英　　語

第１問　Read the following passage and choose the most appropriate answer from **a**～**d** for each question.

The characteristics of the rings inside a tree can tell scientists how old a tree is and what the weather conditions were like during each year of that tree's life. Very old trees can offer clues about what the climate in an area was like long before measurements were recorded. But（　1　）what the trees tell us, we first have to understand the difference between weather and climate.

Weather is（　2　）event—like a rain storm or hot day—that happens over a short period of time. Weather can be tracked within hours or days. Climate is the average weather conditions in a place over a long period of time.

Scientists at the National Weather Service have been keeping track of weather in the United States since 1891. But trees can keep a（　3　）longer record of Earth's climate. In fact, trees can live for hundreds—and sometimes even thousands—of years!

One way that scientists use trees to learn about past climate is by studying a tree's rings. If you've ever seen a tree *[1]stump, you probably（　4　）that the top of the stump had a series of rings. It looks a bit like a *[2]bullseye.

These rings can tell us how old the tree is, and what the weather was like during each year of the tree's life. The light-colored rings represent wood that grew in the spring and early summer,（　5　）the dark rings represent wood that grew in the late summer and fall. One light ring plus one dark ring equals one year of the tree's life.

Because trees are sensitive（　6　）local climate conditions, such as rain and temperature, they give scientists some information about that area's local climate in the past.

［Source: NASA/JPL - Caltech］

Notes: *[1]stump　木の切り株　　*[2]bullseye　的の中心

問 1 Which best fills in the blank (1)? **1**

a understand

b understood

c have understood

d to understand

問 2 Which best fills in the blank (2)? **2**

a a specific

b a stable

c a vague

d an extensive

問 3 Which best fills in the blank (3)? **3**

a farther

b much

c too

d very

問 4 Which best fills in the blank (4)? **4**

a gazed

b informed

c looked

d noticed

問 5 Which best fills in the blank (5)? **5**

a thus

b while

c by the time

d in conclusion

問 6 Which best fills in the blank (6)? **6**

a by

b for

c to

d with

第 2 問 Choose the most appropriate answer to fill in the blank from **a** ～ **d** for each question.

問 1 She (　　) for three hours when I visited her last night. 7

a studies

b is studying

c will have studied

d had been studying

問 2 With many people (　　) this project, these dogs became great guide dogs. 8

a support

b are supported

c supporting

d have supported

問 3 I told Beth several times to practice the flute more, but she (　　) listen to me. 9

a did

b ought not

c shall

d would not

問 4 The taste of the cake was (　　) that we couldn't help but eat it right away. 10

a much

b very

c such

d too

問 5 I worked at a restaurant when I was young, (　　) I gained customer service skills. 11

a where

b which

c how

d that

問 6 The bag is not very expensive now, but they say the price is (　　) to change without notice. 12

a subject

b objective

c surprised

d similar

問 7 A: I heard Jack's (　　) on some international trips lately.

B: Yes. He's visited a lot of places on business. 13

a made

b got

c done

d been

問 8 A: Would you like to join us and watch a baseball game next week?

B: (　　). 14

a You should come with us

b Let them take a break

c How I wish I could

d I can take your place

問 9 A: Is stress really a serious problem?

B: Sure. It is (　　) a wide variety of diseases. 15

a associated with

b picked out

c applied for

d made up

問10 Many people criticized my proposal, but Sunny was the only one who (　　) for it. 16

a assured

b contributed

c made it

d stood up

第 3 問 Read the following passage and choose the most appropriate answer from **a**～**d** for each question.

Emotions are mysterious things. Psychologists agree that various human emotions are a response to surrounding social environments. Emotions are not just simple states of mind but are fluid, *[1]evoked in our minds, *[2]triggered by our experiences. For example, after watching an exciting game with a winning or losing outcome, we may feel excited, *[3]frustrated, or even *[4]motivated to support the team. Recent studies have found that there are complex *[5]interactions between motivation and emotions. According to those studies, our motivation is determined by how much effort we are willing to put into completing a task. This finding somewhat contrasts with the assumption that people are motivated by *[6]tangible rewards, such as luxurious cars and houses.

Dan Ariely is a psychologist who has extensively studied employees' motivation by collecting their reactions to workplace experiences. In one of his studies, he analyzed the association between the type of tasks and motivation. He conducted an origami project with three groups of university students. Interestingly, the study found that the level of task complexity or intricateness influenced the degree of their involvement in their task. Let us look at the task in more detail. The first group made origami following written instructions, while the second group did the same task without written instructions. This made the second group's task more difficult. They spent more time on task than the first group. Lastly, the third group did not participate in making origami but instead observed the other two groups creating origami. The experimenter then asked the participants how much they would willingly pay for the origami. Curiously, the results showed that when they put more effort into their tasks, the students likely *[7]evaluate their origami highly. In the experiment, the two groups that actually made the origami said they would pay five times more money than the observational group. Furthermore, the group that worked without written instructions evaluated their origami more highly than those with written instructions. In other

words, those who completed more difficult tasks showed an increased love for their origami creations and appreciated them more.

Ariely suggests that, when it comes to a love of our work, the type of task plays a big role in motivating us. Those who put extra effort into achieving their goals and those who engaged longer in their tasks developed an increased love for their work. Nevertheless, many companies today break down employees' tasks into small components with a primary focus on efficiency. Ariely says it is more important to assign inspiring tasks and let workers decide how much effort and challenge they willingly accept.

[Source: Yasunaga, Akie. *Imagining a Better Society: Thinking and Learning Through TBL.* Shohakusha.]

Notes: *[1]evoke ～を呼び起こす *[2]trigger ～を誘発する *[3]frustrate ～をいらだたせる
*[4]motivate ～を動機づける *[5]interaction 相互作用 *[6]tangible 目に見える
*[7]evaluate ～を評価する

問 1 What do psychologists generally believe about human emotions? 17

a They are unrelated to our surroundings.

b They arise as a reaction to social contexts.

c They come from strict personal routines.

d They are permanent mental conditions.

問 2 What has been discovered through recent studies? 18

a Emotional factors such as willingness influence motivation.

b Rewards are the main source of emotions and motivation.

c Motivation has little to do with the levels of commitment.

d Motivation drops significantly after completing tasks.

問 3 What did Ariely do in his research? 19

- **a** Comparing the motivation levels of employees and students
- **b** Analyzing employees' complaints about financial problems
- **c** Conducting an experiment with students to study motivation
- **d** Collecting extensive data on psychologists' work experiences

問 4 How was Ariely's origami project organized? 20

- **a** Three groups were provided with identical tasks.
- **b** Two out of the three groups received instructions in writing.
- **c** The first group worked in teams and the others individually.
- **d** One of the groups watched how the others worked.

問 5 What did Ariely ask the three groups after completing their tasks? 21

- **a** What financial value the produced items have
- **b** How difficult their tasks were compared with those of other groups
- **c** How much effort they were willing to give to their work
- **d** What aspects of the tasks they particularly enjoyed

問 6 According to Ariely, what do the results of the origami project indicate? 22

- **a** More time spent on tasks causes lower self-assessment.
- **b** Higher level of difficulty deepens appreciation for work.
- **c** Simpler tasks result in higher work evaluations.
- **d** The amount of effort has no impact on work.

問 7 What is mentioned about the current practice of companies? 23

- **a** Reducing work hours to motivate employees
- **b** Promoting competition to increase productivity
- **c** Dividing tasks to give priority to efficient ways of working
- **d** Giving employees multiple tasks to help them adjust quickly

問 8 What recommendation does Ariely make regarding workplace motivation? 24

- **a** To allow workers to decide the level of challenge in their tasks
- **b** To eliminate complex projects from employee responsibilities
- **c** To encourage employees to play big roles regardless of their career goals
- **d** To split tasks up to increase employees' motivation

第 4 問 Read the following passage and choose the most appropriate answer from **a**～**d** for each question.

As they glide through the ocean, mighty *[1]humpback whales belt out complex melodies of moans, cries and *[2]squeaks. These sing-a-longs can last for hours, and males in a given population are known to *[3]transmit tunes to one another; they add their own twists to the song, which are then picked up by other males. (Females don't appear to sing.) Gradually, the songs spread between populations, so that a tune from an Indian Ocean population, for instance, might crop up among humpbacks of the South Pacific—like an ocean-wide game of telephone.

Now, as Roni Dengler reports for *Discover*, a new study has found that humpback whale songs don't stay the same forever. The melodies *[4]evolve to become increasingly complex over a period of a few years until, suddenly, the whales drop the tune for a new and simpler song—something that the authors of the study, published in *Proceedings of the Royal Society B*, *[5]deem a "cultural revolution."

A team led by marine biologist Jenny Allen of the University of Queensland analyzed recordings of eastern Australian humpback whales, taken over the course of 13 *[6]consecutive years. In total, according to Virginia Morell of *Science*, they looked at 412 song cycles from 95 singers, scoring the *[7]ditties' complexity based on the number of sounds, themes and variations.

The researchers found that the songs gradually evolve to become longer and include more parts, possibly due to flourishes that individual males come up with to distinguish themselves from the rest of the chorus. Scientists don't know precisely why male humpbacks sing, but some have theorized that they are putting on an acoustic performance to attract females—or even to impress their male buddies.

"Since all the males in a population sing the same song, small changes might be an opportunity to stand out from the crowd," Allen tells Dengler.

Every few years, however, the whales abandon their *[8]sophisticated melody in favor of a *[9]sparser song. The researchers aren't sure why, but *[10]paring down the tune

might give humpbacks a new opportunity to add their own *11embellishments. In a University of Queensland video, Allen compares the whales' shifting song preferences to the *12ebb and flow of fashion trends among humans.

"When a new fashion trend comes in, everybody wants to look new and slightly different," she says, "so everybody will *13incorporate that fashion trend until it becomes the *14norm."

It is also possible that, after a certain point, the whales just can't keep up with the increasingly elaborate songs. There may be "a limit to the whales' capacity to learn new material," Allen explains.

But make no mistake: humpback whales are highly sophisticated creatures. Their ability to transmit songs, not just within populations, but also between them, "is cultural transmission on a scale comparable to what we find in people," according to Allen. Having a better understanding of what drives cultural and social learning in whales could, therefore, help scientists gain new insight into why these *15traits have evolved with unparalleled complexity in humans.

Notes: *1humpback whale ザトウクジラ *2squeak キーキー声 *3transmit ～を送る、伝える
*4evolve 発展する *5deem ～を…と考える *6consecutive 連続した
*7ditty （短い）歌 *8sophisticated 洗練された *9sparse （情報などが）少ない
*10pare down ～をシンプルにする *11embellishment 装飾 *12ebb and flow 盛衰
*13incorporate ～を取り入れる *14norm 標準 *15trait 特質、特徴

問 1 What characterizes the songs produced by humpback whales? 25

a Brief, simple and quiet sounds

b Complex musical compositions

c Repeated patterns with no variation

d Silent communication via body movements

問 2 What humpback whales' characteristic is implied by the phrase "game of telephone" in the passage? 26

- **a** The sound transmission within a population is not accurate.
- **b** The tune spreads gradually throughout the oceans.
- **c** Each group has completely different songs.
- **d** Males and females frequently exchange songs.

問 3 What has been revealed by a new study? 27

- **a** Whales switch their songs after developing them for a certain period.
- **b** Whales tend to prefer simpler tunes to more complex ones.
- **c** A particular melody does not last for more than a year.
- **d** Whales stay in the same place until they finish composing a song.

問 4 How did the research team evaluate the complexity of the humpback whale songs? 28

- **a** By measuring the volume and frequency of each song
- **b** By labeling the quantity and variety of sound components
- **c** By recording the length of the humpback whale songs
- **d** By studying the distance the songs traveled underwater

問 5 Why might humpback whales introduce new elements to their songs? 29

- **a** To confuse fish in order to feed on them
- **b** To signal danger to other humpback whales
- **c** To compete with female humpback whales
- **d** To be better recognized by other humpback whales

問 6 What reason do researchers suggest for whales' returning to singing simpler songs? 30

- **a** To give them more chances for adding variations
- **b** To avoid confusing other whales in the area
- **c** To make it harder for others to follow the trends
- **d** To better control their energy needed for singing

問 7 What similarity does Allen find about the behaviors of whales and humans? 31

- **a** Avoiding unfamiliar things to stay safe
- **b** Following trends until they become common
- **c** Creating music mainly for survival
- **d** Using songs to teach younger generations

問 8 What does Allen indicate about the whales' ability? 32

- **a** Whales have an ability to copy the songs of other marine creatures.
- **b** Whales can memorize any songs no matter how complex they are.
- **c** The capacity of whales to learn songs might not be endless.
- **d** Whales can adapt to the changes in the marine environment.

問 9 Why is understanding humpback whales' ability to pass on songs important for scientists? 33

- **a** It would prove that humpback whales' intelligence is better than humans'.
- **b** It shows that animal communication is different from humans'.
- **c** It could offer perspective on humans' social behaviors and cultural development.
- **d** It demonstrates the unique nature of culture in southern oceans.