

I

次の空所を埋めよ。（配点 40）

- (1)  $i^2 = -1$  とする。 $(1-i)^2 =$   であり、 $(1-i)^{16} =$   である。
- (2)  $\frac{2}{\sqrt{5}+\sqrt{3}}$  は分母を有理化すると  である。また、 $\sqrt{8-2\sqrt{15}} =$    $-\sqrt{3}$  である。
- (3) 方程式  $2|x-4| = x-1$  を解くと、 $x =$   ,  である。ただし、  $<$   とする。
- (4) 不等式  $2^{1+x} + 2^{1-x} < 5$  を解くと、  $< x <$   である。

II

次の空所を埋めよ。（配点 30）

- (1)  $\theta$  は鋭角とする。 $\cos \theta = \frac{1}{4}$  のとき、 $\sin \theta =$   である。
- (2)  $2 \cos 2\theta - 4 \cos \theta + 3 = 0$  のとき、 $\theta =$   である。ただし、 $0 \leq \theta \leq \pi$  とする。
- (3) 円に内接する四角形 ABCD がある。AB = 5, AD = 8, BC = 3,  $\angle BAD = 60^\circ$  とする。  
このとき、対角線 BD の長さは  であり、この円の半径は  である。  
さらに、辺 CD の長さは  であり、四角形 ABCD の面積は  である。

III

関数  $f(x) = x^3 + ax + b$  について、次の問いに答えよ。ただし、 $a, b$  は定数とする。（配点 30）

- (1)  $f(x)$  が  $x = 2$  で極値をとるとき、 $a$  の値を求めよ。
- (2)  $a$  を (1) で求めた値とする。 $f(x)$  の極大値が 0 のとき、 $b$  の値を求めよ。
- (3)  $a, b$  を (1), (2) で求めた値とする。曲線  $y = f(x)$  と  $x$  軸で囲まれた図形の面積を求めよ。  
ただし、 $\int x^3 dx = \frac{x^4}{4} + C$  ( $C$  は積分定数) を用いてよい。

Ⅰ 次のエイプリルフールについての英文を読み、下記の設問に答えよ。（配点 27）

What is April Fools' Day and what are its origins? It is commonly believed that in medieval France, New Year was celebrated on <sup>1)</sup> April 1. Then in 1562, Pope Gregory introduced a new calendar for the Christian world, changing New Year to January 1. With no modern communications, news travelled slowly and new ideas were often questioned. Many people did not hear of the change, others chose to ignore it, while some merely forgot. These people were called fools. Invitations to non-existent 'New Year' parties were sent and other practical jokes were played. This <sup>2)</sup> jesting evolved over time into a tradition of playing tricks on April 1. The custom eventually spread to England and Scotland, and it was later transported across the Atlantic to the American colonies of the English and the French. April Fools' Day has now developed into an international festival of fun, with different nationalities celebrating the day in special ways.

In France and Italy, if someone plays a trick on you, you are the <sup>3)</sup> 'fish of April'. By the month of April, fish have only just <sup>\*</sup>hatched and are therefore easy to catch. Children stick paper fish to their friends' backs and chocolate fish are found in the shops.

In Scotland, April Fools' Day lasts for two days! The second day is called <sup>4)</sup> 'Taily Day' and tricks on this day involve the bottom (or the 'tail' in informal speech).

In Spain and Mexico, similar celebrations take place on December 28.

Today, Americans and the British play small tricks on friends and strangers on April 1. Schoolchildren might tell a friend that school has been cancelled. Sometimes the media get involved. Once, a British short film was shown on April Fools' Day about spaghetti farmers and how they harvest their crop from spaghetti trees!

Most April Fool jokes are in good fun and not meant to harm anyone. The best trick is the one where everyone 6, especially the person upon whom the joke has been played.

注 <sup>\*</sup>hatched ふ化した

（ April Fool's Day by Claire Powell and Dave Collett from British Council.  
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(1) 下線部1) April 1 の読み方を、次の中から1つ選び、その番号をマークせよ。 1

- ① April first
- ② April the one
- ③ one April
- ④ one in April

(2) 下線部 2) jesting の意味として最も適切なものを、次の中から 1 つ選び、その番号をマークせよ。

2

- ① forgetfulness
- ② kind behavior
- ③ strict practice
- ④ playfulness

(3) 下線部 3) fish of April の意味として最も適切なものを、次の中から 1 つ選び、その番号をマークせよ。

3

- ① one who likes chocolate fish
- ② one who is played a trick on by someone
- ③ one who plays a trick on someone
- ④ one that is just hatched

(4) 下線部 4) Taily Day の意味として最も適切なものを、次の中から 1 つ選び、その番号をマークせよ。

4

- ① the second day of April Fools' Day in England
- ② the day when tails of animals are displayed
- ③ the day when people play tricks involving the bottom
- ④ the day when people celebrate by playing tricks in Spain and Mexico.

(5) 本文の内容に合わないものを、次の中から 1 つ選び、その番号をマークせよ。

5

- ① Many people believe that in medieval France New Year was celebrated on April 1.
- ② Playing tricks on April 1 was started in the French colonies in America.
- ③ In some countries people celebrate on December 28 similarly as on April Fools' Day.
- ④ There was once a short film shown on media about spaghetti trees.

(6) 空所 6 に入る最も適切なものを、次の中から 1 つ選び、その番号をマークせよ。

6

- ① cries      ② understands      ③ sings      ④ laughs

Ⅱ 次は、スピーキングテストに備えるコツについての英文である。空所 7 ~ 14 に入る最も適切なものを、選択肢の中から 1 つ選び、その番号をマークせよ。(配点 24)

This is going to help you to prepare for speaking exams, which for many learners are the exam that is most feared! This will give you lots of tips and advice so you can do as well as possible in any speaking test. Remember that everyone gets nervous in exams, especially oral exams. So, don't worry, our tips will help you feel confident in a speaking exam.

- Listening to as much English as possible will help to improve your speaking. Listening to songs, podcasts, films, TV series or video clips will help you to feel 7 about speaking.
- Speak as much English in class as possible. If you speak English regularly in class, you will find it easier to speak in an exam.
- Slow down! It's not a race. 8 you speak, think carefully about what to say and speak a little slower than normal.
- Use language you know is correct. Use words and expressions you have used 9.
- If you don't know a word, think 10 another way to say it. For example, if you know the word 'expensive', but can't remember the word 'cheap', you could say: *It's not expensive. It's a good price. It's not a lot of money.*
- Listen to yourself 11 you speak and if you hear a mistake, correct it. Native speakers make mistakes and correct them all the time.
- Look at the examiner's or other student's face and eyes when you speak. Do they understand you? If not, say it again with different words.
- If you don't understand the question or the activity, ask the examiner. Say: 'Could you 12 that, please?'
- Always say something. Don't just say 'yes' or 'no'. Explain your answer with a reason. Say 'Yes, I agree because....'
- If you can choose the question or topic, choose one you know something about. It's easier to talk about something you know.
- Speak clearly so that the examiner can hear you. If you find this difficult, practice with a friend at home. Stand at opposite ends of a room and speak to each other in English.
- This is your opportunity to show the examiner 13 you know. Use your best language and pronunciation.
- Remember that everyone feels nervous in exams. So, take some deep breaths before the exam and try to relax.
- 14, remember that the examiners are normal human beings, not aliens!

(Speaking Exams from British Council. Reproduced with permission of British Council.)

- 7    ① little confident                      ② less confident  
      ③ much confident                      ④ more confident

- 8    ① On    ② After  
      ③ Before                                      ④ Over

- 9    ① ago    ② then  
      ③ after                                        ④ before

- 10   ① by    ② with  
      ③ of    ④ from

- 11   ① while     ② who  
      ③ which                                        ④ what

- 12   ① repeat                                        ② listen  
      ③ tell    ④ whisper

- 13   ① which     ② what  
      ③ how    ④ who

- 14   ① Finally                                        ② Wrongly  
      ③ Formally                                    ④ Officially

Ⅲ Taro と Frank の会話を読み、下記の設問に答えよ。(配点 23)

Frank: Hey Taro. Do Japanese students often take a gap year ?

Taro: A gap year? Is that where you delay entering university for a year and go travelling around the world?

Frank: That's right! But not everyone goes travelling. Some people stay home and get some work experience and others work as volunteers at home or 15.

Taro: It's not so easy to do that in Japan. I don't think universities or employers would look at it in a positive way. How about in the UK?

Frank: I think it's often seen as a good experience by universities. Studies have shown that students that take a gap year often get better grades.

Taro: I wonder 16 that is.

Frank: One reason is that after a gap year students often have a better understanding of what they would like to study or the job they would like to get in the future. So they become more focused in their study.

Taro: But how about potential employers?

Frank: If you take a gap year and get work experience, that's usually seen as positive by employers. I'm not so sure if that's the same if you just go travelling.

Taro: But how do students pay to travel around the world?

Frank: I think parents often contribute some and some students work before they go or during the trip.

Taro: I don't think it's as easy for Japanese parents to do that 17 they already have to pay a lot for university fees which are very high in Japan.

Frank: That's too bad!

Taro: I wish I could do it but there's no way my parents could afford it. My plan is to work part-time in school holidays and then 18 a trip overseas before I graduate.

Frank: That sounds like a good idea.

(1) Which of the following words is best to fill in 15 ~ 18? Choose the best answer and mark the number on the answer sheet.

- |  |           |            |           |                 |
|--|-----------|------------|-----------|-----------------|
| <span style="border: 1px solid black; padding: 0 5px;">15</span> | ① abroad  | ② domestic | ③ foreign | ④ international |
| <span style="border: 1px solid black; padding: 0 5px;">16</span> | ① where   | ② whether  | ③ who     | ④ why           |
| <span style="border: 1px solid black; padding: 0 5px;">17</span> | ① because | ② so       | ③ then    | ④ whereas       |
| <span style="border: 1px solid black; padding: 0 5px;">18</span> | ① come    | ② go       | ③ take    | ④ visit         |

(2) Which of the following has the same meaning as “a gap year” in the conversation? Choose the best answer and mark the number on the answer sheet. 19

- ① A year off before starting university
- ② A year off part way through university
- ③ A year off before graduating from university
- ④ A year off after graduating from university

(3) Which of the following statements is true according to the conversation? Choose the best answer and mark the number on the answer sheet. 20

- ① In the UK, everyone goes travelling in a gap year.
- ② Students who don't take a gap year usually are more successful in their studies.
- ③ In the UK, employers often think a gap year spent working is a good experience.
- ④ Parents must pay all the costs of a gap year.

(4) Which of the following statements about Taro is true according to the conversation? Choose the best answer and mark the number on the answer sheet. 21

- ① Taro thinks it is easy for Japanese students to take a gap year.
- ② Taro has experienced a gap year.
- ③ Taro would like to travel abroad.
- ④ Taro is working part-time for a university.

Ⅳ 次は、2016 年 2 月 7 日付の新聞記事の抜粋である。図を参照しながら英文を読み、下記の設問に答えよ。(配点 26)

The central government and private companies are among those developing a system to automatically send health advice to employees through smartphones and other devices. The advice on illness prevention would be based on computer analyses of data including daily activity and food consumption sent from \*pedometers and other devices, [ 22 ] the results of health checks.

A government panel including health insurance societies and medical device manufacturers is currently discussing how to design the system. They plan to compile an outline by the end of March.

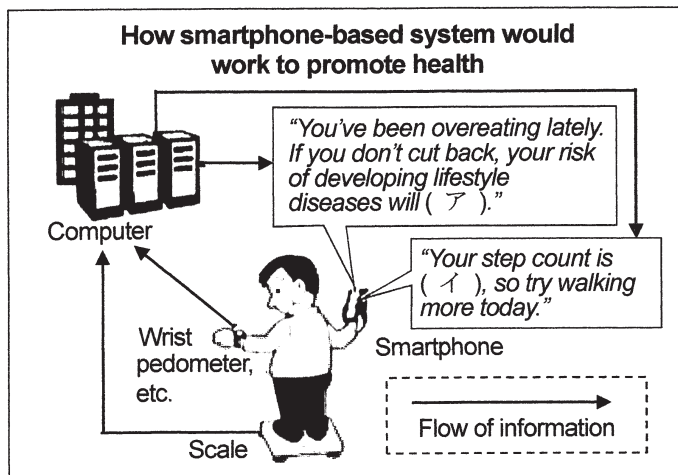
Several health-related devices that can send data electronically are currently 1) on the market, including pedometers, weight scales and blood pressure monitors. Device makers and others offer services that allow users to view their daily records via a smartphone or personal computer.

The planned system would combine data sent daily, such as from a pedometer, with a user's health check results, which are often held by a health insurance society, to offer personalized health advice. For example, someone [ 23 ] health check results indicate \*diabetes risk and who has not been very active lately may receive a message saying, "Let's walk more than usual today." Users could also enter the calories they consume into their smartphones and send the data to the system, which would then suggest [ 24 ] to eat or sleep.

The Economy, Trade and Industry Ministry is leading the effort, [ 25 ] private companies would handle the development of devices to track daily activity and smartphone applications. The government plans to create an organization that would include membership by health insurance societies, and to test the system on data from several tens of thousands of people. Kazuyo Tsushita, head of the Comprehensive Health Science Center in Aichi Prefecture, expressed hope the system would be beneficial. "2) Outside voices are important for sticking to health efforts, so I think information technology could play a role there. Ways could be found to give advice that is suited to each [ 26 ]," Tsushita said.

注 \*pedometer 万歩計 \*diabetes 糖尿病





(System to advise on health vis smartphones)  
(The Japan News, Feb 7, 2016)

(1) 空所 22 ～ 26 に入る最も適切なものを、次の中からそれぞれ1つ選び、その番号をマークせよ。

- |    |                |              |               |              |
|----|----------------|--------------|---------------|--------------|
| 22 | ① such as      | ② as well as | ③ in spite of | ④ because of |
| 23 | ① who          | ② whose      | ③ whom        | ④ of which   |
| 24 | ① what         | ② which      | ③ how many    | ④ how much   |
| 25 | ① while        | ② when       | ③ because     | ④ if         |
| 26 | ① organization | ② society    | ③ smartphone  | ④ individual |

(2) 下線部 1) on the market の意味として最も適切なものを、次の中から1つ選び、その番号をマークせよ。 27

- ① available      ② remarkable      ③ reasonable      ④ payable

(3) 下線部 2) Outside voices are important for sticking to health efforts, so I think information technology could play a role there の内容に合うものとして最も適切なものを、次の中から1つ選び、その番号をマークせよ。 28

- ① Information technology role-playing games are good for your health.  
 ② Your parents and friends are more helpful to promote health than smartphones.  
 ③ Information technology plays a role in sending your voice outside.  
 ④ Smartphones are useful for giving advice on good health.

(4) 図の空所 ( ア ) と ( イ ) に入る組み合わせとして最も適切なものを、次の中から1つ選び、その番号をマークせよ。 29

- ① rise – high      ② rise – low      ③ fall – high      ④ fall – low