


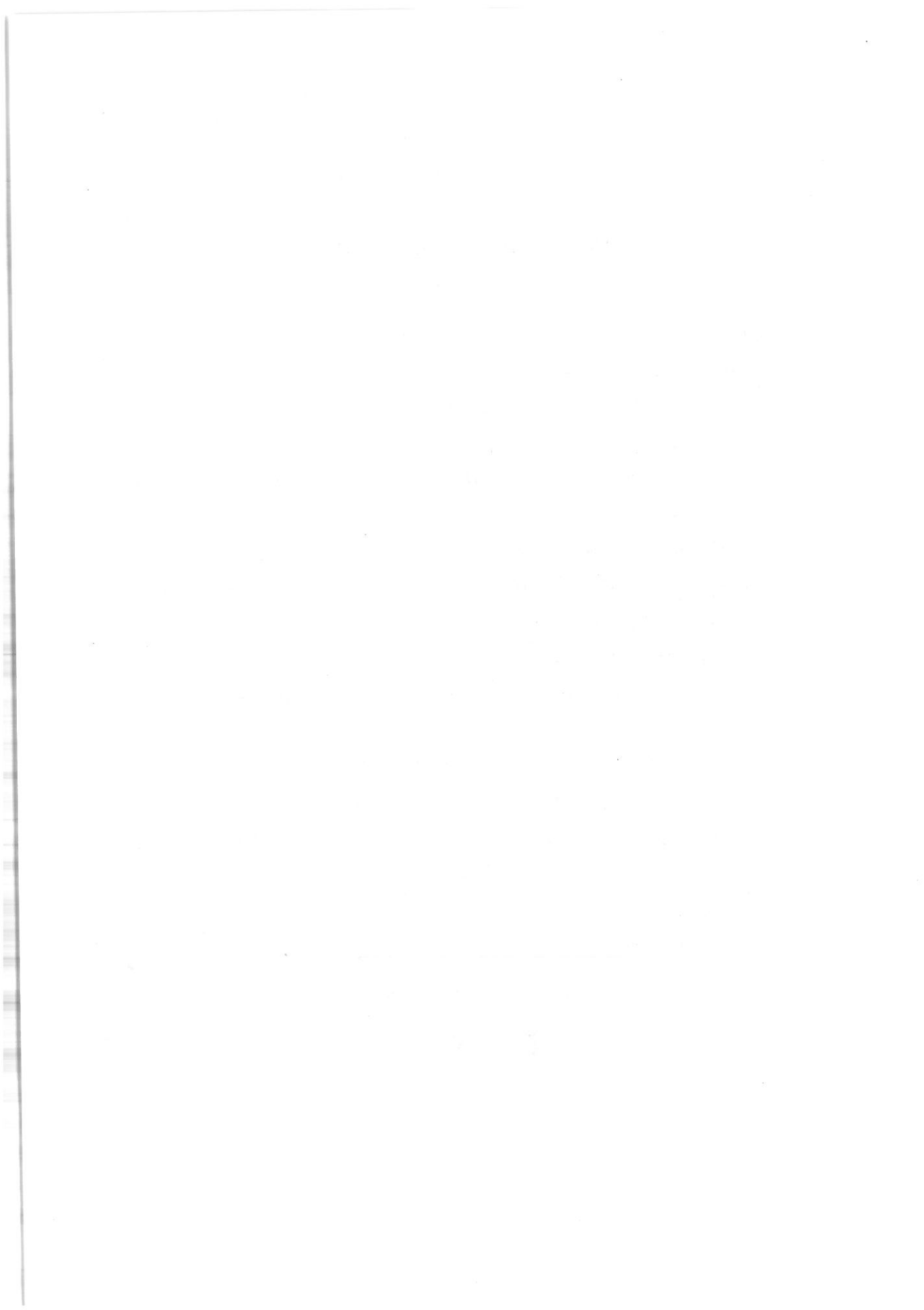
## 英 語 問 題

(解答番号 1～39)

はじめに、これを読みなさい。

1. この問題冊子は16ページある。ただしページ番号のない白紙はページ数に含まない。
2. 解答用紙に印刷されている受験番号が正しいかどうか受験票と照合し、確認すること。
3. 監督者の指示に従い解答用紙の氏名欄に氏名を記入すること。
4. 解答はすべて解答用紙の所定欄にマークもしくは記入すること。所定欄以外のところには何も記入しないこと。
5. 問題に指定された数より多くマークしないこと。
6. 解答は必ず鉛筆またはシャープペンシル(いずれもHB・黒)で記入のこと。
7. 訂正する場合は消しゴムできれいに消し、消しくずを残さないこと。
8. 解答用紙は、絶対に汚したり折り曲げたりしないこと。
9. 解答用紙はすべて回収するので、持ち帰らず、必ず提出すること。ただし、この問題冊子は、必ず持ち帰りなさい。
10. 試験時間は60分である。
11. マーク記入例

| 良い例   | 悪い例   |
|---|---|
|  |  |





[ I ] 次の文章を読んで、以下の質問に答えなさい。\*の付いた単語には文末に注があります。

The 500 series Shinkansen, famous for its sharp-angled, blue and silver nose cone, was the first train in Japan to exceed 300 kilometers per hour on a commercial run. At first sight, its futuristic design seems an uncompromising statement of human technological \*prowess, but Eiji Nakatsu, who directed development of the 500 series at West Japan Railway Co. during the 1990s, tells a more complex story.

He was struggling to come up with a nose design that would reduce the shockwave noise which occurred when the train entered a tunnel. Nakatsu, an avid bird watcher, remembered the form of a kingfisher as it breaks through water surfaces at high speed to catch fish. He realized, through repeated experiments, that the ideal shape for the nose cone was exactly the same as that of a kingfisher's beak.

Owls, meanwhile, offered hints on how to decrease noise caused by the pantograph—the arm-like device extending from the top of train carriages that draws electrical power from overhead lines. When an owl flies, the unevenness of its wing tips creates microscopic <sup>(10)</sup> \*eddies in the air which apparently reduce air resistance. Nakatsu experimented with the theory, attaching a zigzag shaped \*protuberance to the pantograph's extendable arm. Noise levels were reduced by two decibels, equivalent to the reduction in noise by slowing down 20 kilometers per hour. "I realized there are many things that we can learn from living creatures," says Nakatsu.

In fact, emulating the shapes and features of living creatures and applying them to engineering processes is an emerging discipline. It is known as biomimicry, and an increasing number of engineers are using it in their designs. \*Dragonflies, which are able to fly at slow speeds, have helped

Hideki Ishida, an engineering professor at Tohoku University, in his attempts to create small wind power generation propellers.

Ishida is working with researchers at Nippon Bunri University to design propellers that can be attached to the eaves of houses and respond to even the gentlest of breezes. They aim to build a viable power generator based on the design by the end of the year. Examining the blades from the side reveals that they are bent in a complex, bumpy pattern. Ishida found that the complex textures of a dragonfly's wings allowed air to flow smoothly across them. Similarly, the bumpy sections on the surface of the propeller blades create eddies in the air, allowing the wind to flow over them and enabling the propeller to turn even in the softest of winds. "Nature makes perfect sense. It can be said that living creatures are a 'gold mine' of inspiration," says Ishida.

The extent of our reliance on the estimated 10 million to 30 million species of plants, animals, and fungi that inhabit the Earth can often best be understood by looking at specifics, rather than trying to grasp our interaction with our environment in its entirety. Of course, that reliance reaches far beyond providing inspiration for engineers. On the outskirts of Wakayama, for instance, about 8,000 bumblebees buzz around a large glass-sided greenhouse, pollinating tomatoes. Kagome Co., a maker of tomato- and vegetable-based products, relies on bees for pollination at all of its vegetable gardens nationwide. Bees and other pollinators play a vital role in the cultivation of watermelons, apples, eggplants and other foods commonly found on our dining tables. Honeybees pollinate 90 percent of the strawberries grown in our greenhouses. We rely on nature for food in the form of meat and fish, lumber for use in paper and housing, fiber for clothing, and raw materials for pharmaceutical products that help cure illnesses. Forests provide oxygen and clean drinking water and prevent flooding.

Is it possible to \*quantify the extent of our reliance on nature? In 1997, a group of environmental experts including the U.S. economist Robert Costanza tried to do just that, estimating in monetary terms just how much benefit mankind receives from living organisms every year. Costanza and his group eventually arrived at a figure: the natural world's "ecosystem services" to mankind amounted to something in the range of \$16 trillion to \$54 trillion (1,280 trillion to 4,320 trillion yen at an exchange rate of 80 yen to the dollar) annually. At the time, the total global gross domestic product annually was \$18 trillion. "Treating \*biodiversity in a scientific manner and attempting to tie it in to conservation and other policies will become increasingly important,"<sup>(1)</sup> says Ryo Kohsaka, an associate professor of economics at Nagoya City University.

注

prowess : 優れた能力

eddies : (気流などの)渦巻き

protuberance : 突起部

dragonflies : トンボ

eaves : 軒

fungi : 菌類

pollinating : 授粉している

quantify : 数量化する

biodiversity : 生物の多様性

(1) 質問の答として最も適切なものを選び、その記号を解答欄にマークしなさい。

1 Which of the following sentences best expresses the essential information in the underlined sentence in paragraph 2?

- A After a while, Nakatsu understood that a kingfisher's beak imitated the Shinkansen's nose.
- B The ideal shape of a kingfisher's beak should be repeated through experiments.
- C Through research, Nakatsu determined that the Shinkansen's nose should resemble the beak of a kingfisher.
- D Despite his experiments, Nakatsu understood that the nose cone should be based on the shape of a kingfisher's beak.

2 Which of the following would be considered to be biomimicry?

- A A designer creates a raincoat that would be comfortable on a dog.
- B A submarine is designed to swim like a shark.
- C A dolphin learns to make the sound of a motorboat.
- D A building is engineered to allow birds to nest on the roof.

3 Why does the author mention Kagome Co.?

- A To give an example of a company that benefits from nature.
- B To illustrate the importance of fruits and vegetables.
- C To explain a method for cultivating honeybees.
- D To show the difference between pollination and production.

(2) 本文の内容に基づいて、4～9の英文を完成させるのに最も適切な選択肢をそれぞれ1つ選び、その記号を解答欄にマークしなさい。

4 The purpose of a pantograph is to

- A produce electricity for the train to go fast.
- B reduce the noise created by air resistance.
- C take power from the rails to the wheels.
- D deliver electrical current to power the train.

5 Small wind power generation propellers will be useful because

- A they can be used in normal everyday locations.
- B they can turn by using very little electricity.
- C they can imitate the flight of dragonflies.
- D they can generate more power than nuclear plants.

6 Ishida believes that

- A nature can inspire engineers to solve problems.
- B the natural genius of man can achieve everything.
- C dragonflies can be used for generating electricity.
- D man should modify nature to create new inventions.

7 Ishida uses the term “gold mine” to indicate that

- A nature can give us many ideas.
- B animals are a good source of energy.
- C a lot of money can be made from wildlife.
- D the natural world is very logical.



- 8 At a place near Wakayama, bumblebees
- A help keep tomatoes free from disease.
  - B are being pollinated in large glass greenhouses.
  - C help naturally promote the growth of tomatoes.
  - D make a buzzing noise that helps pollinate tomatoes.

- 9 A group of experts have tried to assess
- A how mankind could avoid its reliance on nature.
  - B the financial benefits of nature to mankind.
  - C the amount of money the U.S. spends on nature each year.
  - D how the costs of living organisms could be reduced.

(3) 下線部 10～11 の内容に最も近いものをそれぞれ一つ選び、その記号を解答欄にマークしなさい。

10 microscopic

- A tiny                      B soft                      C feathery                      D precise

11 it

- A scientific manner                      B gross domestic product  
C \$18 trillion                      D biodiversity

〔Ⅱ〕 12～25 の空欄に入れるのに最も適当なものを、それぞれ下のA～Dの中から1つ選び、その記号を解答用紙の所定欄にマークしなさい。

12 The train bound ( ) Pelham arrives at 1:23.

- A by                      B for                      C in                      D with

13 He hasn't been back to work ( ) his accident.

- A because              B by                      C since                      D until

14 Carl is over 50 years old now, but he tries to dress like a teenager. Those clothes ( ) him.

- A aren't suitable                      B don't suit  
C mismatch                      D not appropriate

15 The soccer match is really exciting, but I know that I ( ) to turn off the TV and do my homework.

- A had better              B mightn't                      C ought                      D should

16 I've lived in Japan all of my life. I ( ) been abroad.

- A hasn't never              B didn't never              C have ever                      D haven't ever

17 I usually stop at the convenience store ( ) home from work.

- A for                      B in coming                      C on my way                      D to

18 In order to prepare for the essay, I'll need to ( ) a number of books from the library.

- A borrow                      B invest                      C lend                      D rent

- 19 His colleagues, ( ) at the news of his resignation, could not utter a word.  
A delight            B shocked            C surprising            D perplexing
- 20 You couldn't imagine how ( ) James's Japanese was thirty years ago.  
A badly            B fluently            C poor            D well
- 21 I just remembered that I had ( ) at the dentist this afternoon.  
A a commencement            B an appointment  
C attendance            D present
- 22 This question may need significant ( ), as many of us think it is too easy for our applicants.  
A rewriter            B revised            C revision            D to rewrite
- 23 An exceptionally attractive lady came up to me and ( ) if I wanted to dine with her tonight.  
A asked            B invited            C said            D suggested
- 24 I ( ) to this examination room much earlier except that my train was delayed by that accident.  
A could come            B had been unable to come  
C would come            D would have come
- 25 It will be a long time ( ) she can write as efficiently as her classmates. She has got a lot of catching up to do.  
A ago            B before            C by            D whether

〔Ⅲ〕 次の文章を読んで、以下の質問に答えなさい。\*の付いた単語には文末に注があります。

In the early 1990s, a trio of psychologists descended on a historic arts academy in the heart of West Berlin. They came to study the violinists. As described in their subsequent publication, the researchers asked the academy's music professors to help them identify a set of standout violin players — the students who the professors believed would go on to careers as professional performers. We'll call this group the *elite players*.

For a point of comparison, they also selected a group of students from the school's education department. These were students who were on track to become music teachers. They were serious about violin, but as their professors explained, their ability was not in the same league as the first group. We'll call this group the *average players*.

The three researchers subjected their subjects to a series of in-depth interviews. They then gave them diaries which divided each 24-hour period into 50-minute chunks, and sent them home to keep a careful log of how they spent their time. Flush with data, the researchers went to work trying to answer a fundamental question: *Why are the elite players better than the average players?*

The obvious guess is that the elite players are more dedicated to their craft. That is, they're willing to put in the long hours required to get good, while the average players are off, enjoying life. The data, as it turns out, had a different story to tell.

We can start by disproving the assumption that the elite players dedicate more hours to music. The time diaries revealed that both groups spent, on average, the same number of hours on music per week (around 50). The difference was in how they spent this time. The elite players were spending almost three times more hours than the average players on deliberate practice — the uncomfortable, methodical work of stretching your ability. This

might not be surprising, as the importance of deliberate practice has been reported many times.

But the researchers weren't done. They also studied how the students scheduled their work. The average players, they discovered, spread their work throughout the day. A graph included in the paper, which shows the average time spent working versus the waking hours of the day, is essentially flat. The elite players, by contrast, consolidated their work into two well-defined periods. When you plot the average time spent working versus the hours of the day for these players, there are two prominent peaks: one in the morning and one in the afternoon.

In fact, the more elite the player, the more pronounced the peaks. For the best of the best — the subset of the elites who the professors thought would go on to play in one of Germany's two best professional orchestras — there was essentially no deviation from a rigid two-sessions-a-day schedule. This isolation of work from leisure had pronounced effects in other areas of the players' lives.

Consider, for example, sleep: the elite players slept an hour more per night than the average players. Also consider relaxation. The researchers asked the players to estimate how much time they dedicated each week to leisure activities — an important indicator of their subjective feeling of relaxation. By this \*metric, the elite players were significantly more relaxed than the average players, and the best of the best were the most relaxed of all.

To summarize these results:

- The average players are working just as many hours as the elite players (around 50 hours a week spent on music),
- but they're not dedicating these hours to the right type of work (spending far less time than the elites on crucial deliberate practice),

- and furthermore, they spread this work \*haphazardly throughout the day. So even though they're not doing more work than the elite players, they end up sleeping less and feeling more stressed, not to mention that they remain worse at the violin.

I've seen this same phenomenon time and again in my study of high achievers. It came up so often in my study of top students, for example, that I even coined a name for it: the paradox of the relaxed \*Rhodes Scholar.

This study sheds some light on this paradox. It provides \*empirical evidence that there's a difference between hard work and hard-to-do work:

- **Hard work** is deliberate practice. It's not fun while you're doing it, but you don't have to do too much of it in any one day (the elite players spent, on average, 3.5 hours per day engaged in deliberate practice, broken into two sessions). It also provides you with measurable progress in a skill, which generates a strong sense of contentment and motivation. Therefore, although hard work is hard, it's not draining and it can fit nicely into a relaxed and enjoyable day.
- **Hard-to-do work**, by contrast, *is* draining. It has you running around all day in a state of false busyness that leaves you, like the average players from the Berlin study, feeling tired and stressed. It also, as we just learned, has very little to do with real accomplishment.

This analysis leads to an important conclusion. Whether you're a student or well along in your career, if your goal is to build a remarkable life, then <sup>(39)</sup> busyness and exhaustion should be your enemy. If you're chronically stressed and up late working, you're doing something wrong. You're the average players from the arts academy—not the elite. You've built a life around hard-to-do work, not hard work.

The solution suggested by this research, as well as my own, is as simple as it is startling: Do less. But do what you do with complete and hard focus. Then when you're done be done, and go enjoy the rest of the day.

注

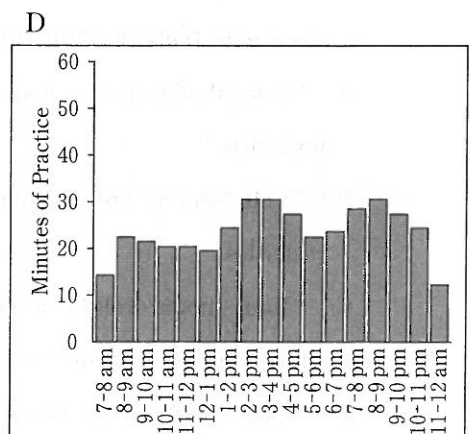
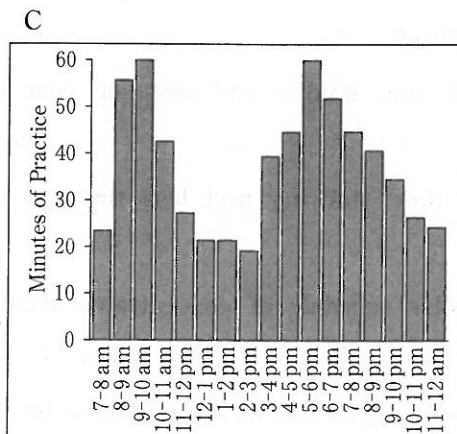
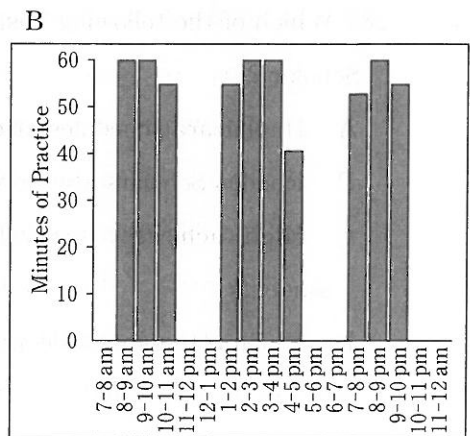
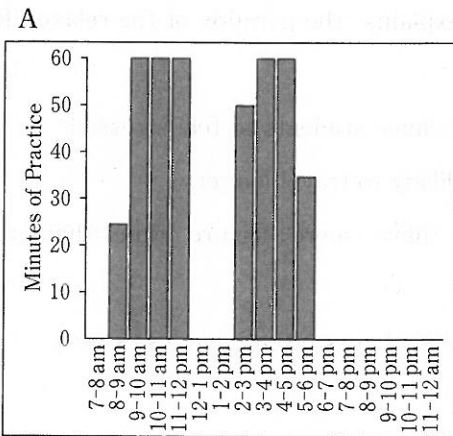
metric : 測定基準

haphazardly : 不規則に

Rhodes Scholar : オクスフォード大学で学ぶ奨学金受給留学生

empirical : 実験に基づく

- (1) A～Dのグラフは調査対象となった生徒4名の練習パターンを示したものである。各時間帯の練習量は全調査期間を通じて平均化してある。これについて26～27の質問に答えなさい。



26 Which of these graphs best matches the practice pattern of a typical “elite” student from the study?

27 Which of these graphs best matches the practice pattern of a typical “average” student from the study?

(2) 質問の答として最も適切なものを選び、その記号を解答欄にマークしなさい。

28 Which of the following best explains “the paradox of the relaxed Rhodes Scholar”?

A Haphazard schedules often cause students to feel stressed.

B Rhodes Scholars are more likely to travel longer.

C High achievers generally have more leisure time than average students.

D Violin players who sleep longer hours often have less stress.

29 Which of the following would most likely be the author’s advice for a student who feels tired and stressed?

A “You should focus less on your studies and more on your leisure activities.”

B “You should spend more time studying and less time on leisure activities.”

C “You should follow a regular schedule of concentrated study, and allow time for leisure.”

D “You should sleep more so that you will have more time for leisure activities.”



- (3) 本文の内容に基づいて、30～35の英文を完成させるのに最も適切な選択肢をそれぞれ1つ選び、その記号を解答欄にマークしなさい。

- 30 This study took place at
- A a famous school of psychology in Berlin.
  - B a Berlin academy of historical studies.
  - C a music academy in Germany.
  - D a martial arts academy in West Berlin.
- 31 The researchers asked the students to
- A keep a diary for a day, divided into chunks.
  - B go home and read a diary each day for 50 minutes.
  - C record each day's activities in detail.
  - D divide their daily lives between performing and teaching.
- 32 The data shows that
- A the top players spent more hours on their music.
  - B students in both groups practiced about the same amount of time.
  - C the average players spent more time on practice.
  - D the top players were lazy and did not practice.
- 33 The researchers found that
- A the top players got more sleep and were more relaxed.
  - B the average players stayed up late, enjoying themselves.
  - C the top players did not value leisure and were stressed.
  - D the average players slept late and therefore were relaxed.

- 34 The phenomenon among the high achievers in this study
- A was surprising news to the writer of the text.
  - B made the writer invent a special name for them.
  - C was already familiar to the writer.
  - D repeated research that the writer had already carried out.

- 35 Average players
- A don't succeed because they are lazy and disorganized.
  - B achieve a balanced life in terms of work and leisure.
  - C carefully plan their lives in order to create success.
  - D work in a less effective and less productive way.

(4) 下線部 36~39 の内容に最も近いものをそれぞれ一つ選び、その記号を解答欄にマークしなさい。

36 standout

- A exceptional
- B tall
- C hard-working
- D established

37 Flush with data

- A having a lot of information
- B destroying documents
- C needing to know more
- D doing some research

38 pronounced

A spoken

B significant

C subtle

D entrenched

39 well along

A established

B starting

C searching

D wealthy

