入学試験問題集

令和6年度

金沢工業大学

令和6年度　入学試験問題

■一般試験A（1日目）

■一般試験A（2日目）

■一般試験B

一般試験A（1日目）

1時限　数学

注意：問題1（1）から（3）の解答は［数学 No. 1］－第1面の「1」の解答マーク欄を使用してください.

問題1

（1）　$x=\dfrac{\sqrt{7}+3}{\sqrt{7}-3}$ であるとき，$x+\dfrac{1}{x}=$ アイウ，$x^2+\dfrac{1}{x^2}=$ エオカ，

$x^3+\dfrac{1}{x^3}=$ キクケコサ である.

（2）　座標平面において，直線 $(2+a)x+(1-2a)y+1-a=0$ は，

定数 a の値に関係なく定点 $\left(\dfrac{\text{シス}}{\text{セ}},\dfrac{\text{ソタ}}{\text{チ}}\right)$ を通る.

また，この直線が点 $(1,\ 1)$ を通るとき，$a=$ ツ である.

（3）　$0 \leqq \theta \leqq \pi$ とする．x の2次方程式 $2x^2+(4\cos\theta)x+1+2\cos 2\theta=0$ が

実数解をもつような θ の値の範囲は $\dfrac{\text{テ}}{\text{ト}}\pi \leqq \theta \leqq \dfrac{\text{ナ}}{\text{ニ}}\pi$ である.

（［数学 No. 1］－第1面の「1」の解答マーク欄で使用する欄は ニ までです.）

注意：問題１（４）から（６）の解答は［数学 No. １］－第１面の「２」の解答マーク欄を使用してください．

（４）　４枚の硬貨を同時に投げるとき，表と裏が同じ枚数だけ出る確率は $\dfrac{\boxed{ア}}{\boxed{イ}}$ である．また，10 枚の硬貨を同時に投げるとき，表と裏が同じ枚数だけ出る確率は $\dfrac{\boxed{ウエ}}{\boxed{オカキ}}$ である．

（５）　n を自然数とする．$\displaystyle\sum_{k=1}^{n}\frac{2}{(2k+1)(2k+3)}=\frac{\boxed{ク}n}{\boxed{ケ}n+\boxed{コ}}$ であり，

不等式 $\left|\displaystyle\sum_{k=1}^{n}\frac{2}{(2k+1)(2k+3)}-\frac{1}{3}\right|<\frac{1}{100}$ を満たす n のうち，最小のものは $\boxed{サシ}$ である．

（６）　関数 $f(x)$ が等式 $f(x)=x^2+\displaystyle\int_0^1(x+2)f(t)dt$ を満たしている．このとき，

$f(x)=x^2-\dfrac{\boxed{ス}}{\boxed{セ}}x-\dfrac{\boxed{ソ}}{\boxed{タ}}$ である．

（［数学 No. １］－第１面の「２」の解答マーク欄で使用する欄は タ までです．）

注意：問題２と問題３の解答は［数学 No. １］－第２面の「３」の解答マーク欄を使用してください．

問題２　関数 $y = 4^x + 4^{-x} + 3(2^x - 2^{-x}) - 6$ において，$t = 2^x - 2^{-x}$ とおく．

(1)　y を t の式で表すと，$y = t^2 +$ ア $t -$ イ である．

(2)　y は $t = \dfrac{\text{ウエ}}{\text{オ}}$，つまり $x =$ カキ のとき，最小値 $\dfrac{\text{クケコ}}{\text{サ}}$ をとる．

問題３　OA＝6, OB＝2, ∠AOB＝60° である △OAB があり，その外接円の中心を C とし，$\overrightarrow{OC} = p\overrightarrow{OA} + q\overrightarrow{OB}$ とおく．ここで p, q は実数である．

(1)　$\overrightarrow{OA} \cdot \overrightarrow{OB} =$ シ である．

(2)　辺 OA の中点を D とすると，$\overrightarrow{OA} \cdot \overrightarrow{DC} =$ ス であるから，p, q は

セ $p + q =$ ソ を満たす．

(3)　辺 OB の中点を E とすると，$\overrightarrow{OB} \cdot \overrightarrow{EC} =$ タ であるから，p, q は

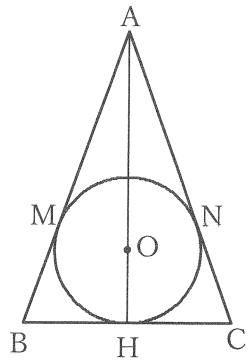
チ $p + 2q =$ ツ を満たす．

(4)　$\overrightarrow{OC} = \dfrac{\text{テ}}{\text{ト}}\overrightarrow{OA} - \dfrac{\text{ナ}}{\text{ニ}}\overrightarrow{OB}$ である．

（［数学 No. １］－第２面の「３」の解答マーク欄で使用する欄は ニ までです．）

注意：問題４の解答は［数学 No. １］－第２面の「４」の解答マーク欄を使用してください．

問題４　AB＝AC である二等辺三角形 ABC に半径 1 の円が内接しており，辺 BC の中点 H について，AH＝4 とする．内接円の中心を O，内接円と辺 AB の接点を M，内接円と辺 AC の接点を N として，次の問いに答えよ．



(1)　AM＝$\boxed{\text{ア}}\sqrt{\boxed{\text{イ}}}$，$\sin\angle\mathrm{BAH}=\dfrac{\boxed{\text{ウ}}}{\boxed{\text{エ}}}$，

$\cos\angle\mathrm{BAH}=\dfrac{\boxed{\text{オ}}\sqrt{\boxed{\text{カ}}}}{\boxed{\text{キ}}}$ である．

(2)　$\sin\angle\mathrm{BAC}=\dfrac{\boxed{\text{ク}}\sqrt{\boxed{\text{ケ}}}}{\boxed{\text{コ}}}$ であり，△AMN の面積は $\dfrac{\boxed{\text{サ シ}}\sqrt{\boxed{\text{ス}}}}{\boxed{\text{セ}}}$ である．

(3)　MN＝$\dfrac{\boxed{\text{ソ}}\sqrt{\boxed{\text{タ}}}}{\boxed{\text{チ}}}$ であり，△AMN の外接円の半径は $\dfrac{\boxed{\text{ツ}}}{\boxed{\text{テ}}}$ である．

（［数学 No. １］－第２面の「４」の解答マーク欄で使用する欄は テ までです．）

（以上，問題終了）

一般試験A（1日目）

2時限　外国語（英語）

Ⅰ．　次の（ア）～（コ）の下線の部分に入れる語句として、最も適切なものを選択肢から選びなさい。

（ア）　I _____ that our classes will be canceled tomorrow because of the storm.

1. have hearing
2. heard
3. hearing
4. was heard

（イ）　A hybrid vehicle is one _____ uses both gasoline and electric power.

1. how
2. that
3. what is
4. which is

（ウ）　Can you imagine what life will be like 100 years _____ now?

1. at
2. by
3. from
4. in

（エ）　The ski season was short _____ the lack of snow.

1. come from
2. depends on
3. due to
4. part of

（オ）　The referee _____ a flag each time a goal is scored.

1. raise
2. raises
3. rise
4. rises

（カ） The advances in AI technology _____ astonishing.

1. are
2. has
3. have
4. is

（キ） Green tea has always been popular, but its popularity is growing _____ so now that we understand its health benefits.

1. as much as
2. even more
3. ever since
4. more than

（ク） I could _____ in town longer if I had known you were going to be here.

1. have stayed
2. stayed
3. staying
4. to stay

（ケ） _____ this data, the experiment was a success.

1. According to
2. As
3. Compare to
4. Support

（コ） A: Do you mind if I use your tablet?
B: No, _____.

1. I haven't
2. I'm not
3. it doesn't
4. not at all

Ⅱ. A　次の（ア）～（オ）に入れる文として、最も適切なものを選択肢から選びなさい。選択肢は、一回しか使えません。

A: Did you finish choosing your classes for the fall semester?

B: I did, but it was confusing. （　　ア　　）

A: I'd never done it before either, but I eventually figured it out. Could you register for all the classes you want to take?

B: I wanted to sign up for Introduction to Japanese History, but I couldn't get into it. I had to choose something else.

A: Oh, really? （　　イ　　） I wonder why you couldn't.

B: Well, I tried a few times yesterday, but I kept getting the same message. （　　ウ　　）

A: It's a pretty popular class, so I'm not surprised. I did it three days ago, on the first day of the registration period.

B: （　　エ　　） I had to finish writing my final reports, so I didn't have time until yesterday.

A: If you really want to take that course, why don't you talk to the professor? （　　オ　　）

B: Do you think that's possible? I'll send her an email now.

［選択肢］

1. I should have done it then as well, but I was busy.
2. I was able to register for it.
3. It said that the class was full.
4. It was my first time doing it, so I wasn't sure exactly what to do.
5. She may allow you to join the class.
6. Textbooks are sold at the school bookstore.
7. That school's Japanese classes are difficult.
8. When is the final exam?

Ⅱ. B　次の（カ）～（コ）に入れる文として、最も適切なものを選択肢から選びなさい。選択肢は、一回しか使えません。

A: I went to the local pizza restaurant to ask about a part-time job. The sign on the window said that they were looking for someone to help make pizzas.

B: （＿＿カ＿＿）

A: Two, actually. I'm an after-school tutor for elementary school students, and I also work at the convenience store near my apartment.

B: （＿＿キ＿＿）

A: Well, the convenience store is closing next month, so I need something to replace it.

B: That makes sense. Still, with two jobs and homework for all of your classes, you must be exhausted.

A: It's true, I haven't been doing very well in school lately because of all of the time I spend working. （＿＿ク＿＿）

B: What's wrong with the one you have now?

A: （＿＿ケ＿＿） The repair shop said that it would be cheaper to buy a new one rather than to get it fixed.

B: I see. My brother works at a computer store nearby. （＿＿コ＿＿）

A: That would be great! Thank you so much.

［選択肢］

1. A different job might pay more money.
2. Couldn't you ask your parents?
3. I dropped it and broke the screen.
4. I'll ask him if he can get you a discount.
5. I'm trying to earn money for a new computer, though.
6. My brother can make pizzas too.
7. So, you're looking for a third part-time job?
8. Wait, don't you already have a part-time job?

Ⅲ. 次の英文は「15 分都市計画」について述べたものです。（ア）～（コ）に入れる最も適切なものを選択肢から選びなさい。

The populations of cities are increasing, and adapting transportation systems and other infrastructure to handle a larger number of people is a challenge. To solve this problem and improve the quality of life for the people who live in cities, urban planners came up with the concept of the 15-minute city.

In a 15-minute city, most of the places people （ ア ） go—work, school, shops, hospitals, and leisure facilities—are all available within a 15-minute walk or bicycle ride from their homes. There are some obvious benefits to a city like this. Having fewer cars on the road reduces pollution and accidents. With people walking or cycling more, they are physically healthier, while （ イ ） easier access to parks and other green spaces improves their mental wellbeing.

Although the main goal is quick access to essential services, 15-minute cities are designed with four important points in mind: density, proximity, diversity, and digitalization.

Density refers to how many people live within a certain area. Designing cities so that they have the correct density is important because it will encourage people who live near each other to solve problems by working （ ウ ） on a local level.

Proximity, or the distance between places, can be thought of as both space and time. Because places are （ エ ） together in 15-minute cities, they take up less space and reduce urban expansion. It also takes less time to travel from one location to another.

Diversity means not only having people of various ethnic and cultural backgrounds living near each other, but also having （ オ ） that can be used for several different purposes. For example, a building in which people live may also have entertainment facilities or businesses.

Digitalization addresses how technology has changed the way we live our lives. Working from home is becoming more common, as are （ カ ） shopping and virtual communication. For these reasons, commuting for work or other purposes is not as necessary as it once was.

However, there are some （ キ ） to creating 15-minute cities. The main problem is how to turn existing cities, which already have extensive infrastructure, into 15-minute cities. Additionally, the same 15-minute city model can't be used everywhere. In European cities, which are more （ ク ）, a 15-minute city model would be easier to implement than in cities in North America, which are usually spread out over a larger area.

Still, many places around the world are already adopting aspects of the 15-minute city. China is developing cities in which residents can （ ケ ） their daily needs within a 15-minute walk from their homes. In Paris, France, school playgrounds were turned into public parks during the COVID-19 pandemic. In Melbourne, Australia, bicycle lanes are being expanded to encourage （ コ ） driving and more cycling. As more urban areas around the world embrace the concept of the 15-minute city, the experience of city living will improve.

（ア）	1. busy	2. destinations	3. live
	4. normally	5. vehicle	
（イ）	1. having	2. hot	3. invent
	4. nature	5. supports	
（ウ）	1. relate	2. social	3. team
	4. think	5. together	
（エ）	1. closer	2. comparison	3. measure
	4. nothing	5. same	
（オ）	1. convenient	2. enjoyable	3. planned
	4. quickly	5. spaces	
（カ）	1. ancient	2. online	3. purchased
	4. toward	5. wait	
（キ）	1. adapt	2. challenges	3. man-made
	4. positive	5. worry	
（ク）	1. build	2. compact	3. famously
	4. prepare	5. traffic	
（ケ）	1. always	2. identification	3. meet
	4. simple	5. trouble	
（コ）	1. academic	2. enter	3. international
	4. less	5. when	

IV.

次の（ア）～（オ）のそれぞれの日本文の意味を表す英文になるように、各英文の空欄に語または句を最も適切な順番に並べた場合、<u>３番目にくるものの番号</u>を選びなさい。ただし、文頭にくるものも小文字で書いてあります。また、必要なコンマが省略されている場合もあります。［解答欄のカ～コは使用しません。］

（ア）　昨日よりも少し多く雪が降った。

It snowed a ____ ____ **___** ____ ____.

1. heavily　　2. little　　3. more
4. than　　5. yesterday

（イ）　キャシーは店長なので、誰よりも先に職場に来る。

Being ____ ____ **___** ____ ____ before anyone else.

1. Cathy　　2. comes　　3. the store manager
4. to　　5. work

（ウ）　配送する箱がまだいくつかある。

There are still ____ ____ **___** ____ ____.

1. be　　2. boxes　　3. shipped
4. some　　5. to

（エ）　父は新しい電子レンジを買わざるを得なかった。

My father didn't have ____ ____ **___** ____ ____ a new microwave.

1. any　　2. but　　3. buy
4. choice　　5. to

（オ）　私たちが晩ご飯に何を食べるかは彼にはどうでもいいことだ。

It doesn't ____ ____ **___** ____ ____ eat for dinner.

1. him　　2. matter　　3. to
4. we　　5. what

V. 次の（ア）～（オ）の下線部分①～④で、各文脈に合わないものを一つずつ選びなさい。［解答欄のカ～コは使用しません。］

（ア） There are two types of paint used to protect and color items: oil-based and water-based. “Oil” and “water” refer to the solvent, or material that is mixed with the paint that allows it to ① **stay** in liquid form while being applied to a surface. Water-based paint dries quickly, keeps its color longer, and is usually cheaper than oil-based paint. Oil-based paint is durable, meaning it does not chip off easily, and has a more vibrant color ② **compared** to water-based paint. Each type of paint is better suited for protecting different kinds of surfaces. For example, water-based paint is good for ③ **protecting** the outside of a house, and oil-based paint is better for items like bookshelves and furniture that are more likely to get scratched. When in doubt about which ④ **color** to use, ask a specialist to help decide which is best for your situation.

（イ） Many cities in modern-day England are similar in one strange way: The west side of town is usually ① **hotter** than the east side. But what could be causing this difference? The ② **answer** goes back to the burning of coal in factories over 200 years ago. Before that time, rich and poor areas in English cities were more evenly distributed. However, the burning of coal increased dramatically during the Industrial Revolution, and so did air pollution. In England, the wind generally ③ **blows** from west to east, meaning the air tended to be less clean in the eastern halves of cities. Through the 1800s, richer people often moved to the cleaner western halves, and property values ④ **dropped** in the east. Even though air pollution has decreased in England since those days, the west sides of cities have remained slightly richer to this day.

(ウ) There are many ways to relax when we are feeling stressed out. A ① **method** that has become popular is autonomous sensory meridian response, also known as ASMR. ASMR involves triggering the sense of sight, touch, or sound. For example, a person might relax by watching a video ② **showing** different light patterns. Another person might enjoy the sound of someone whispering quietly. Others prefer the sensation of getting their hair cut. People who practice ASMR say that it makes them feel relaxed, calm, and sleepy. They might also feel a tingling sensation that ③ **starts** on the top of the head and spreads down to the back of the neck. These days, you can easily find videos or smartphone applications that aim to stimulate ASMR. The next time you are feeling ④ **hungry**, why don't you try ASMR?

(エ) In spite of their name, whale sharks are not actually whales at all. While closely related to sharks, these ① **giants** of the ocean are the world's largest fish and the only member of the *Rhincodontidae* biological family. They can be found in the warm, tropical waters of the world's oceans and are known to ② **swim** vast distances. In 2011, a group of scientists tracked one whale shark for 841 days over a distance of more than 20,000 km. They are also impressively large, with the longest confirmed whale shark measuring 18.8 m. Despite their ③ **history**, whale sharks are calm creatures and not a threat to humans, making them popular to swim with in the wild. However, there is a lot we don't know about this ④ **species**. Their growth rate, how long they live, and how they reproduce largely remain a mystery.

（オ） A sneeze is a reflex action that generally occurs when foreign particles like dust and pollen ① **enter** the nose. When this happens, nerve endings in our nasal passages send signals to our brains, triggering the sneeze response in an effort to get rid of the irritant. Another form of sneezing is known as the Autosomal Dominant Compelling Helio-Ophthalmic Outburst syndrome, or ACHOO syndrome. For people with ACHOO syndrome, uncontrollable sneezing occurs when they are ② **exposed** to or look at bright light. This is often followed by a recovery period of up to 24 hours during which bright light will not cause ③ **sleeping**. The condition is genetically inherited and affects approximately 35% of the world's population. While the mechanisms behind ④ **regular** sneezing are well understood, scientists still don't fully understand ACHOO syndrome.

［以上、試験問題終了］

一般試験A(2日目)

1時限　数学

注意：問題1（1）から（3）の解答は［数学No. 1］－第1面の「1」の解答マーク欄を使用してください.

問題1

（1）　$(2+\sqrt{2}-\sqrt{6})(2+\sqrt{2}+\sqrt{6}) = \boxed{ア}\sqrt{\boxed{イ}}$ であり，$\dfrac{1}{2+\sqrt{2}+\sqrt{6}}$ の分母を有理化すると $\dfrac{1}{2+\sqrt{2}+\sqrt{6}} = \dfrac{\boxed{ウ}+\sqrt{\boxed{エ}}-\sqrt{\boxed{オ}}}{\boxed{カ}}$ である.

（2）　2 次方程式 $x^2-5x+8=0$ の解は $x = \dfrac{\boxed{キ} \pm \sqrt{\boxed{ク}}\, i}{\boxed{ケ}}$ である．ここで，i は虚数単位である．この 2 つの解をそれぞれ α, β とおくとき，2 数 α^2, β^2 を解とする 2 次方程式の 1 つは $x^2 - \boxed{コ}x + \boxed{サシ} = 0$ である.

（3）　座標平面上に 2 点 $\mathrm{A}(-1,0), \mathrm{B}(3,4)$ がある．点 P が直線 $y=x$ 上を動くとき，線分 AP と線分 PB の長さの和 AP＋PB の最小値は $\sqrt{\boxed{スセ}}$ であり，そのときの点 P の座標は $\left(\dfrac{\boxed{ソ}}{\boxed{タ}}, \dfrac{\boxed{チ}}{\boxed{ツ}}\right)$ である.

（［数学No. 1］－第1面の「1」の解答マーク欄で使用する欄は ツ までです.）

注意：問題１（４）から（６）の解答は［数学 No. １］－第１面の「２」の解答マーク欄を使用してください．

（４） ３個のさいころを同時に投げるとき，出る目の和が４になる確率は $\dfrac{\boxed{ア}}{\boxed{イウ}}$ である．また，出る目の積が６以上になる確率は $\dfrac{\boxed{エオ}}{\boxed{カキ}}$ である．

（５） 関数 $f(\theta)=2\cos 2\theta-4\sin\theta+3$ $(0\leqq\theta\leqq 2\pi)$ は，

$\theta=\dfrac{\boxed{ク}}{\boxed{ケ}}\pi,\ \dfrac{\boxed{コサ}}{\boxed{シ}}\pi$ のとき最大値 $\boxed{ス}$ をとり，

$\theta=\dfrac{\boxed{セ}}{\boxed{ソ}}\pi$ のとき最小値 $\boxed{タチ}$ をとる．

（６） 数列 $\{a_n\}$ が $a_1+a_3=2,\ a_2+a_4=6$ を満たしている．数列 $\{a_n\}$ が

等差数列ならば，その一般項は $a_n=\boxed{ツ}n-\boxed{テ}$ であり，

等比数列ならば，その一般項は $a_n=\dfrac{\boxed{ト}^{n-1}}{\boxed{ナ}}$ である．

（［数学 No. １］－第１面の「２」の解答マーク欄で使用する欄は ナ までです．）

注意：問題２と問題３の解答は［数学 No. 1］－第２面の「３」の解答マーク欄を使用してください．

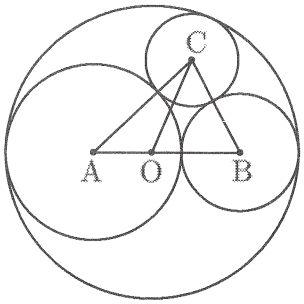
問題２　次の問いに答えよ．

(1) 不等式 $\log_3(2^x+1)<2$ の解は，$x<$ ア である．

(2) 方程式 $\left(x-1\right)\left(1-\frac{1}{x}\right)=\frac{1}{2}$ の解は，$x=\frac{1}{\text{イ}}$，ウ である．

(3) 不等式 $\log_4\{(8^x-1)(1-8^{-x})\}>-\frac{1}{2}$ の解は，$x<-\frac{1}{\text{エ}}$，$\frac{1}{\text{オ}}<x$ である．

問題３　点 O を中心とする半径 5 の円 O，点 A を中心とする半径 3 の円 A，点 B を中心とする半径 2 の円 B があり，右図のように円 O に円 A と円 B が内接し，円 A と円 B が外接している．さらに，円 O に内接し，円 A と円 B に外接する円の中心を点 C，半径を r とする．



(1) $\mathrm{OC}=5-r$，$\mathrm{OA}=$ カ，$\mathrm{AC}=$ キ $+r$ である

から，$\cos\angle\mathrm{AOC}=\dfrac{\text{ク}-\text{ケ}\,r}{\text{コ}-r}$ である．

(2) $\mathrm{OC}=5-r$，$\mathrm{OB}=$ サ，$\mathrm{BC}=$ シ $+r$ であるから，

$\cos\angle\mathrm{BOC}=\dfrac{\text{スセ}-\text{ソ}\,r}{\text{タ}(\text{チ}-r)}$ である．

(3) $r=\dfrac{\text{ツテ}}{\text{トナ}}$ である．

（［数学 No. 1］－第２面の「３」の解答マーク欄で使用する欄は ナ までです．）

注意：問題４の解答は［数学 No. １］－第２面の「４」の解答マーク欄を使用してください.

問題４　a を実数とする．座標平面において，放物線 $y = x^2$ を C_1，
放物線 $y = -x^2 + ax + 4$ を C_2 とおく．C_1 と C_2 が異なる 2 点で交わり，
それらの交点を通る直線が直線 $y = x$ に平行であるとする．このとき，

(1)　$a =$ ア である．

(2)　C_1 と C_2 の交点の座標は $(x, y) =$ (イウ, エ), (オ, カ) である．

(3)　C_1 と C_2 で囲まれた図形の面積は キ である．

（［数学 No. １］－第２面の「４」の解答マーク欄で使用する欄は キ までです．）

（以上，問題終了）

一般試験A(2日目)

2時限　外国語(英語)

Ⅰ．　次の（ア）～（コ）の下線の部分に入れる語句として、最も適切なものを選択肢から選びなさい。

（ア）　I hope that she _____ abroad next year.

1. go
2. going
3. had gone
4. will go

（イ）　There was a feeling of _____ among the fans after their team lost the game.

1. disappoint
2. disappointed
3. disappointing
4. disappointment

（ウ）　The company is making _____ effort to raise profits this year.

1. every
2. far
3. many
4. really

（エ）　One _____ four people, or 25%, say they don't exercise daily.

1. and
2. in
3. out
4. to

（オ）　My cousin Rachael stayed with me _____ my mother was on a business trip.

1. by
2. during
3. through
4. while

（カ） My parents had their car _____ before going on vacation.

1. fix
2. fixed
3. fixes
4. fixing

（キ） Greg invited me to a concert but didn't tell me _____ it is.

1. here
2. that
3. there
4. when

（ク） A small airplane was _____ taking off from the runway.

1. saw
2. seeing
3. seen
4. sees

（ケ） We study the _____ influential technology of this century.

1. moreover
2. most
3. that
4. which

（コ） I regret _____ eaten so much spicy curry last night.

1. about
2. for
3. having
4. was

Ⅱ. A　次の（ア）～（オ）に入れる文として、最も適切なものを選択肢から選びなさい。選択肢は、一回しか使えません。

A: Good morning. How did you sleep last night?

B: Morning, Dad. Uh, pretty well, I guess.

A: That's good. （　ア　） We have a very busy day today, and it's already 9:00 AM.

B: Really? But it's Saturday, and I want to relax and watch TV this morning. By the way, where's Sara?

A: （　イ　） Now you have to hurry so I can take you to tennis practice. It starts in half an hour.

B: Can't I just stay at home today? I'm so tired.

A: No, sorry. After I drop you off at tennis, I need to pick your sister up. （　ウ　）

B: Will Mum come with you to see me play?

A: Unfortunately not. She's on her way back from her business trip today. We'll all go to the station and pick her up this afternoon. （　エ　）

B: Yeah, that sounds good. （　オ　）

A: Great, we can go out for lunch after tennis. You can choose the place!

［選択肢］

1. Before we get her, would you like to eat lunch at a restaurant?
2. He always does the dishes after breakfast.
3. I already took your sister to her swimming lesson.
4. I'll be hungry after playing tennis, and I bet Sara will be too after swimming.
5. The match was so exciting.
6. Then, Sara and I will come back and watch the end of your practice.
7. They went there yesterday.
8. You'll have to get ready quite quickly this morning, though.

Ⅱ. B　次の（カ）～（コ）に入れる文として、最も適切なものを選択肢から選びなさい。選択肢は、一回しか使えません。

A: Hi, Sandra. How are you? Have you finished making your poster for the science presentation tomorrow?

B: I'm good, Barry. （＿＿＿カ＿＿＿）

A: Don't you remember? The teacher told us that we have to create individual posters for our team research project. （＿＿＿キ＿＿＿）

B: Oh no! I completely misunderstood the instructions. I thought that our team was creating one poster and that the presentation was next week.

A: Nope, it's tomorrow. What are you going to do?

B: Umm, could I get a copy of your poster? （＿＿＿ク＿＿＿） Is that OK?

A: Well . . . The teacher told us to make our own poster and our own script. I don't think we can both use the same poster. （＿＿＿ケ＿＿＿）

B: OK, I guess I'd better get started then. I still have another report to write for my English class. That's due tomorrow as well!

A: （＿＿＿コ＿＿＿） You should try writing down deadlines and due dates in your calendar.

B: Thanks, that's good advice. I really need to be more organized.

［選択肢］

1. Buying the supplies online is much cheaper.
2. Did you remember to lock the door?
3. Each team member has to give a presentation tomorrow.
4. I'll use it to make my own presentation script.
5. Maybe it's better if you make everything yourself.
6. Should they try to make time after the weekend?
7. What presentation are you talking about?
8. Wow, you have a lot to do!

Ⅲ.　次の英文は「長距離ランナー　クリフ・ヤング」について述べたものです。（ア）～（コ）に入れる最も適切なものを選択肢から選びなさい。

When you think of the world's top athletes, what kind of people do you imagine? Perhaps you picture fit, young adults who spend hours in the gym every day, training in expensive sneakers and using top-of-the-line exercise equipment. While this image is true of most of the world's best athletes, it certainly didn't apply to legendary Australian runner Cliff Young.

Young began running long distances during his childhood on his family's farm. The Youngs （ ア ） around 2,000 sheep on their land in Beech Forest, Victoria, but they didn't ride horses or drive vehicles through the fields to keep an eye on the animals. Instead, Young used to run alongside the sheep in his boots to move them from one place to （ イ ）.

As he grew into an adult, Young shifted into potato farming, but he continued running 20 to 30 km each morning （ ウ ） breakfast just for fun. Then one day in 1979, at the age of 56, he noticed an advertisement in a local newspaper for a 16 km race. He decided to join.

Young enjoyed the race and performed well in it. The （ エ ） motivated him to join other races, and he participated in the Melbourne Marathon four times from 1979 to 1982. Each year, he finished with a respectable time of just over three hours.

His real fame came in 1983 when, at the age of 61, he won the Westfield Sydney to Melbourne Ultramarathon—an 875 km race （ オ ） he completed in a time of five days, fifteen hours, and four minutes. One impressive element of his record-breaking time was his strategy of nearly continuous running. Other participants ran faster but stopped at night for six hours of sleep on （ カ ）. Young, on the other hand, would sleep for only two hours some nights, and other nights he wouldn't sleep at all. While others may have run faster, Young's slow-and-steady, day-and-night approach earned him first place.

Young won $10,000 for his first-place finish in the ultramarathon, but he felt it was not fair that he should get all of the money when five other people had （ キ ） finished the difficult race too. He divided the prize money among them, giving each of the other finishers $2,000 and not keeping any for himself.

The （ ク ） of the 61-year-old's unlikely victory spread, and Cliff Young became a hero to Australian runners. His running style, called the "Young Shuffle," gained popularity among extreme long-distance runners. The method （ ケ ） taking shorter steps to reduce impact on the legs and keeping the arms low at the sides so that energy isn't wasted in moving them too much.

Cliff Young passed away in 2003, but his legacy lives on. People remember him for his endurance, his generosity, and his willingness to take on （ コ ） challenges later in life. A memorial plaque in his hometown describes his importance to the community, and appropriately, it is attached to a statue of a boot, just like he wore in his younger days when running on the farm.

(ア)	1. always	2. final	3. kept
	4. many	5. under	
(イ)	1. another	2. avoided	3. else
	4. quickly	5. seasonal	
(ウ)	1. before	2. have	3. meal
	4. on	5. prefer	
(エ)	1. advanced	2. experience	3. greatly
	4. hurried	5. tense	
(オ)	1. by	2. its	3. so
	4. such	5. that	
(カ)	1. afterward	2. average	3. general
	4. less	5. today	
(キ)	1. gone	2. he	3. none
	4. successfully	5. worth	
(ク)	1. basically	2. future	3. places
	4. recorded	5. story	
(ケ)	1. become	2. eventually	3. involves
	4. requirement	5. unique	
(コ)	1. create	2. face	3. new
	4. remove	5. unable	

Ⅳ.

次の（ア）～（オ）のそれぞれの日本文の意味を表す英文になるように、各英文の空欄に語または句を最も適切な順番に並べた場合、<u>３番目にくるものの番号</u>を選びなさい。ただし、文頭にくるものも小文字で書いてあります。また、必要なコンマが省略されている場合もあります。［解答欄のカ～コは使用しません。］

（ア）　多くのリサイクル資材が建築に使用され始めている。

Many recycled materials ____ ____ ▬ ____ ____ in construction.

1. are　　2. be　　3. beginning
4. to　　5. used

（イ）　全ての人がファッションに興味がある訳ではない。

Not ____ ____ ▬ ____ ____ fashion.

1. all　　2. are　　3. in
4. interested　　5. people

（ウ）　チームはプロジェクトを進めるかどうか決断する必要がある。

The team needs to ____ ____ ▬ ____ ____ the project or not.

1. decide　　2. proceed　　3. to
4. whether　　5. with

（エ）　稲妻が光るのと同時に雨が強く降り始めた。

____ ____ ▬ ____ ____ the lightning flashed, rain started to fall hard.

1. as　　2. at　　3. same
4. the　　5. time

（オ）　自動運転車が公道を普通に走る日が近い将来に来るだろうか。

Will the day come in the ____ ____ ▬ ____ ____ are common on public roads?

1. future　　2. near　　3. self-driving
4. vehicles　　5. when

V. 次の（ア）～（オ）の下線部分①～④で、各文脈に合わないものを一つずつ選びなさい。［解答欄のカ～コは使用しません。］

（ア） The Great Bell of Dhammazedi is thought to be the largest bell ever made. It was cast from silver, gold, copper, and tin in 1484 in present-day Myanmar. It weighed 297,000 kg, was nearly 6 m tall, and was over 3 m wide. ① **Despite** its great size, nobody knows exactly where the Great Bell of Dhammazedi is today. In 1608, Portuguese explorers stole the bell with the goal of melting it and using the metal to make a cannon. They loaded the ② **cannon** onto their boat and began transporting it down a river. However, the water became too ③ **rough** and the boat sank. Many people have looked for the bell at the bottom of the river, but it may be buried under several meters of mud. Although governments and private explorers have made great efforts to find it, the ④ **location** of the Great Bell of Dhammazedi is still unknown.

（イ） When we describe the sides of a boat, we use the words “starboard” for the right side and “port” for the left side. The words starboard and port come from the time when boats were steered using long, wooden boards. Originally, since most ① **people** are right-handed, steering boards were located on the right, or starboard, side of the boat. When people wanted to get on or off of a boat, they would have to use the left, or port, side since the ② **board** on the starboard side would be in the way. It can be confusing to know which side of a boat is right or left depending on whether a person on the boat is ③ **looking** toward the front or the back of the boat. Using the terms starboard and port helps sailors avoid this confusion. For this reason, even though boat technology has changed, we still use starboard and port when talking about the ④ **size** of a boat.

(ウ) While it may not look like one, the piano is actually a type of stringed instrument. When a piano key is ① **pressed**, a system of levers and springs causes a soft hammer to hit strings of varying lengths and thicknesses to produce sound. The ② **general** idea is the same as that of a finger plucking a guitar string, except in the case of the piano, there is a padded hammer hitting the string. When a key is not being pressed down, a soft fabric pad rests on top of the string to ③ **keep** it from vibrating. Pressing down on a key lifts the fabric pad to allow the string to vibrate when the hammer hits it. When the player's finger is raised from the ④ **page**, the fabric pad returns to the original position on the string, stopping the sound.

(エ) The Nazca Lines are a collection of large pictures carved into the ground near the city of Nazca in southern Peru. Many of the Nazca Lines form the images of animals like monkeys, birds, and spiders, while ① **others** are simple geometric shapes or patterns. Created between 1,500 and 2,500 years ago, some of these ancient ② **roads** measure up to 370 m long. The Nazca Lines were made by the removal of small, reddish-brown stones from the surface of the ground, revealing a yellowish soil underneath. The area receives almost no rainfall and has very little wind—calm conditions which have helped to ③ **preserve** the Nazca Lines. Some of the images have been shown to mark the movements of the sun and stars, but no one knows the full story of ④ **exactly** why the Nazca people created these desert illustrations.

（オ） Doing physical activities like exercising or working outside during hot weather can be dangerous. To determine the risk of hot weather ① **conditions**, weather forecasters measure the Wet Bulb Globe Temperature (WBGT). WBGT helps ② **predict** the effects of temperature, humidity, wind speed, and solar radiation on the human body. A device for measuring WBGT uses three thermometers. The first is a wet bulb thermometer that is covered in a wet cloth to mimic human sweating. Water evaporates from the cloth and cools the thermometer. The second is a black globe thermometer. It measures solar radiation, which heats the globe while the wind cools it. Finally, a dry bulb thermometer measures the temperature of the air in the shade. In general, a WBGT of 35°C is considered the maximum temperature that the ③ **environment** can handle. By measuring WBGT instead of just measuring the air temperature, we can get a better idea about the dangers of engaging in ④ **physical** activities outdoors on a hot day.

［以上、試験問題終了］

一般試験B

1時限　数学

注意：**採点は解答用紙のみで行います．問題用紙に書いた計算等は評価しません．**
問題1（1）～（5）の解答は，答えのみを【数学】第一面 の該当箇所に記入してください．

問題1　次の問いに答えよ．

（1）　$x=\dfrac{\sqrt{5}+\sqrt{3}}{2}, y=\dfrac{\sqrt{5}-\sqrt{3}}{2}$ であるとき，x^2+y^2 および $\dfrac{1}{x}+\dfrac{1}{y}$ の値を求めよ．

（2）　平行四辺形 ABCD が $\mathrm{AB}=3, \mathrm{AD}=4, \mathrm{BD}=2$ を満たしている．このとき，$\cos\angle\mathrm{BAD}$ の値と平行四辺形 ABCD の面積 S を求めよ．

（3）　方程式 $|x^2-2x|=-2x^2+1$ を解け．

（4）　3 個のさいころを同時に投げるとき，3 個とも異なる目が出る確率 P_1 を求めよ．また，3 個のさいころのうち 2 個は同じ目，残りの 1 個は異なる目が出る確率 P_2 を求めよ．

（5）　$\left(2x+\dfrac{1}{2x}\right)^{10}$ の展開式において，定数項 a と x^2 の係数 b を求めよ．

注意：**採点は解答用紙のみで行います．問題用紙に書いた計算等は評価しません．**
問題１（６）～（10）の解答は，答えのみを【数学】第一面 の該当箇所に記入してください．

（６） a, b を定数とする．整式 $P(x) = x^3 - ax^2 - bx + 2$ を

$x-1$ で割ると余りが -6，$x-2$ で割ると余りが -12 であるとき，

a, b の値を求めよ．

（７） 方程式 $\log_2(x+2) + \log_2(2-x) + \log_2(3-x) = 2 + \log_2 3$ を解け．

（８） 初項が 1 である等差数列 $\{a_n\}$ と初項が 1 である等比数列 $\{b_n\}$ が

$a_2 + b_2 = 2, a_3 + b_3 = 6$ を満たしている．このとき，$\{a_n\}$ の公差 d と $\{b_n\}$ の

公比 r の組 (d, r) をすべて求めよ．

（９） a を定数とする．座標平面上で，円 $(x-a)^2 + (y-2a)^2 = 5$ と

直線 $x - 2y + 2 = 0$ が接しているとき，a の値をすべて求めよ．

（１０） すべての実数 x について，等式 $f(x) + \int_0^x t f'(t)\,dt = x^3 - 3x^2 - 9x + 7$ を

満たす 2 次関数 $f(x)$ を求めよ．

注意：**採点は解答用紙のみで行います．問題用紙に書いた計算等は評価しません．**
問題２，３の解答は，途中の推論・計算も含め【数学】第一面，【数学】第二面の該当箇所に記入してください．

問題２　1 辺の長さが 1 である正方形 OABC において，辺 OA を 3 : 1 に内分する点を D，線分 OB を 1 : 2 に内分する点を E とし，線分 AE と線分 BD の交点を F とする．また，$\overrightarrow{\mathrm{OA}} = \vec{a}$，$\overrightarrow{\mathrm{OC}} = \vec{c}$ とする．

(1) $\overrightarrow{\mathrm{OE}}$ を $\vec{a}$, $\vec{c}$ を用いて表せ．

(2) $\overrightarrow{\mathrm{OF}}$ を $\vec{a}$, $\vec{c}$ を用いて表せ．

(3) $\overrightarrow{\mathrm{OF}}$ の大きさ $\left|\overrightarrow{\mathrm{OF}}\right|$ を求めよ．

問題３　$\cos\theta = -\dfrac{3}{7}$　$\left(\dfrac{\pi}{2} < \theta < \pi\right)$ であるとき，

(1) $\sin\theta$, $\tan\theta$ の値を求めよ．

(2) $\sin 2\theta$, $\cos 2\theta$ の値を求めよ．

(3) $\sin\dfrac{\theta}{2}$, $\cos\dfrac{\theta}{2}$ の値を求めよ．

注意：**採点は解答用紙のみで行います．問題用紙に書いた計算等は評価しません．**
問題４の解答は，途中の推論・計算も含め【数学】第二面 の該当箇所に記入してください．

問題４　座標平面上の放物線 $y=\frac{1}{2}x^2$ を C とし，C 上の点 $\mathrm{P}\left(1, \frac{1}{2}\right)$ における C の接線を ℓ_1 とする．また，ℓ_1 に垂直で C に接する直線を ℓ_2 とし，ℓ_2 と C の接点を Q とする．

(1) ℓ_1 の方程式を求めよ．

(2) ℓ_2 の方程式を求めよ．

(3) 直線 PQ と C で囲まれた図形の面積 S_1 を求めよ．

(4) ℓ_1, ℓ_2 および C で囲まれた図形の面積 S_2 を求めよ．

（以上，問題終了）

一般試験B

2時限　外国語(英語)

Ⅰ．　次の（ア）～（オ）各文の(　　)に入る最も適切な英単語を、選択肢から１つ選んで書きなさい。選択肢は１度しか使えません。

［選択肢］

almost	become	conduct	daytime
energy	football	for	involve
manage	matches	patient	pen
pie	put	qualities	where

（ア）He handed her one ticket and (　　) the other one in his pocket.

（イ）None of the elementary school teachers are as kind and (　　) as Dick.

（ウ）It was (　　) dark when I entered the house.

（エ）Why doesn't anybody want to eat the (　　) I baked?

（オ）The carpet really (　　) the style of the room.

Ⅱ. 次の（ア）～（オ）各文の下線部分１～３のうち日本文に合わないものを１つ選んで 誤 1 2 3 欄の番号に丸をつけなさい。次に、日本文に合うように、それを正して 正 に書きなさい。正しい形は２語以上になる場合もあります。

例

二人の女性は往来の激しい道を渡った。

Two women walk across the busy street.
1 2 3

[解答例]

誤 ① 2 3　　正 walked

（ア）私がインタビューした４人のうち、レイだけが正しく質問に答えた。

Among the four people when I interviewed, only Ray answered my questions correctly.
1 2 3

（イ）どんな困難な状況でも、あきらめるか乗り越えようとするかだ。

In any difficult situation, you can either give up and try to overcome it.
1 2 3

（ウ）長い議論の末、委員たちはついに同意に達した。

After a long discussion, the committee members have finally reached an agreeable.
1 2 3

（エ）カラフルな帽子をかぶった男性たちが先週行われたコンサートで踊った。

Men wear colorful hats danced in the concert that was held last week.
1 2 3

（オ）友人と私は二つの家具を隣の部屋に移動するように頼まれた。

My friend and I were asked to move two pieces of furnitures to the next room.
1 2 3

Ⅲ. 次の（ア）～（オ）のそれぞれの日本文の意味を表す英文になるように、各英文の空欄に語または句を最も適切な順序に並べた場合、<u>３番目にくるものの番号</u>を書きなさい。ただし、文頭にくるものも小文字で書いてあります。また、必要なコンマが省略されている場合もあります。

（ア） 以前、この地域では暖房器具が必要ではなかった。

People in ____ ____ ▬▬ ____ ____ before.

1. a heater　2. area　3. needed
4. never　5. this

（イ） ボビーは、ゲームをする時間より勉強する時間のほうが短い。

____ ____ ▬▬ ____ ____ studying is less than he spends playing video games.

1. Bobby　2. of　3. spends
4. the amount　5. time

（ウ） 本日、私が提案書を一つ、上司が明日もう一つお届けします。

I'll bring one proposal today, and my ____ ____ ▬▬ ____ ____ one tomorrow.

1. boss　2. bring　3. other
4. the　5. will

（エ） ミシュランガイドはもともと人々にフランス中を旅行させるために出版された。

The Michelin Guide was originally ____ ____ ▬▬ ____ ____ throughout France.

1. encourage　2. people　3. published
4. to　5. to travel

（オ） 週末までにすべてのレポートを準備しておきます。

I will ____ ____ ▬▬ ____ ____ ready by the weekend.

1. all　2. have　3. of
4. reports　5. the

Ⅳ.　会話が完成するように、（ア）～（ウ）に文脈に適した文または表現を考えて３語以上で書きなさい。

A:　（　　ア　　）You don't look so good.

B:　My stomach really hurts.

A:　What did you eat for lunch?

B:　（　　イ　　）

A:　Hmm . . . I wonder if it gave you food poisoning.

B:　I don't think the sushi is the problem. It was fresh and tasted delicious.

A:　Do you have a fever?

B:　I don't think so. I don't know what to do. I feel so terrible right now.

A:　（　　ウ　　）Do you want me to take you there?

B:　Yes, please. Thank you so much.

V． 次の英文は「テニスの得点方法」について述べたものです。本文を読んで、設問に答えなさい。

In many sports, the winner is determined by which team or player scores the most points in the contest. The scoring system varies depending on the sport, but it is usually quite simple. In soccer, for example, a team is awarded one point each time the ball passes completely over the opponent's goal line. In basketball, a team is awarded points each time the ball goes through the basket. However, some sports have more complicated scoring systems. Tennis is one such sport.

In a tennis game, players start with a score of "love," which is the term used for zero points. Rather than counting each point in order (one, two, three, etc.), points are counted in the following sequence: 15, 30, 40, game. If both players reach 40, it is referred to as "deuce." In this case, a player must then win two more points in a row to win the game.

The history of how tennis came to have such a unique scoring system is not entirely clear. One theory is that clocks were originally used to keep score, with the minute hand moving a quarter of the way around the clock each time a point was won—15 minutes, 30 minutes, 45 minutes, and 60 minutes. When the minute hand made its way completely around the clock face, the game was finished. To allow for deuce scores, the 45 was changed to 40, and the minute hand would be moved ahead 10 minutes for each point won thereafter. If a player could not win two points in a row, the clock would be reset to the 40-minute mark, and the game would continue.

Although this sounds like a logical explanation of how the tennis scoring system was developed, there is one problem: The first reference to tennis scoring was in the 15th century. At that time, clocks only measured time in hours, not minutes, so it is unlikely they would have been used to score tennis games in this manner.

Another possible source of tennis scoring comes from a French game called *jeu de paume*. Like in tennis, this game is played on a court and involves hitting a ball to an opponent, though players first used their hands instead of rackets. Each side of the court was 45 feet long (approximately 14 meters), and when a point was won, the player moved forward 15 feet. After winning another point, the player would move ahead another 15 feet (30 feet total). Upon winning a third point, the player would move forward 10 feet (40 feet total). However, there is no proof that *jeu de paume* was the actual inspiration for modern-day tennis scoring.

Over the years, several alternative scoring methods for tennis have been created. As matches have grown longer, tennis associations have begun to consider changes to the tennis scoring system that would shorten the length of games. Some of these scoring systems have even been used in exhibition matches between professional tennis players. However, it is yet to be seen whether they will be adopted more widely, and the standard 15-30-40-game scoring system remains the most common.

A.　（ア）～（オ）の設問について本文の内容に基づいて英語で答えなさい。ただし、１０語以内とします。

（ア）What are two sports that have simple scoring systems?

（イ）What does “deuce” mean?

（ウ）One theory is that clocks were originally used to keep score in tennis. Why is this probably not true?

（エ）What did *jeu de paume* players originally use to hit the ball?

（オ）What is one reason that tennis associations are interested in changing the tennis scoring system?

B.　次の本文の要約の空欄（カ）～（コ）に入る言葉をそれぞれ本文からそのまま一語のみ抜き出して書きなさい。

Compared to other sports, the scoring system in tennis is somewhat （　カ　）. Players start with （　キ　） points, also known as “love.” A player must win four points to win a game, and the points are counted as follows: 15, 30, 40, game. It is not （　ク　） how this scoring system was developed, but some people think clocks may have first been used to keep score. Others think the scoring system may come from a French game that is similar to tennis. In that game, a player moves （　ケ　） on the court after winning a point. Today, there are some （　コ　） scoring systems, but the standard 15-30-40-game method is used the most.

［以上、試験問題終了］