

I 次の空所を埋めよ。(配点 40)

- (1) $i^2 = -1$ とする。 $(1 - \sqrt{3}i)^3 = \boxed{\text{ア}}$ である。
- (2) $a = \frac{1}{\sqrt{2}-1}$, $b = \frac{1}{\sqrt{2}+1}$ のとき, $a^2 + b^2 = \boxed{\text{イ}}$ であり, $a^4 + b^4 = \boxed{\text{ウ}}$ である。
- (3) 整式 $x^3 - 2x^2 + ax + b$ を $x - 1$ で割った余りが 1 , $x + 1$ で割った余りが -2 とするとき, 定数 a, b の値は $a = \boxed{\text{エ}}$, $b = \boxed{\text{オ}}$ である。
- (4) 方程式 $\log_4(2x - 5) + \log_4(x + 1) = \log_2(x - 1)$ を解くと, $x = \boxed{\text{カ}}$ である。
- (5) 2^{60} , $\left(\frac{5}{2}\right)^{50}$, 3^{40} を小さい順に並べると, $\boxed{\text{キ}} < \boxed{\text{ク}} < \boxed{\text{ケ}}$ である。

II $f(x) = x^3 - 6x + 1$ とするとき, 次の空所を埋めよ。(配点 30)

- (1) $f'(x) = \boxed{\text{ア}}$ である。
- (2) $f(x)$ は $x = \boxed{\text{イ}}$ のとき極大値 $\boxed{\text{ウ}}$ をとり, $x = \boxed{\text{エ}}$ のとき極小値 $\boxed{\text{オ}}$ をとる。
- (3) 放物線 $y = \boxed{\text{ア}}$ と x 軸で囲まれた図形の面積は $\boxed{\text{カ}}$ である。

III 関数 $y = \sin \theta + \cos^2 \theta + 1$ について, 次の問いに答えよ。ただし, $-\frac{\pi}{2} \leq \theta \leq \frac{\pi}{2}$ とする。(配点 30)

- (1) $\sin \theta = t$ において, y を t の式で表せ。
- (2) y の最大値および最小値を求めよ。また, そのときの θ の値を求めよ。

- I 次の英文 A, B は、日本の医療についてのある状況を述べている。英文 C は、英文 A, B の内容に関連する会話である。英文 A, B, C を読み、下記の設問に答えよ。（配点 35）

A.

There will be a critical shortage of doctors in major urban areas — including the Tokyo metropolitan area, Aichi Prefecture and Osaka Prefecture — in 2035, when people aged 75 or older will account for about 20 percent of the nation's population, a team of researchers has forecast.

It has generally been believed that the shortage of doctors will worsen in rural areas in the future, and measures are being taken to cope with the situation. However, the team's trial calculations revealed that the demand for *terminal care is expected to rise sharply in major cities and surrounding areas, which may be densely populated 20 years from now.

注 *terminal care 終末期医療

B.

The current doctor shortage partly stems from an uneven distribution of doctors, as they are currently concentrated in urban areas.

The medical departments of universities and local governments in rural areas have taken measures to encourage doctors to settle in more remote areas. For example, they *exempt young doctors from repaying their scholarship loans, or allow them to pay at a reduced rate on the condition they work in hospitals in such areas for several years.

However, the latest forecast clearly shows Japan will face a doctor shortage even in major urban areas such as the Tokyo metropolitan area about 20 years from now.

On a nationwide level, the doctor shortage will likely be eased due to the expected future decline of the nation's population. In 2035, however, the number of deaths of people aged 75 or older will increase to 1.88 times the level in 2010. Thus, in urban areas, where the graying of the population will sharply progress, the supply of doctors will be unable to meet the increasing demand.

The research group also estimated that the number of doctors aged 60 or older in 2035 will be 141,000 — nearly triple the 2010 number. The percentage of elderly doctors among all doctors will also rise from 20 percent in 2010 to 36 percent in 2035. Elderly doctors treating elderly patients will likely become the norm in urban areas.

注 *exempt 免除する

C.

(Taro and his uncle are talking.)

Uncle: Taro, what are you studying at university?

Taro: I'm studying . I want to be a doctor and work in a hospital after I graduate.

Uncle: That's fantastic. Japan needs doctors.

Taro: I hope I can find a job.

Uncle: There is expected to be a shortage of doctors in the coming years so I think you can find a good job. The shortage is greater in rural areas, so if you don't mind working in the countryside, there should be a lot of opportunities.

Taro: I'm not sure. I think I the city to the countryside.

Uncle: Well, some areas are concerned about this shortage that they're even offering to waive repayment of scholarship loans if young doctors work in a local hospital for a few years.

Taro: Really? That's good to know. I'm worried about how I'll pay back my scholarship loan. It might be worth thinking about.

(“Doctor shortage predicted in major urban areas in 2035.” The Japan News, 11 Jan. 2014)

- (1) 下線部 1) urban と 2) demand の反対の意味の語を次の中からそれぞれ 1 つ選び、その番号をマークせよ。

下線部 1) urban

- ① local ② rural ③ major ④ public

下線部 2) demand

- ① requirement ② suggestion ③ expectation ④ supply

- (2) 下線部 3) uneven と文脈を変えずに置き換えられ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。

- ① not smooth ② not regular ③ not equal ④ not flat

- (3) How will doctors be encouraged to work in rural areas? Choose the best answer and mark the number on the answer sheet.

- ① They will receive a higher salary.
② They will not need to pay back their scholarship loan or only need to pay back part of it.
③ They will receive free housing and discounts on local services.
④ They will start in a higher position.

(4) Which of the following statements is correct? Choose the best answer and mark the number on the answer sheet.

- ① The doctor shortage is based on the growing population of the country.
- ② The total number of doctors in Japan is expected to be 141,000 in 2035.
- ③ The number of elderly doctors will be increasing in the future.
- ④ It is very likely that there will be enough doctors in the future.

(5) 英文 C の空所 ～ 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。

- | | | | | |
|--------------------------------|----------------|---------------|----------|------------|
| <input type="text" value="6"/> | ① architecture | ② agriculture | ③ law | ④ medicine |
| <input type="text" value="7"/> | ① dislike | ② like | ③ prefer | ④ stand |
| <input type="text" value="8"/> | ① although | ② many | ③ so | ④ such |

II A の発言に対する B の応答として最も適切なものを、次の中からそれぞれ1つ選び、その番号をマークせよ。(配点 15)

(1) A: The announcement says that Flight 277 is leaving from Gate 56 in twenty minutes.

B: Thanks.

- ① I must be going, then.
- ② It's coming back to me.
- ③ I'll send an email to the pilot.
- ④ The family is joining me.

(2) A: Are you doing anything special on Sunday?

B:

- ① Yes, thanks. I'll be coming on Sunday.
- ② Yes, I'm doing that right now.
- ③ Of course, I've already done that.
- ④ Of course, I'm going shopping with my friend.

(3) A: Excuse me, Mr. Newman, but do you have the time?

B:

- ① Sure, I can make some time for you.
- ② Sure, it's 4:20.
- ③ Yes, I do. Shall we meet in 10 minutes?
- ④ No, I need to attend a meeting in 20 minutes.

- Ⅲ 下線部 1) ～ 4)を文脈に合うように並べ替えるとき、3 番目に来る語の番号をマークせよ。(配点 20)

Tomita continued to recycle *trash after entering Tama Art University, collecting *oddities she would find 1) (① and ② her ③ to ④ on ⑤ way) from campus. Whether it was old-fashioned black telephones, broken fans or *discarded advertising displays, they all formed the backbone of her distinct creations.

Tomita has made about 1,000 *critters so far, including turtles, camels, chameleon and elephants. "If you change your perspective about the materials you casually throw away in your daily life, you'll come to 2) (① how ② attractive ③ can ④ see ⑤ they) be," she said.

On Feb. 21, Tomita visited Higashiyamato *municipal primary school No. 10 as a *lecturer with "art delivery university," a project in which graduates give classes at primary schools.

Speaking to 65 students in the fifth grade, Tomita said, "Let's create your original living creatures by using the materials' colors and shapes," as she 3) (① them ② transform ③ to ④ how ⑤ taught) plastic items brought from home into replicas of living creatures.

Student Marin Sasaki, 11, said with a smile: "By taking a second look, I can find many things, both in school and at home, which can be useful for art. From now on, I'm going to 4) (① before ② I ③ twice ④ think ⑤ throw) things away and consider whether they can be reused for something else."

注 *trash ごみ *oddities 奇妙なもの *discarded 捨てられた *critters 動物
*municipal 市の *lecturer 講師

("Breathing creative life into waste." The Japan News, 10 Mar. 2014.)

- 12 下線部 1) (① and ② her ③ to ④ on ⑤ way)
13 下線部 2) (① how ② attractive ③ can ④ see ⑤ they)
14 下線部 3) (① them ② transform ③ to ④ how ⑤ taught)
15 下線部 4) (① before ② I ③ twice ④ think ⑤ throw)

- Ⅳ 次は、新聞の読者からの質問(Q)とその回答(A)である。英文を読み、下記の設問に答えよ。(配点 30)

Q

I have a class of *preschool students and am thinking of using *nursery rhymes as part of class activities. But there are a lot of nonsense words like "hickory dickory doc" or "skinnamarink." Are these kinds of songs *appropriate for very young English learners? — An instructor in Saitama

A Nursery rhymes originated in England. It is interesting to note that there is *speculation that many of them were written as protests against the ruling class concerning the issues of the day. In any event, they have been passed down from generation to generation in the form of nursery rhymes, and it appears that their appeal to *youngsters has not *diminished with time. Children like them because they are short, *rhythmical, *rhymed and filled with fascinating images.

I understand fully your *hesitation concerning nonsense words. When I raised my son, I did not read nursery rhymes to him for the very reason that you pointed out. Why fill his head with nonsense words, which would not help him navigate himself bilingually? In addition, at that time the only media support I had consisted of books, cassette tapes and NHK's broadcasts of "Sesame Street."

But times are different now. There is so much available for teachers and parents, not only in the form of books but also on CDs, DVDs and the Internet. Because of the increase in media available, we have a wealth of educational tools at our fingertips. For example, after just viewing a video on the Internet, I can say without doubt I would have used it with my young son and would be happy to use it with my preschool students today.

Reading nursery rhymes in a picture book is sufficient for native English-speaking children because the youngsters can understand the words and imagine various scenarios from looking at the pictures. Non native-speaking English learners would benefit more from nursery rhymes being presented via songs and dance because the melody and tempo will give them comfort. After hearing the song a number of times, they will feel secure. They will be able to anticipate where the melody will go and how the tempo will *pulse.

I believe the benefits of singing and dancing to nursery songs with Japanese preschoolers are as follows:

- Increase in *vocabulary
- Comfort in repetition
- Rhythm anticipation
- Development of memory skills
- Social acceptance and sharing with others
- Development of motor skills through dance

Children might not understand the meaning of the nonsense word "skinnamarink," but they will eventually understand the words that follow "I love you," the three best words in the English language.

注 *preschool 就学前の *nursery rhymes わらべ歌 *appropriate 適切な
 *speculation 推測 *youngsters 子ども *diminish 減少する *rhythmical リズミカルな
 *rhymed 韻を踏んだ *hesitation ためらい *vocabulary 語彙 *pulse 拍を打つ

(Helen J. Uchida, "Navigating nonsense words," The Japan News, 22 Mar. 2014.)

- (1) 下線部 1) their appeal to youngsters has not diminished with time が表す内容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。 16

- ① generations of youngsters have not lost interest in nursery rhymes
- ② nursery rhymes have not appealed to youngsters as time goes by
- ③ it takes time for nursery rhymes to appeal to youngsters
- ④ youngsters have less time to read nursery rhymes

- (2) Why do children like nursery rhymes? Choose the best answer and mark the number on the answer sheet. 17

- ① Because nursery rhymes have nonsense words.
- ② Because nursery rhymes can give children a sense of media.
- ③ Because nursery rhymes are full of uninteresting images.
- ④ Because nursery rhymes have rhythm.

- (3) 下線部 2) for the very reason that you pointed out を具体的に表す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。 18

- ① because learning nursery rhymes is useless
- ② because nursery rhymes contain nonsense words
- ③ because nursery rhymes are good for young learners
- ④ because children are not interested in nursery rhymes

- (4) Which of the following is NOT the benefit of singing and dancing to nursery rhymes for Japanese preschoolers? Choose the best answer and mark the number on the answer sheet. 19

- ① To feel secure.
- ② To build up their vocabulary.
- ③ To understand the meanings of nonsense words.
- ④ To improve their memory and motor skills.

- (5) Which of the following statements is correct? Choose the best answer and mark the number on the answer sheet. 20

- ① A reader in Saitama asserts that preschoolers should use nursery rhymes as class activities.
- ② The advisor let her son watch a video on the Internet when she raised him.
- ③ Nursery rhymes would be useful to non-native English-speaking children.
- ④ Children will finally understand the meanings of "skinnamarink."