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【出題の意図(Intention of the question)】
計算科学の利点と欠点を理解した上で，この方法論を研究課題に取り入れていく能力があるかを評価する。
【解答例（Sample Answer】

Computational science is revolutionizing pharmaceutical research by accelerating drug discovery, improving precision, and reducing costs. Its application has become essential in addressing complex diseases and the growing expense of drug development. One major advantage is speed. Computational modeling allows researchers to screen millions of compounds efficiently, identifying potential drug candidates without extensive lab work. This also lowers costs by reducing the need for early-stage physical trials and minimizing failed experiments. Another key benefit is precision. Machine learning and bioinformatics enable the analysis of genetic and molecular data, leading to more personalized medicine tailored to individual patients. Additionally, computational tools help model complex biological systems, improving our understanding of disease mechanisms and identifying new drug targets. Virtual clinical trials are also made possible, allowing researchers to simulate drug responses in diverse patient populations. This helps predict efficacy and safety before real-world testing, increasing the chances of success. However, there are challenges. The accuracy of computational models depends on data quality; poor or biased data can lead to unreliable predictions. Biological systems are complex, and even advanced models may oversimplify reality. High initial investment and the need for skilled personnel are also barriers. Moreover, regulatory frameworks for computational evidence are still evolving. In conclusion, while not a replacement for traditional methods, computational science is a valuable tool that enhances the efficiency, accuracy, and innovation of pharmaceutical research.

2. Provide a concise summary of your previous research achievements, and discuss your future research goals, including your intended approach and the rationale behind it.

【出題の意図(Intention of the question)】
研究を進めていく課程で生じた問題点やその解決策をどれだけ深く考えているかを評価する。
【解答例（Sample Answer】

In my research, I have focused on the exploration of bioactive compounds derived from natural resources, such as medicinal plants and marine organisms, as potential lead compounds for drug development. Through extraction, isolation, and structural characterization, I successfully identified several compounds exhibiting promising antimicrobial and anti-inflammatory activities. These findings suggest that natural sources remain a rich and underexplored reservoir for novel therapeutic agents. Moving forward, I intend to further investigate the mechanisms of action of the most active compounds using both in vitro and in silico approaches. In particular, I plan to use molecular docking and pharmacophore modeling to predict target interactions and optimize lead structures. Additionally, I aim to collaborate with researchers in pharmacology to evaluate the in vivo efficacy and safety profiles of selected compounds. The reason for this direction is twofold. First, understanding the mode of action is essential for validating these compounds as viable drug candidates. Second, integrating computational tools and biological testing will streamline the drug discovery process and enhance the translational potential of my findings. Ultimately, I hope to contribute to the development of new drugs derived from natural products, particularly for diseases that lack effective treatments.