前期日程

令和３年度入学試験問題

英　　語

注　意　事　項

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3．　本学の受験番号をすべての解答用紙の指定されたところへ正しく記入しなさい。氏名を書いてはいけません。

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1 次の英文を読んで以下の問に答えなさい。

One of the things scientists talk about with great frequency is the reproducibility of their observations. In other words, if one researcher performs an experiment and observes a result, can a similar result be observed when the experiment is repeated over and over again? Moreover, can a scientist in a lab halfway across the world observe the same thing? There are several reasons why reproducibility is something that scientists focus on so intensely and why it contributes to defining what science is and how it works.

First, the issue of reproducibility speaks to errors of chance that appear to, but do not in actuality, reflect natural phenomena. In an effort to draw general conclusions from specific observations of nature, there is always a concern that one has not actually observed a true aspect of nature but has been fooled by random noise in the system. However, if a phenomenon occurs over and over again, then it is much less likely to be a random event that happened by chance alone. Hence, (1) reproducibility protects against the error of concluding some effect exists in nature when it really doesn't.

The second essential component of reproducibility, especially when speaking about different scientists and labs, is the issue of (**A**). Something may happen over and over again in one scientist's lab but may not happen in any other lab in the world. If this is the case, then scientists from around the world may visit the reporting lab and observe the phenomenon for themselves. In many well-known cases of this situation, the lab making the observation was making an error, being sloppy, or misinterpreting nature. However, in other cases, there was something particular about the technique in the reporting lab that was not communicated properly to other labs. Alternatively, there may have been something particular to the environment in the reporting lab that was absent from other labs. Determining the difference that makes the phenomenon work not only allows labs around the world to observe and study the same thing, but can also provide key insights into mechanisms of the phenomenon.

A third issue is that reproducibility is essential in the search for mechanistic understanding and causal associations. To illustrate why, consider famous events that have occurred in human history, such as the fall of the Roman Empire or the Great Depression. Countless hours of energy

and thought have gone into the analysis of why the Roman Empire fell and why the Great Depression occurred. Many scholars have analyzed these questions and proposed a wide variety of different hypotheses, each of which predicts the data and many of which are mutually incompatible with each other. As is the practice in science, historians likewise ask themselves: how is one to assess which hypotheses are the most likely?

In historical studies, one is analyzing an event that happened in the past and will never happen again. Future empires may fall and economic depressions will almost certainly happen again, but the Roman Empire will never exist again, and the precise geopolitical and economic conditions present in 1929 will never occur again. Suppose one has the hypothesis that the Roman Empire fell due to the use of lead in dishes that resulted in the poisoning of Roman leaders and a decline in their ability to govern. Unless one can invent a (**B**), go back to ancient Rome, prevent lead dishes from ever being used and see if the Empire doesn't fall in the same way, one can never test the hypothesis directly.

This is precisely the problem that is remedied by a system that is robustly reproducible. If a phenomenon happens over and over again in a similar way each time, then one is essentially using a time machine. If a scientist has a highly reproducible system, then she or he can remove factor A and see if the phenomenon still occurs. If removing factor A has no effect, then she or he can conclude that factor A is not required. If removing factor A prevents the phenomenon, she or he can conclude that factor A is necessary. This mechanistic knowledge would then extend not only to previous occurrences of the phenomenon but also to future recurrences.

Thus, consistency over time (or, in other words, a controlled reproducibility) is essential to any increase in knowledge with regard to predicting or controlling. It is precisely for (2) this reason that reproducibility of systems is so essential to all of science and why scientists put such a premium on such issues. Without reproducible systems, there can be no purposeful forward progress through direct experimentation in the system.

(*Source*: James C. Zimring, *What Science Is and How It Really Works*)

問1　なぜ下線部（1）のようなことが言えるのか。論旨を踏まえて、その理由を25字以内の日本語でまとめなさい。

問2　論旨を踏まえて、空欄(　**A**　)に入れるのにもっとも適切な語を次の①～⑤から選び、その番号を書きなさい。

① falsifiability　② generalizability　③ individuality
④ optionality　⑤ reducibility

問3　historical studies（歴史研究）が science（自然科学）と異なるのはどのような点だと筆者は述べているか。両者を比較し、40字以内の日本語で説明しなさい。

問4　論旨を踏まえて、空欄(　**B**　)に入れるのにもっとも適切な2語からなる名詞を本文中より抜き出しなさい。

問5　論旨を踏まえて、下線部（2）の内容を25字以内の日本語でまとめなさい。

2 次の英文を読んで以下の問に答えなさい。

A new study reveals that bumblebees force plants to flower by making tiny incisions in their leaves—(1) a discovery that has stunned bee scientists. "Wow! was my first reaction," says bee biologist Neal Williams. "Then I wondered, how did we miss this? How could no one have seen it before?"

Chemical ecologist Consuelo De Moraes had the same reaction when one of her students, Foteini Pashalidou, noticed buff-tailed bumblebees making tiny incisions in the leaves of their greenhouse plants. However, the insects didn't seem to be carrying off the bits of leaves to their nests or ingesting them. (a) the bees were inducing the plants to flower, the team set up a series of experiments.

For the study, Pashalidou and colleagues placed flowerless tomato and black mustard plants in mesh cages with pollen-deprived buff-tailed bumblebee colonies. They then removed the plants after worker bees made five to ten holes in their leaves. The small punctures caused the black mustard plants to flower two weeks earlier than usual, and the tomato plants a month sooner than normal.

(2)The scientists also placed pollen-fed and pollen-deprived bumblebee colonies in mesh cages with the flowerless plants to compare their behaviors. [I] The results show that when pollen sources are scarce, such as in a greenhouse or during early spring, bumblebees can force plants to bloom up to a month earlier than usual.

The mutually beneficial relationship between insect pollinators and flowers extends back some 130 million years. Plants provide the pollinators with food; in exchange, the pollinators fertilize their flowers.

But neither one (b) if they're out of sync with each other, so they've found ways to communicate. "That's what this study shows," says behavioral ecologist Lars Chittka. "In a sense, the bees are signaling, Hey, we need food. Please speed up your flowering, and we'll pollinate you." It seems bees have (c) the code that causes plants to flower.

The research is promising for two reasons. For one, it strongly suggests bumblebees manipulate flowers, a particularly useful skill as warming temperatures worldwide are causing

the pollinators to (d) before plants have bloomed. The insects depend nearly exclusively on pollen for food for themselves and their young in the early spring.

The research is also a potential boost for (**A**): if crops can be made to flower early, it could increase production of some plants. When the study authors used a razor to mimic the holes the bees made, the plants bloomed earlier than normal, but not as soon as they did in response to the bees' bites. "They do something we haven't quite captured," says study co-author Mark Mescher. "It could be they introduce a biochemical or odor cue" from a salivary gland*. "We hope to figure this out." Doing so could create a whole new way for humans to cultivate plants, a potentially major advance for (**A**).

For bee experts, one of the greatest marvels of the study is that it started with simple, old-fashioned observation. "Charles Darwin followed bumblebees around," says Williams. "Anyone interested in bumblebees has likely spent hours watching them on flowers. But probably not on plants that aren't in bloom." Then Pashalidou did just that—and opened an entirely new phenomenon to our eyes.

(*Source*: Virginia Morell, "Bumblebees bite plants to make them flower early, surprising scientists" *National Geographic*)

*a salivary gland: 唾液腺

問1　下線部（1）につながった研究者の着眼が、他の研究者たちの着眼と異なっていたのはどのような点か。論旨を踏まえて、20字以内の日本語で説明しなさい。

問2　空欄(a)～(d)に入れるのにもっとも適切な動詞を下から選び、文法的に正しい形で記入しなさい。ただし、同じものを繰り返して用いないこと。

benefit　　crack　　emerge　　suspect

問３　下線部（２）の実験結果が空欄［　I　］で説明されている。その説明としてふさわしいと考えられるものすべてを下より選び、記号を○で囲みなさい。

a. Bumblebees from the pollen-deprived colonies busily damaged the plants.

b. Bumblebees from the pollen-fed colonies ingested the leaves.

c. Bumblebees from the pollen-deprived colonies rarely damaged the plants.

d. Bumblebees from the pollen-fed colonies busily damaged the plants.

e. Bumblebees from the pollen-deprived colonies ingested the leaves.

f. Bumblebees from the pollen-fed colonies rarely damaged the plants.

問４　空欄(　**A**　)に共通して入れるのにもっとも適切な語を次の①～⑤から選び、その番号を書きなさい。

① agriculture　② biology　③ chemistry

④ psychology　⑤ technology

3 *Read the following text and answer the questions.*

We have a man named Walt who does a bit of carpentry around the house from time to time. He looks to be about 112 years old, but goodness me the man can saw and hammer. He has been doing handiwork around town for at least fifty years. Walt lives in Vermont, just across the Connecticut River from our little town, and is a proper New Englander—honest, hardworking, hates to waste time, money or words.

Anyway, the other day he arrived at our house a few minutes before seven and apologized for being late because the traffic through Norwich had been 'fierce'. What was interesting about this was not the notion that traffic in Norwich could ever be fierce, but that he pronounced it 'Norritch', like the English city. [1] This surprised me because everyone in Norwich and for miles around pronounces it 'Nor-wich' (i.e., with the 'w' sounded, as in 'sandwich').

Walt explained to me that the village was pronounced 'Norritch' until the 1950s, when outsiders from places like New York and Boston began to move in and, for whatever reason, started to modify the pronunciation. Now virtually everyone who is younger than Walt, which is virtually everyone, pronounces it 'Nor-wich'. That seemed to me quite sad, the idea that a traditional local pronunciation could be lost simply because outsiders were too lazy or inattentive to preserve it, but it's only symptomatic of a much wider trend.

Thirty years ago, three-quarters of the people in Vermont were born there. Today the proportion has fallen to barely half, and in some places it is much lower. [2] The same thing has been happening all over the country. I have just been reading an academic study on the dialect of Ocracoke Island off the coast of North Carolina. Ocracoke is part of the Outer Banks, a chain of barrier islands where the inhabitants once spoke a dialect so rich and mysterious that visitors sometimes supposed they had stumbled on some half-lost outpost of Elizabethan England. [3]

The locals—sometimes called 'Hoi-Toiders' for the way they pronounced 'high tide'—had an odd accent and used many archaic terms. [4] And this carried on until 1957, when the federal government built Ocracoke a bridge to the mainland. Almost at once, tourists came in and the Ocracoke dialect began to go out.

This was scientifically monitored and recorded by linguists from North Carolina State University, who made periodic field trips to the island over half a century. Then, to everyone's surprise, the Ocracoke dialect began to undergo a revival. The researchers found that middle-aged people—those who had grown up in the 1950s and 1960s when tourism first became a dominant feature of island life—had stronger accents than even their parents had. The explanation, the researchers surmise, is that the islanders 'exaggerate their island dialect features, whether consciously or not, because they want there to be no mistake that they are "real" Ocracokers and not tourists or new residents recently relocated from the mainland'.

So does this mean that the rich and chewy Vermont accent will likewise recover? Sadly, it seems not. From the evidence, it appears that these dialectal revivals happen only on islands or in communities that are in some way still comparatively isolated. So it seems likely that when old Walt finally hangs up his saw and hammer, whoever takes his place won't sound like an old-time Vermonter even if he was born and raised there.

(*Source*: Bill Bryson, *Notes from a Big Country*)

Question 1 Why does Walt pronounce Norwich differently to most people in Norwich? Choose the correct answer.

(**a**) Because Walt was not born and raised in Norwich.

(**b**) Because Walt is too lazy to pronounce Norwich correctly.

(**c**) Because when Walt was small, Norwich was pronounced differently by the villagers.

(**d**) Because when Walt was small, Norwich was an outpost of Elizabethan England.

(**e**) Because Walt is trying to preserve his dialect.

Question 2 Why do local people in Ocracoke speak in a strong accent? Choose the correct answer.

(a) To make themselves sound different from outsiders.

(b) Because the federal government built a bridge.

(c) Because their parents spoke the same way.

(d) Because they do not want to make mistakes when they speak.

(e) To help tourism become a strong feature of their island.

Question 3 What does the article say about dialects in America today? Choose the correct answer.

(a) Once dialects have disappeared, they are lost forever.

(b) Dialects disappear because young people prefer not to use them.

(c) Disappearing dialects can recover, but only in special circumstances.

(d) The disappearance of dialects is a major problem for small communities.

(e) Local dialects will grow if tourism is reduced.

Question 4 Look at the sentence below, which has been removed from the text. In what position [1] – [4] should it appear? Write the correct number in the box.

In consequence these days you are far less likely than you once were to hear locals pronouncing cow as 'kyow'.

Question 5 Do you think local dialects and accents should be preserved? Give two specific reasons to support your opinion. Write your answer in English in the space provided.

4 次の英文を読んで以下の問に答えなさい。

Eight million horses perished in the First World War, along with untold numbers of donkeys and mules, just as the ascendancy of the car made clear that the pervasiveness of the horse as a working animal was coming to an end. The disappearance of the horse from urban—and later rural—life didn't happen overnight. Horses and donkeys were still found in great numbers in British towns and cities until just after the Second World War, when the shift to motorised transportation of goods caused the collapse of the equine market and 200,000 city animals were destroyed in a two-year period. The farm population dropped steeply, from nearly 1.1 million in 1944 to 147,000 a decade later. 'Dehorsification' unfolded (a), and more recently, than we might think.

Horses were as ubiquitous in the 19th century as cigarettes were in the 20th and some ア[a, as, less, no, them, threat, saw] to public health. In England in the 1860s there were as many horses in cities as in the countryside, and (b) urban horses outnumbered country horses two to one. Equine density was even greater in the United States. In New York there were nearly five hundred horses per square mile, an astonishing figure that works out to around one horse for every four New Yorkers. In the years between 1860 and 1900, a banker in Boston would have seen more horses than a Colorado cowboy or a Texas rancher. Cities were crowded and smelled awful: horses left about 1,100 tons of manure* on the streets of New York (c), along with 71,000 gallons of urine**.

The rise of the steam engine actually increased the dependence on equine power. In the US, the number of horses and mules grew sixfold, to nearly 27.5 million, between 1840 and 1910, a rate almost twice that of its human population. Comparable increases were seen throughout Europe. Often working in tandem with steam technologies, horses were used to harvest, thresh and bale hay, and in mills to grind flour; to pull stagecoaches and canal boats over long distances and omnibuses, streetcars and hackney cabs over shorter ones; to move goods to and from factories, farms and markets around the clock. (I) Susanna Forrest in *The Age of the Horse* describes a steam tram that had an engine disguised as a horse's head, neck and chest, a bell stuck between its ears, and a booth for the driver where the animal's body would have been.

The design was arrived at so as 'not to frighten the horses', which the tram's inventor could not imagine disappearing from city streets (d).

In the latter part of the eighteenth century, James Watt, the inventor of the steam engine, had adopted the word 'horsepower'. But it would be (e) before horseless carriages gained the upper hand and 'motor stables' began to displace horse stalls for good. The British railway system in 1948 still had nearly nine thousand horses, assisting in shunting vehicles and short-distance transport. In 1967 the last of them, a Clydesdale called Charlie, was put out to pasture. The days of the working horse would soon be over.

(*Source*: Eric Banks, "Where have all the horses gone?" *London Review of Books*)

*manure: (婉曲的に)馬などの糞　　**urine: 尿

問1　空欄(a)～(e)に入れるのにもっとも適切な語句を次の①～⑤から選び、その番号を書きなさい。ただし、同じ番号を繰り返して用いないこと。

① any time soon　② by the turn of the century　③ every day
④ more than a century　⑤ over a longer period

問2　文中**ア**[　　]の中の語を文意に沿うように並べかえなさい。

問3　馬とラバは 1840 年時点でアメリカには何万頭くらいいたと推定されるか。その数を次の①～⑤から選び、その番号を書きなさい。

① 46 万頭　② 160 万頭　③ 460 万頭
④ 1600 万頭　⑤ 1 億 6000 万頭

問4　論旨を踏まえて、空欄(　　I　　)に入れるのにもっとも適切な文を次の①～⑤から選び、その番号を書きなさい。

① A world with horses must have been as hard to picture as it is for us to imagine a world with cars and trucks.

② A world with horses must have been as easy to picture as it is for us to imagine a world without cars and trucks.

③ A world without horses must have been as easy to picture as it is for us to imagine a world without cars and trucks.

④ A world without horses must have been as hard to picture as it is for us to imagine a world with cars and trucks.

⑤ A world without horses must have been as hard to picture as it is for us to imagine a world without cars and trucks.