文部科学省後援

技術英語能力検定

プロフェッショナル

プレテスト

実施日：2019年11月30日（土）

開始時刻：14時00分
終了時刻：16時00分

＜注意事項＞

1．座席番号、氏名をこのページ下欄に必ず記入してください。
記入漏れの場合は無効となります。

2．問題はⅠからⅤまで（全５問）あります。**すべての問題を英語で解答してください。**

3．解答は、この問題用紙の各問題文につづく解答欄（線上）に書いてください。

4．この冊子は提出してください。お持ち帰りいただくことはできません。

座席番号	
氏　　名	

●内閣府認定の公益法人
JSTC 公益社団法人 日本工業英語協会
JAPAN SOCIETY FOR TECHNICAL COMMUNICATION

I. Read the passage below and answer questions (1) and (2) in English. (50 点)

Human bodies evolved to live on Earth, so on the International Space Station, where there is no sensation of gravity, astronauts lose muscle and bone (despite exercising hours each day), start to see poorly, and develop abnormal immune systems. The rogue particles that zip through deep space outside of Earth's protective magnetic bubble threaten to upset the delicate functioning of the human mind as well.

Scientists have known for years that in addition to damaging DNA, the particles of radiation found in deep space also disrupt human brains. All of that research, however, came from using a particle accelerator to blast rodents with months- to years-worth of radiation in the span of a few minutes. The first study to test mice under realistic space-like conditions—with the help of a new facility capable of delivering radiation at a slow drip—confirms that neutron and photon particles significantly disrupt their nervous systems. If humans are similarly sensitive, the study claims, multiple members of a five-person crew would suffer neurological symptoms such as increased anxiety or impaired memory during a multi-year mission to Mars.

One NASA-funded room at Colorado State University acts a lot like a spacecraft. A nugget of radioactive californium-252 bathes the area with neutrons and high-energy light rays, mimicking what the inside of a Mars-bound ship might be like. Any creature spending a full day inside the enclosure receives about as much radiation, albeit of different particle types, as it would after a day in deep space.

Forty mice spent six months in the radiation room—about as long as a one-way trip to Mars—while a control group of the same size enjoyed the full protective benefits of Earth’s magnetic field. Afterward, the researchers sent the mice to three labs and studied what had happened to their nervous systems on three levels.

At the cellular level, researchers found it harder to trigger activity in radiation-exposed brain cells in the hippocampus (a part of the brain associated with memory) than in the neurons of non-exposed counterparts. These findings meshed with results at the network level, which suggested that groups of neurons in the hippocampus became less able to cooperate, failing to fire together in a way associated with memory and learning. But Charles Limoli, a professor of radiology at the University of California Irvine and co-author of the study, suggests that radiation damage may extend to other areas of the brain as well.

“Remember that these animals were [completely] exposed. There's no reason to suspect that there's just one region of the brain affected,” he said. “In a nutshell, the circuit activity of the brain has been disrupted.”

The radiation disrupted the animals’ behavior too. Limoli and his team put the mice through a battery of tests meant to reveal various facets of their mental states. The scientists arranged playdates with other mice to test their extroversion, for instance, and swapped out Legos for rubber duckies in their cages to see if the mice would notice the newcomer. They also taught their subjects to fear electric shocks following a certain tone, only to cancel the shocks and see how long it took the rodents to realize that the danger was gone.

The radiation-exposed mice underperformed their counterparts across the board. On playdates, the space-mice spent twice as much time on average being antisocial. When a new toy appeared in their cage, they spent less time inspecting it. After the electric shocks stopped, they were a third more likely to continue to fear them.

Altogether, the results, published recently in the journal eNeuro, paint a picture where space radiation makes astronauts—who need to operate at peak mental and physical condition—grow withdrawn, anxious, forgetful, and fearful. And these mental and emotional changes would come on top of the side-effects of six months stuck in a confined space with the same handful of people. No one knows to what degree the rodent results might translate to humans, but the researchers estimate that one in five astronauts would experience radiation-caused anxiety on the way to Mars, and one in three would have memory trouble.

What's more, these tests all took place three to six months after the mice emerged from the radiation room, suggesting long-lasting effects. "That's a big deal," Limoli says. "This isn't something that's going up and down and back to normal."

Vipan Parihar, a colleague of Limoli's who was not involved in this study but has researched the effects of radiation on mice in the past, called the findings "fantastic" and said they'd have far-reaching consequences for future astronauts. In particular, he pointed to the irradiated mice's difficulty forgetting their fear as suggestive that astronauts might have trouble switching from one task to another, and could become more prone to Post Traumatic Stress Syndrome.

Nevertheless, both researchers emphasize that while radiation may represent one of the biggest technical challenges to a Mars mission, it's not necessarily a showstopper. Spacecrafts and spacesuits built from as yet unknown materials could stop particles in their tracks, and future medication could alleviate the worst effects of the radiation that makes it through. At this early stage, they say, what matters is to help the world's space agencies know what to expect.

"The Apollo astronauts were out in space for two weeks. These [Mars-bound astronauts] are going to be out there for two and a half years," Limoli says. "NASA doesn't want to be catastrophically surprised."

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(1) Create a title that is most suitable for this article within 15 words. Enter the number of words you used in the parentheses below the answer column. (10 点)

(words)

(2) Summarize this article within 120 words in English. Enter the number of words you used in the parentheses below the answer column. (40 点)

(words)

II. Translate the following Japanese passage into English. (30 点)

電磁石とは、電流により電磁場を発生させる磁石である。電磁石は、軟鉄や鋼鉄の心のまわりに、通常は銅線やエナメル線などのワイヤを巻いてできたコイルである。この鉄心は、電流がコイル内を流れるときに強く磁化し、電流が切れると完全に磁化が消える。電磁石には、材料を保持するだけのために設計された運搬用と、ある一定の距離まで力を及ぼして何かを動かすために設計された牽引用がある。吊り上げ磁石は、運搬用電磁石の一例である。牽引用の電磁石は、可動部分があるほとんどすべての電気機器に使われている。その適用範囲は、大型のモーターからとても小さい中継器に及ぶ。

III. Summarize the following Japanese passage in up to 90 words in English. Enter the number of words you used in the parentheses below the answer column. (40 点)

ヒノキは建築材として非常に有用な木である。通常、ヒノキの樹木は直径 1m 程度にまで成長する。カンナなどで表面の仕上げを行うと美しい光沢とヒノキ特有の芳香を出す。木材として使用する場合の特徴としては、耐久性が高く、水や湿気にも強い傾向がある事があげられる。特に菌や虫などに対する耐性が高く、樹齢の古いものは伐採後、200 年程は強度が上がると言われている。乾燥も行いやすく、あまり硬い材ではなく、粘りがあるので加工も容易である。このように木材としての多くの良い特徴を持つ事から、ヒノキは国内の針葉樹の中で第一級の良材とされている。尚、一口にヒノキと言っても、生育した地域や天然林か人工林かなどでも個体差がでる。飛騨地方（長野県の木曽川流域）で育った「木曾ヒノキ」はヒノキの中でも特に有名で通常よりも年輪が細かいなどの特徴がある。ヒノキ材は日本人的な心情もあってか過大に評価されがちであるが、硬さが必要な用途にはあまり向かないなど、何に利用しても問題ない万能の木という訳ではない。したがって、特性に合った用途で利用する事が重要だと言える。

(words)

IV. Read the passage below and answer questions (1) to (3) in English. (40 点)

The topic of a paragraph is its main idea or theme—what the paragraph is about. In formal scientific and technical writing, the most common way of presenting the topic of a paragraph is the so-called deductive pattern: the opening sentence introduces the topic and may even indicate how it will be developed. In some cases, a second sentence is used to refine the topic, to summarize it, or to shift the direction of development. Busy readers generally want to know right away what the topic is. They will use whatever cues they can to quickly generate expectations about the paragraph. This strategy serves two purposes: (1) it allows readers to guess what's coming and thus digest it more easily and (2) it allows them to avoid reading the paragraph altogether if the subject matter holds no interest for them.

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(1) Think of what can happen if no topic is provided in an opening sentence of a paragraph. Describe any one drawback of lacking a topic sentence. (10点)

(2) For special purposes, you can use an inductive pattern of development, in which you delay the topic sentence until the end of or near the end of a paragraph. Think of one such situation. (10点)

(3) Fill in the topic sentence that is appropriate for the following paragraph and rewrite the paragraph concisely. (20点)

Neuroscientists call it plasticity. When you learn how to juggle or make use of a new phone app, there are subtle changes that are occurring at synapses, which are the sites in which nerve signals travel between neurons. If you master a new skill, it brings about biochemical changes in a neuron and this results in either stronger or weaker transmission across synapses. This simple type of plasticity undergoes persistence throughout a course of lifetime. A person can learn different new things at all times.

(Topic sentence) (5点)

(Rewrite the paragraph.) (15点)

V. The following is a poorly written Japanese handling instruction for an oven toaster, and its poor translation in English. Read them and answer questions (1) and (2) below in English. (40 点)

JSTC 工業の「ホットサンドメーカーミニ」をお買い上げいただき、ありがとうございます。一般のトースター類と比較して、サイズと手軽さに重点をおいた商品でございますので、ご使用に際しては少々の制約がございます。ご留意の上、お使いください。

- 「ホットサンドメーカーミニ」は、使用前の予熱の必要はありません。調理物を入れずに 10 分以上加熱すると、寿命が短くなったり、あるいは事故の原因となったりすることがあります。また、使用しない時は必ず電源コードをコンセントから抜いておいてください。
- 「ホットサンドメーカーミニ」は、ホットサンドを作るほか、トーストやマフィンの暖めにもお使いいただけますが、魚や肉など油脂肪を多く含むものにはお使いいただけません。このような使用法は、本体や周囲の汚損や故障につながりますので、十分にご注意ください。

We appreciate your having bought “Hot Sandwich Maker Mini” from JSTC Industries. Comparing to general kinds of toasters, it is a product with emphasis on size and handiness, and there are few restrictions upon use. Please be careful and use it.

- “Hot Sandwich Maker Mini” need not be heated in advance before operation. If heating is done more than 10 minutes without anything cooked, the service life will be shorter and become the cause of accident. Or, extract the power cord from the consent if you do not use.
- You can use “Hot Sandwich Maker Mini” for making hot sands and, other than that, warming toasts and muffins, but not for things including oil and grease much like fish and meat. Such a way of usage is connected to dirty damage and faults of the main body and surroundings, so be sufficiently careful.

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(1) Pick any three errors in the above English passage. Describe what is wrong and how they change the meaning. (20 点)

(2) Under the heading shown below, reorganize the information in the Japanese passage and present it as an appropriate caution statement in English. Eliminate unnecessary or irrelevant information, if any. (20 点)

Notes on using the product: