

英語
(医学部)

— 2月7日 —

解答はすべて解答用紙に記入して提出しなさい。

次の英文を読み、問1、問3、問6、問8、問9は問い合わせに答え、問2、問4、問5、問7は文を完成させなさい。答えは最も適切なものを、それぞれA～Eの中から一つ選びなさい。問10は指示に従ってTかFを選びなさい。

Our day-to-day lives are shaped by the use of watches and clocks. However, these devices that tell us when class starts or work has finished are human inventions. At the same time, humans are also dependent on another type of timekeeping mechanism that is embedded in our genes and existed before our ability to invent and use machines. Our biological clock, also called a "circadian clock," helps to guide our sleep, ensure our alertness, and even maintain our health. The word "circadian" is derived from the Latin words *circa* and *dies* meaning "about" and "day," respectively, and refers to a naturally-occurring 24-hour cycle.

A day is a cycle of light and dark that lasts 24 hours; these changes in light inform our circadian clock, which roughly follows the same 24-hour pattern. Our bodies adjust to day and night by subconsciously preparing us for the next phase. For example, as the planet spins and the dark of night arrives, our circadian clock gradually lowers our body temperature and blood pressure, making us feel tired in preparation for sleep. Just before we wake up in the morning, our natural clock gives our metabolism a boost, getting us ready for the day's activities.

During the 24-hour day, we are repairing cells and breaking down our food into useful compounds such as proteins, fats, and carbohydrates. [1], our bodies continually produce the energy we need in order to walk, exercise, or work. Thousands of biological functions must work in harmony for all of these processes to take place successfully. Without a biological clock ensuring that each of our cells is getting the material it needs at the right time and place, our biological demands would be impossible to fulfill.

The notion of a body clock was first explored in the fourth century, but it was not until the work of Jeffrey Hall, Michael Rosbash, and Michael Young in the 1980s that we gained our first clear understanding of how this innate time-keeping works. They discovered that the information that guides our circadian clock is embedded in our genes. The team was awarded the 2017 Nobel Prize in Physiology or Medicine for their isolation of biological clock genes in fruit flies.

Genes almost identical to those in fruit flies can be found in humans, birds, and even fish. An appreciation of how circadian clocks function and the role they play in human biology has led to advances in many areas. Perhaps the most important of these is an understanding of how circadian rhythms are linked to overall health. The disruption of a biological clock can have seriously adverse effects on our well-being.

Shift workers are particularly prone to circadian disturbance. Night-shift workers who try to sleep during the day tend to have shorter and poorer-quality sleep. This is because the circadian system is instructing their bodies that they should be awake. Such interference can have a negative impact on memory, problem-solving abilities, and emotions. Research has shown that night-shift work can increase the risk of physical illnesses such as heart disease, diabetes, and obesity, mental illnesses such as depression, and neurological conditions like Alzheimer's disease.

Future research into biological clocks is essential. Chronobiology is a new field of investigation that combines our current understanding of the biological clock with exploration in the field of medicine. By engaging in such investigation, scientists hope to further understand why circadian disruption has such a significant impact on our health and gain more knowledge on how it can be treated.

問 1 According to the first paragraph, which of the following is true about a biological clock? _____

- ア. It looks similar to a clock on the wall.
- イ. It originates from old English words.
- ウ. It helps us sleep at certain times.
- エ. It tells us when to start or finish school.

問 2 According to the second paragraph, our circadian clock is strongly influenced by _____.

- ア. a cycle of cold and warmth
- イ. the rotation of the earth
- ウ. changes in our blood pressure
- エ. boosts in our metabolism

問 3 Which of the following best replaces [1] in the third paragraph? _____

- ア. Sooner or later
- イ. In the first place
- ウ. From a distance
- エ. At the same time

問 4 According to the third paragraph, a biological clock _____.

- ア. needs to be renewed and repaired on a daily basis
- イ. breaks down cells in order to release energy
- ウ. regulates the distribution of essential nutrition
- エ. places unnecessary demands on the body

問 5 According to the fourth paragraph, Hall, Rosbash, and Young _____.

- ア. were pioneers in explaining how biological clocks function
- イ. discovered the biological clock in the fourth century
- ウ. were able to implant a biological clock in fruit flies
- エ. received a Nobel Prize in the 1980s for their work

問 6 According to the fifth paragraph, why is knowledge about circadian clocks in fruit flies important?

- ア. It gives us a deeper understanding of the differences between fish and birds.
- イ. Fruit fly genes could be used to disrupt biological clocks in human beings.
- ウ. The overall health of fruit fly populations is in decline.
- エ. It helps us to understand human circadian rhythms.

問7 According to the sixth paragraph, shift workers are _____.

- ア. able to sleep adequately during the day
- イ. likely to experience body clock disorders
- ウ. gifted with increased problem-solving skills
- エ. becoming healthier from working at night

問8 According to the final paragraph, which of the following is true?

- ア. Chronobiology has long been an important field of scientific exploration.
- イ. Current treatments for circadian disruption have a significant negative impact on our lives.
- ウ. The study of biological clocks could lead to essential medical advancements.
- エ. Scientists have a conclusive understanding of the link between body clocks and health.

問9 Which would be the best title for the passage?

- ア. Circadian Disorders in Animals
- イ. Biological Knowledge
- ウ. The Ecology of Fruit Flies
- エ. The Hidden Clock Inside Us

問10 According to the passage, mark "T" if the statement is true and mark "F" if the statement is false.

1. Circadian clocks were invented by early humans.
2. Circadian clocks are partly responsible for lowering our body temperature at night.
3. Fish and fruit flies share some very similar genes.
4. Physical and mental illnesses can be treated by circadian disruption.
5. Night-shift workers have learned to completely overcome the influence of their biological clocks.

次の1～10の英文の空所に入る最も適切な語(句)を、それぞれA～Eの中から一つ選びなさい。

1. I am exhausted! If you don't mind, I would rather not () the reception tonight.
ア. to attending イ. to attend ウ. attending エ. attend
2. Steve's garden is overgrown with weeds. He never takes care of it, ()?
ア. he does イ. doesn't he ウ. does he エ. he doesn't
3. Don't forget your key, () you will be locked out tonight.
ア. or イ. and ウ. but エ. nor
4. Family is () acknowledged as one of the key factors in our mental growth.
ア. generalization イ. general ウ. generalize エ. generally
5. Professor Donovan refused to assess any graduate theses () after the deadline.
ア. submitting イ. submitted ウ. had submitted エ. were submitted
6. Our neighbor often plays his piano loudly, () makes it difficult for us to sleep.
ア. which イ. that ウ. when エ. it
7. Our stay at the Blue Island Hotel () more enjoyable if the weather had been better.
ア. would have been イ. will be ウ. has been エ. will have been
8. I trust that you will take all your trash home when you () barbecuing.
ア. will finish イ. will have finished ウ. have been finished エ. have finished
9. This year's race for city governor had by far the () number of candidates since 1980.
ア. lower イ. low ウ. lowest エ. lowly
10. My friend and I went to a restaurant with a cash-only policy, but () of us was carrying any.
ア. either イ. neither ウ. no エ. both

次の1～10の英文を読み、下線部の意味に最も近い語(句)を、それぞれA～Eの中から一つ選びなさい。

1. We had anticipated the change of plans and were fully prepared for it.

A. restricted B. effected C. neglected D. predicted

2. Fred likes to make believe he is a ninja on a secret mission.

A. credit B. learn C. pretend D. remark

3. After a month of practicing, Mary conquered her fear of speaking in front of people.

A. developed B. froze C. overcame D. maximized

4. Since the new policy was implemented, the Japanese economy has been improving by degrees.

A. gradually B. permanently C. unexpectedly D. widely

5. Technology has been developed to reduce the emission of carbon dioxide.

A. concentration B. discharge C. elimination D. storage

6. This list is very comprehensive, but not exhaustive enough for us.

A. accurate B. complete C. interesting D. rare

7. We were trying to figure out why we could not see anything on the TV screen.

A. determine B. explain C. plan D. hear

8. Jess likes to keep her room orderly so she can study in comfort.

A. available B. quiet C. tidy D. warm

9. Take your pick from these four exciting new products at our store.

A. Choose B. Judge C. Protect D. Refrain

10. She went downstairs into the damp, dark basement and listened for any sounds.

A. clear B. flat C. gloomy D. moist

4

次の2つの会話文を読み、1～5、7、9はその意味・内容に合うように文を完成させ、6、8は問い合わせに答えなさい。答えは最も適切なものを、それぞれA～Eの中から一つ選びなさい。

Chef: Why's that customer yelling at Tom? Is there a problem with his steak?

Bruce: Yes, there is. I overheard it all. That guy's a regular; his name's Mr. Walters, and he ordered a rare steak, but Tom's given him a well-done one. He's blowing his top. What should I do?

Chef: This isn't the first time Tom's been in trouble with a customer. Tell him to bring the steak back to the kitchen so that you, not Tom, can give him another one. That should calm him down.

Bruce: Certainly. But he also has a problem with his vegetables. He claims the carrots are too soft and don't have any taste at all, and the boiled potatoes are almost raw. He says they're so hard that it's like they haven't been cooked.

Chef: I see. Please give him my apologies for the steak and tell him I'll replace it straight away. Tom must have gotten the order mixed up. But I did the carrots and the potatoes myself, so they're perfect, the same way I always cook them.

Bruce: Actually, he'd like to speak to the chef in person.

Chef: I'll go and talk to him.

...

Chef: Hello, Sir. What seems to be the problem?

Mr. Walters: The waiter brought me a burned steak, the carrots are overcooked, and the potatoes are undercooked. I'm not happy with the service at all. The waiter has made several mistakes with my order tonight, and he's been extremely arrogant, refusing to admit he's made an error.

Chef: Please accept my apologies. I'll send your dish back to the kitchen and get it replaced. We won't charge you for the steak. And by way of further apology, please accept a dessert, on the house, for the inconvenience.

Mr. Walters: That sounds acceptable. Thank you.

...

Bruce: Mr. Walters is angry at Tom again. He said the steak is included on the bill. Tom even filled in an amount for the tip on the receipt.

Chef: This attitude has to stop. With him around, our regular customers may never come back!

1. When Bruce says "blowing his top," he most likely means _____.
 ア. breathing heavily
 イ. eating quickly
 ウ. extremely angry
 エ. pleasantly surprised

2. According to the dialogue, Mr. Walters is NOT satisfied with the service because the waiter _____.

- ア. was rather rude
- イ. was too apologetic
- ウ. served crunchy carrots
- エ. forgot the potatoes

3. When the chef says "on the house," he most likely means _____.

- ア. to take away
- イ. with hot coffee
- ウ. on the rooftop
- エ. free of charge

4. According to the dialogue, Mr. Walters is angry after his meal because Tom _____.

- ア. refused to bring him his receipt
- イ. charged him for the steak
- ウ. told him not to come back
- エ. did not include a tip on the bill

Glyn: Did you and Adam enjoy the tour of the Haunted Manor House?

Nigel: Yeah! You know, they've filmed some famous movies and TV shows there.

Glyn: I've heard that. Like that TV show that was on the IBN Channel a few years back. There were lots of battles and fighting, but it wasn't frightening; it was more about magical creatures like dragons and unicorns. *Fire Sword*, I think it was called.

Nigel: Yes, that's the one! The Manor House is the perfect setting for a story like that: the romantic old building with brick walls and crumbling statues. It kind of looks like an ancient castle.

Glyn: Well, tell me more about the tour. What happened?

Nigel: Our guide, Cuthbert, was very knowledgeable about the local history, and he had so much enthusiasm that it was worth it for the history lesson alone.

Glyn: A history lesson? Well, I'm a history fan, but please tell me there were ghosts on your "haunted tour."

Nigel: After Cuthbert's talk, we went into the main hallway. It was dark with only our flashlights on, and he asked us to listen carefully for any noises. Suddenly, a mysterious blue light flew past us and up the stairs before disappearing into one of the upstairs bedrooms. Even Cuthbert was nervous.

Glyn: What? A blue light?

Nigel: Some people ran out of the house! Adam and I really wanted to see what was in that bedroom, though, so we stuck around.

Glyn: What happened next?

Nigel: We walked up the stairs to the bedroom the light had entered, and Cuthbert told us to turn off our flashlights before we stepped in. We stood there quietly in the dark, and nothing happened. At that point, I just figured the light we saw earlier had been a trick of the eye or maybe a light from a car passing outside.

Glyn: So that was it? I thought you said the tour was amazing! A flashing light and a history lesson don't sound that great.

Nigel: There's more! After a few minutes, he told us to turn our flashlights on. As soon we did, a table in the corner of the bedroom shifted a few inches across the floor! We screamed, pushed poor Cuthbert right out of the way, and ran. It made my night! You should definitely buy tickets for tomorrow night if it's not too late. You won't be disappointed.

Glyn: Moving furniture and screaming tourists? I think I'll give it a miss!

5. *Fire Sword* was most likely a _____ program.

- ア. horror
- イ. fantasy
- ウ. romance
- エ. comedy

6. Why was Cuthbert nervous in the main hallway?

- ア. His flashlight stopped working.
- イ. His tour group disappeared.
- ウ. They saw something strange.
- エ. They heard a mysterious noise.

7. When the tour group first entered the upstairs bedroom, they _____.

- ア. turned off their flashlights
- イ. ran back out again
- ウ. saw a car pass outside
- エ. stood and waited inside

8. Why did the tour group leave the upstairs bedroom in a hurry?

- ア. They heard a loud scream.
- イ. An item of furniture moved.
- ウ. Something pushed Cuthbert.
- エ. They were very disappointed.

9. When Glyn says "I think I'll give it a miss!" he most likely means _____.

- ア. he does not think it is worth joining
- イ. he missed out on buying tickets
- ウ. it is scheduled too late at night
- エ. it has plenty of historical content

5

次の問1～問3の英文を読み、話の流れに沿って意味が通るように並べ替えた場合、最も適切なものはどれか。それぞれア～エの中から一つ選びなさい。

問1 1. Volapük was popular for some time, but was later overtaken by Esperanto, which arose in the 19th century.

2. Lingua Ignota was the first known constructed language ever created.
3. However, constructed languages were not widely known until the language "Volapük" was created.
4. Constructed languages have been around for some time, as has the concept of a universal second language.

ア. 4 → 1 → 2 → 3 イ. 4 → 2 → 1 → 3
ウ. 4 → 1 → 3 → 2 エ. 4 → 2 → 3 → 1

問2 1. This situation was caused by commercial farming and the systematic collection of timber and fuel.

2. In 1974, the depletion of tropical rainforests was estimated to be about 240,000 km² a year.
3. There were demands from environmental groups to thoroughly record the impact of such activities.
4. In response to these requests, the United Nations compiled a list of Earth's most threatened biological resources.

ア. 2 → 1 → 3 → 4 イ. 2 → 4 → 1 → 3
ウ. 2 → 1 → 4 → 3 エ. 2 → 4 → 3 → 1

問3 1. At its birth, a star begins to produce helium.

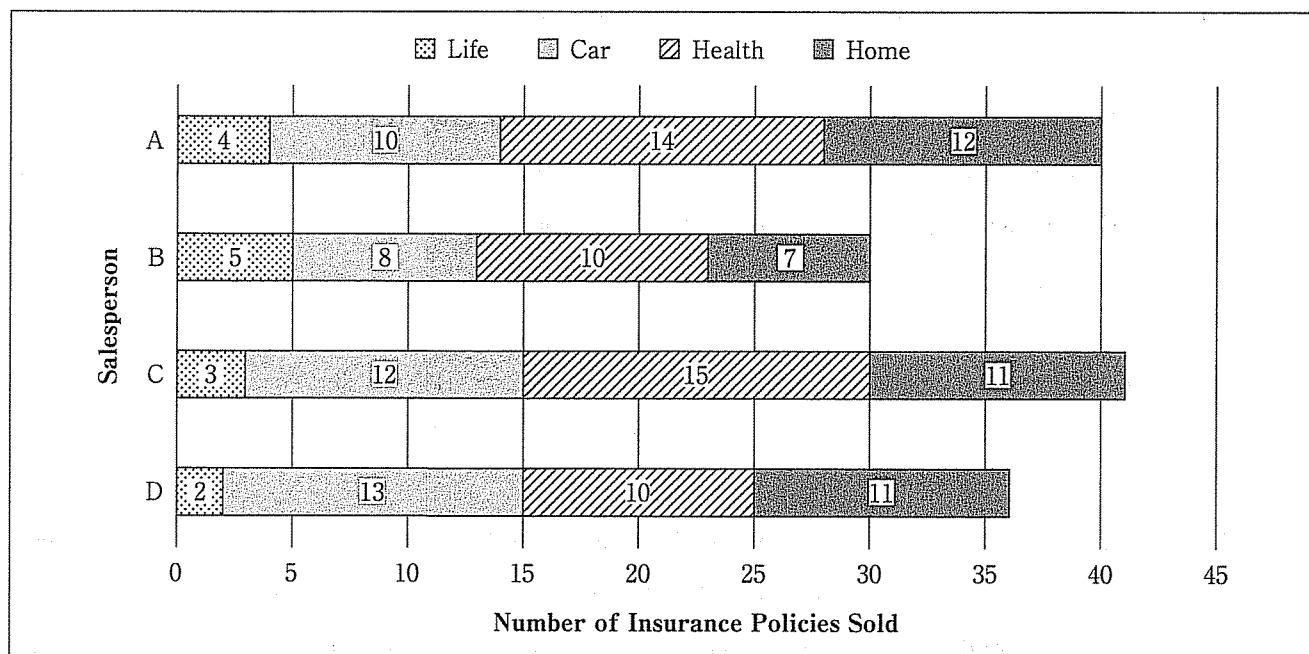
2. These higher temperatures, in turn, contribute to the star's eventual death.
3. The production of this gas takes place near the star's core.
4. The increase in helium leads to an increase in the temperature of the star.

ア. 1 → 2 → 3 → 4 イ. 1 → 3 → 2 → 4
ウ. 1 → 2 → 4 → 3 エ. 1 → 3 → 4 → 2

6

次のグラフを見て、英文の空所(1)~(4)に入る最も適切なものを、それぞれA~Eの中から一つ選びなさい。

Sales of Insurance Policies at Argan Insurance in March, 2018



―― 上記のグラフは架空のものです――

The above graph shows sales of life, car, health, and home insurance policies by four different salespeople at Argan Insurance Company for the month of March, 2018. Salesperson C was the top-seller at Argan in March with just over 40 policies sold. Salesperson A achieved the second-highest total sales, exactly (1) of which were car insurance policies. Although Salesperson B made the fewest total sales, his health insurance sales were (2) those of Salesperson D. For everyone except Salesperson (3), health insurance was the best-selling policy. Overall, (4) insurance proved to be the least popular type of insurance for customers. Argan Insurance is planning a new advertising campaign to address this situation.

(1) ア. one-fifth	イ. one-quarter	ウ. one-third	エ. one-half
(2) ア. half	イ. equal to	ウ. double	エ. three times
(3) ア. A	イ. B	ウ. C	エ. D
(4) ア. life	イ. car	ウ. health	エ. home

