入学試験問題集

令和7年度

■都道府県選抜試験

金沢工業大学

数学　問題

注意：問題１（１）から（３）の解答は［数学］－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）　$2x^2 - xy - 6y^2 + 4x + 13y - 6 = (\boxed{ア}\,x + 3y - \boxed{イ})(x - \boxed{ウ}\,y + \boxed{エ})$ である.

（２）　方程式 $2\log_2(x+2) - 4\log_4(x-3) = 1$ の解は $x = \boxed{オ} + \boxed{カ}\sqrt{\boxed{キ}}$ である.

（３）　a を定数とする．３次方程式 $x^3 - 3ax^2 + 2a^2x - 2a^2 + 10 = 0$ の解の１つが $x = 2$ であるとき，$a = \boxed{ク}$ であり，他の解は $x = \dfrac{\boxed{ケ} \pm \sqrt{\boxed{コサ}}}{\boxed{シ}}$ である.

（［数学］－第１面の「１」の解答マーク欄で使用する欄は シ までです.）

注意：問題１（４）から（６）の解答は［数学］－第１面の「２」の解答マーク欄を使用してください.

（４） １個のさいころを２回投げ，出る目を順に a, b とする.

２次方程式 $x^2 + ax + b = 0$ の解が異なる２つの実数となる確率は $\dfrac{\boxed{アイ}}{\boxed{ウエ}}$ で

ある．また，解が異なる２つの整数となる確率は $\dfrac{\boxed{オ}}{\boxed{カキ}}$ である.

（５） $\sin\theta + \cos\theta = \dfrac{5}{4}$ のとき，$\sin\theta\cos\theta = \dfrac{\boxed{ク}}{\boxed{ケコ}}$，

$\sin\theta = \dfrac{\boxed{サ} \pm \sqrt{\boxed{シ}}}{\boxed{ス}}$ である.

（６） k を定数とする．座標平面において，曲線 $y = |x^2 - 2x - 3|$ と

直線 $y = x + k$ の共有点の個数が１個であるのは $k = \boxed{セソ}$ のときであり，

共有点の個数が４個であるのは $\boxed{タ} < k < \dfrac{\boxed{チツ}}{\boxed{テ}}$ のときである.

（［数学］－第１面の「２」の解答マーク欄で使用する欄は テ までです．）

注意：問題２と問題３の解答は［数学］－第２面の「３」の解答マーク欄を使用してください．

問題２　0 より大きく 1 より小さい分数のうち，分母が 3 以上の奇数であるものを約分しないで次のように並べた数列

$$\frac{1}{3},\frac{2}{3},\frac{1}{5},\frac{2}{5},\frac{3}{5},\frac{4}{5},\frac{1}{7},\frac{2}{7},\frac{3}{7},\frac{4}{7},\frac{5}{7},\frac{6}{7},\frac{1}{9},\frac{2}{9},\frac{3}{9},\cdots$$

について，

(1) $\dfrac{4}{13}$ は，第 $\boxed{\text{アイ}}$ 項である．

(2) 初項から第 $\boxed{\text{アイ}}$ 項までの和は，$\dfrac{\boxed{\text{ウエオ}}}{\boxed{\text{カキ}}}$ である．

(3) 第 140 項は，$\dfrac{\boxed{\text{ク}}}{\boxed{\text{ケコ}}}$ である．

問題３　a を実数とする．座標平面において，円 $x^2+y^2=1$ を C，直線 $y=2x+a$ を ℓ とする．

(1) $a=-2$ のときの C と ℓ の交点の座標は

$\left(\dfrac{\boxed{\text{サ}}}{\boxed{\text{シ}}},\dfrac{\boxed{\text{スセ}}}{\boxed{\text{ソ}}}\right)$，$\left(\boxed{\text{タ}},\boxed{\text{チ}}\right)$ である．

(2) C と ℓ が異なる 2 点で交わるとき，a のとり得る値の範囲は

$\boxed{\text{ツ}}\sqrt{\boxed{\text{テ}}}<a<\sqrt{\boxed{\text{ト}}}$ である．

(3) (2)において，C と ℓ の異なる 2 つの交点を結ぶ線分の中点が直線 $x=-\dfrac{1}{4}$ 上にあるとき，$a=\dfrac{\boxed{\text{ナ}}}{\boxed{\text{ニ}}}$ である．

（［数学］－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］－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, b を定数とする．関数 $f(x) = ax + b$ が以下の 2 条件を満たしている．

$$\int_{-1}^{1} f(x)\,dx = 4, \quad \int_{-1}^{1} xf(x)\,dx = 2$$

(1)　$a =$ ア , $b =$ イ である．

(2)　$\int_{x}^{x+1} tf(t)\,dt = 0$ のとき，$x =$ ウエ , $\dfrac{\text{オカ}}{\text{キ}}$ である．

(3)　関数 $F(x) = \int_{-1}^{x} tf(t)\,dt$ は，$x = \dfrac{\text{クケ}}{\text{コ}}$ のとき極大値 $\dfrac{\text{サ}}{\text{シス}}$ をとり，

$x =$ セ のとき極小値 ソ をとる．

（［数学］－第２面の「４」の解答マーク欄で使用する欄は ソ までです．）

（以上，問題終了）

■出題意図

出題範囲内の幅広い分野から、教科書に記載されている程度の問題を出題します。基本事項の理解と計算力を問う問題、論理的思考力が必要となる問題、多分野の融合問題等を出題します。定理や公式を確実に理解し、的確に使う力とともに、素早く正確に計算する力が求められます。

出題形式は、全問マークシート式です。

■解答

問題１．(1) ア．２　イ．２　ウ．２　エ．３　(2) オ．８　カ．５　キ．２
(3) ク．３　ケ．７　コサ．３３　シ．２
(4) アイ．１７　ウエ．３６　オ．５　カキ．３６
(5) ク．９　ケコ．３２　サ．５　シ．７　ス．８
(6) セソ．－３　タ．１　チツ．１３　テ．４

問題２．(1) アイ．３４　(2) ウエオ．２０５　カキ．１３
(3) ク．８　ケコ．２５

問題３．(1) サ．３　シ．５　スセ．－４　ソ．５　タ．１　チ．０
(2) ツ．－　テ．５　ト．５
(3) ナ．５　ニ．８

問題４．(1) ア．３　イ．２　(2) ウエ．－１　オカ．－２　キ．３
(3) クケ．－２　コ．３　サ．４　シス．２７　セ．０　ソ．０

外国語(英語)　問題

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一つ選びなさい。

（ア）　The baseball game _____ canceled last night due to bad weather.

1. are
2. is
3. was
4. were

（イ）　The guests ate _____ of the cake at the party.

1. each
2. every
3. many
4. most

（ウ）　The new language program _____ you with the opportunity to study at your own pace.

1. gives
2. makes
3. provides
4. requires

（エ）　Pat had more experience _____ anyone else on the school track team.

1. as
2. than
3. to
4. with

（オ）　A: _____ are you late?
B: There was a lot of traffic.

1. What
2. Which
3. Who
4. Why

（カ） _____ the sun began to rise, the birds began to sing.

1. Among
2. As
3. During
4. Meanwhile

（キ） We would have _____ that all of this remain a secret.

1. prefer
2. preferred
3. preferring
4. prefers

（ク） Please find the latest version of my résumé _____ to this email.

1. attached
2. opened
3. replied
4. wrote

（ケ） A: Do you want to purchase travel insurance?
B: Yes, I do. I _____ my lesson the hard way when I lost my bag on my last trip.

1. chose
2. learned
3. made
4. wished

（コ） _____ the United States, Japan has a large network of high-speed trains.

1. Although
2. In contrast
3. More
4. Unlike

Ⅱ．A　次の（ア）～（オ）の**下線部の単語の文中での意味に最も近いもの**を選択肢から一つ選びなさい。

（ア）　Mary felt a lot of joy while swimming in the ocean.

1. anger
2. happiness
3. interest
4. sadness

（イ）　The student gradually improved his English speaking skills.

1. excitedly
2. rapidly
3. slowly
4. suddenly

（ウ）　This bag is compact, but it can carry many things.

1. expensive
2. heavy
3. small
4. stylish

（エ）　I love my new portable battery charger because it is so useful.

1. comfortable
2. complicated
3. confusing
4. convenient

（オ）　My grandfather looks frail, but he is very active and walks 10 km every day.

1. old
2. strong
3. weak
4. young

Ⅱ．B　次の（カ）～（コ）の<u>下線部の単語の文中での意味と反対の意味を表すもの</u>を選択肢から一つ選びなさい。

（カ）　Pete always buys <u>cheap</u> cars.

1. expensive
2. normal
3. special
4. ugly

（キ）　The sound of fireworks <u>agitated</u> the dog.

1. entertained
2. operated
3. relaxed
4. screamed

（ク）　Eating enough vegetables is an <u>indispensable</u> part of a healthy diet.

1. difficult
2. important
3. tired
4. unnecessary

（ケ）　The Olympic athletes had hoped that their medals would be <u>shiny</u> and durable.

1. dull
2. round
3. smooth
4. stiff

（コ）　The <u>success</u> of the company's new product was mentioned in a newspaper article.

1. experience
2. failure
3. progress
4. tragedy

Ⅲ. 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: Excuse me, Mr. Jones. May I ask a few questions about next week's presentation?

B: Of course you can, Brian.

A: Thank you.（＿＿＿ア＿＿＿）

B: You can make as many as you want. The most important thing is that you include all of the information that I explained in class today.

A: Got it. Next, do the slides need to have pictures?

B: No, but pictures often make your slides more interesting for the audience.（＿＿＿イ＿＿＿）That can make them hard to read.

A: That's good advice. Oh, and do all of the members in my group have to speak during the presentation?

B:（＿＿＿ウ＿＿＿）

A: What if one of my group members doesn't come to class next week?

B: In that case, a different group member will have to fill in.

A: Oh, okay.（＿＿＿エ＿＿＿）Thank you for answering my questions.

B: You're welcome.（＿＿＿オ＿＿＿）

A: Thank you! We'll do our best!

［選択肢］

1. First, how many slides do we have to make?
2. How often do you go to the cinema?
3. I don't think my computer can do that.
4. I'll make sure nobody is absent next week.
5. I'm looking forward to your presentation!
6. Where will the presentations take place?
7. Yes, everyone in your group must speak.
8. You should also be careful not to have too many words on your slides.

Ⅲ. 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, Mary. I have a big problem and I need your help.

B: What's wrong, Liz?

A: You know I'm flying to New York City tomorrow morning, right? （　カ　） Could you drive me there in your van, instead?

B: Oh, that's no problem.（　キ　）

A: It leaves at 9:30 AM, but I should be at the airport an hour early.

B: Okay.（　ク　） Shall I pick you up at your house at 8:00?

A: Is it okay if we leave a little earlier in case there's traffic?

B: That's a good idea. How about 7:45?

A: I think that should give us enough time.（　ケ　）

B: No problem. I always wake up early anyway. How long are you staying in New York City?

A: I'll be there for three weeks. Thanks again for helping me.（　コ　）

B: That's very thoughtful of you, but you don't need to do that. So, see you tomorrow morning at 7:45.

A: See you then!

［選択肢］

1. Do you have family there?
2. I have a hard time sleeping on planes.
3. I was planning to take a taxi to the airport, but I have too many bags.
4. I'll definitely buy you a nice souvenir!
5. I'm sorry it's so early.
6. It takes about 30 minutes to get there.
7. What time is your flight?
8. Your bags are all too heavy.

IV.　次の英文は「人工知能の搭載された義肢」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。

AI prosthetic limbs are devices designed to help people who have lost arms or legs. These prosthetics use AI to copy and repeat natural limb （　ア　）. Everyday tasks are made easier to perform because the AI technology allows the prosthetic limb to remember and respond to the user's movements and intentions.

AI prosthetic limbs can transform lives. A （　イ　） example is Sarah de Lagarde, who lost an arm and a leg in a train accident just one month after climbing Mount Kilimanjaro with her husband. Despite this traumatic event, she did not want to give up her active life. （　ウ　）, she chose to use advanced AI prosthetic limbs to regain her independence. With these AI-powered devices, Sarah can walk and use her arm again, enabling her to participate in many of the activities that she enjoyed before her accident.

So, how do these prosthetic limbs work? Our brains send signals to muscles and nerves in our arms and legs, allowing us to move them. AI prosthetic limbs connect to the user's muscles and nerves, and when the user thinks about moving their limb, the AI detects （　エ　） signals and moves the prosthetic as its user intended. Compared to traditional prosthetics, the movements this technology allows are far more natural. For example, if Sarah wants to pick up an object, the AI helps her prosthetic hand grasp it smoothly, like her （　オ　） hand would have done. This precise control is crucial for performing daily tasks like eating, writing, or in Sarah's case, holding her son's hand.

The development of AI prosthetic limbs involves combining sensors, machine learning algorithms, and advanced materials. Sensors in the prosthetic detect muscle signals, which are then read by machine learning algorithms, and the user's intended movement is then predicted. Advanced materials make the prosthetic lightweight and durable, improving comfort and functionality. This （　カ　） of technologies means that the prosthetic limb can adapt to the user's individual movements and preferences over time.

While the technology is impressive, it is still too expensive for many people to afford. Sarah's prosthetic arm cost around $190,000. Although she raised part of the （　キ　） through crowdfunding, it was not enough to completely pay for her new arm. However, it is hoped that future advances will help people such as wounded soldiers, （　ク　） victims, and diabetes patients at reduced costs.

The impact of AI prosthetic limbs extends beyond individual users. These devices also have the potential to reduce healthcare costs by （　ケ　） the need for additional surgeries and long-term rehabilitation. Furthermore, AI prosthetics can enhance the user's psychological well-being by allowing them to participate more fully in social and professional activities. The future of AI prosthetic limbs looks promising, with the potential to （　コ　） many more people lead independent and active lives.

（ア）	1. discuss	2. everywhere	3. grow
	4. motions	5. rarely	
（イ）	1. create	2. disaster	3. notable
	4. power	5. taste	
（ウ）	1. Exactly	2. Instead	3. Keeping
	4. Sympathy	5. Unless	
（エ）	1. much	2. overly	3. these
	4. things	5. why	
（オ）	1. around	2. demonstrate	3. natural
	4. nicely	5. property	
（カ）	1. combination	2. constructed	3. especially
	4. fake	5. harm	
（キ）	1. between	2. defend	3. money
	4. silent	5. waiting	
（ク）	1. accident	2. evenly	3. fantastically
	4. sold	5. who	
（ケ）	1. links	2. minimizing	3. robotic
	4. stretch	5. terribly	
（コ）	1. bodies	2. exciting	3. help
	4. needs	5. safely	

V. 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） その美術館では彼女の作品の一つが展示されています。

One ____ ____ ▬▬ ____ ____ in the museum.

1. exhibited　2. her　3. is
4. of　5. works

（イ） レセプションの前に講演が行われた。

There ____ ____ ▬▬ ____ ____ a reception.

1. a　2. by　3. followed
4. lecture　5. was

（ウ） その会社は製品の品質を適切に確認していないことを責められた。

The company ____ ____ ▬▬ ____ ____ the quality of the product properly.

1. accused　2. checking　3. not
4. of　5. was

（エ） 我々の努力の結果、今年の目標収益を達成した。

We have met this year's profit target ____ ____ ▬▬ ____ ____ hard work.

1. a　2. as　3. of
4. our　5. result

（オ） その計画についてさらにくわしく討議すべきだと提案します。

I propose ____ ____ ▬▬ ____ ____ more detail.

1. discuss　2. in　3. that
4. the plan　5. we

VI.

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）

In Saudi Arabia, a new city known as The Line is under construction. When it is completed, The Line could be the most futuristic city on Earth. Most modern cities are crowded and take up a huge **① area**, but The Line will consist of a single 500-meter-tall building that stretches for 170 km, yet is only 200 m wide. Adding to its futuristic appearance, the entire **② structure** will be covered in mirrored glass. Planners predict that nine million people will eventually live in The Line. Residents won't need **③ sleep** since the city will be designed so that they can access all of their daily needs within a five-minute walk. If they want to go farther, a high-speed rail system will carry them from one end of The Line to the other in just 20 minutes. The Line will also be eco-friendly and run on 100% **④ renewable** energy. Does The Line sound like a place you would like to live?

（イ）

In 1965, Gordon Moore, the co-founder of the microchip company Intel, **① noticed** an interesting trend in microchip development. He observed that approximately every two years, the number of transistors on a microchip doubled. This trend is now known as Moore's Law and has described the rapid **② advancement** of computing power over the last 60 years. Throughout this period, as manufacturing techniques have improved, **③ businesses** have become smaller, faster, and more powerful. Moore's Law has directly influenced the industry by giving microchip manufacturers a goal to aim for. Moore predicted that there would be 65,000 transistors per microchip by 1975. In 2024, companies were able to put 50 billion transistors on a microchip the **④ size** of a fingernail.

（ウ） Whether you like ① **languages** or not, most of us use them all the time. Being able to count things has always been essential to human life. For most people, though, once amounts become very big, they start to lose ② **meaning**, and understanding them can become hard. For example, what is the difference between one million and one billion? We know these two numbers are ③ **different**, and we know one billion is bigger, but how much bigger is it? A useful way to think about this question is to relate it to time. What is the difference in time between a million seconds and a billion seconds? The ④ **answer** may be a little surprising. One million seconds is about 11.5 days, while one billion seconds is about 31.6 years. That is a very big difference, indeed!

（エ） The guitar is a versatile and popular musical instrument with a ① **long** history. Originating in Spain during the 16th century, the guitar has evolved significantly, ② **leading** to various types such as acoustic, electric, and classical. It typically features six strings, although guitars with more or fewer strings are also common. Its use spans many musical genres, from classical and flamenco to rock, blues, and jazz. Iconic guitarists like Jimi Hendrix, B.B. King, and Eric Clapton have showcased the instrument's ability to express emotion through ③ **pictures**. The electric guitar, introduced in the 1930s, transformed music by allowing for increased volume and sound modification. Learning the guitar involves ④ **mastering** chords, scales, and techniques like fingerpicking and bending. Its accessibility and expressive range make the guitar a beloved instrument for both amateur musicians and professional performers alike.

（オ） Have you ever watched a movie with no real plot or dramatic action? That's what audiences found in Richard Linklater's 1990 film, *Slacker*, and many of them ① **loved** it! Young filmmakers and movie-goers at that time wanted to get away from the polished scenes, big budgets, and predictable plots of Hollywood studios, and *Slacker* was exactly what many had been ② **paying** for. Linklater chose students and local artists for his actors and filmed with a cheap, handheld camera. What is the film about? Viewers have to think hard about that. Instead of a single narrative, *Slacker* tells over 20 different ③ **stories**, with each almost completely unrelated to the others. Instead of action, the film features colorful characters and conversations about unique topics. What connects all of these stories? Linklater seems to say it's the ④ **film** itself—that, and the question he hopes viewers will ask themselves: "What connects our many stories?"

［以上、試験問題終了］

■出題意図

基礎力を試す問題を幅広く出題し、細かい文法知識よりも、語彙や読解力など、実践的な英語力を問う出題となっています。文法・語彙問題、読解問題、会話問題などいずれも幅広い英語力を問います。

出題形式は、全問マークシート式です。

■解答

Ⅰ.	(ア)－3	(イ)－4	(ウ)－3	(エ)－2	(オ)－4
	(カ)－2	(キ)－2	(ク)－1	(ケ)－2	(コ)－4
Ⅱ.A	(ア)－2	(イ)－3	(ウ)－3	(エ)－4	(オ)－3
Ⅱ.B	(カ)－1	(キ)－3	(ク)－4	(ケ)－1	(コ)－2
Ⅲ.A	(ア)－1	(イ)－8	(ウ)－7	(エ)－4	(オ)－5
Ⅲ.B	(カ)－3	(キ)－7	(ク)－6	(ケ)－5	(コ)－4
Ⅳ.	(ア)－4	(イ)－3	(ウ)－2	(エ)－3	(オ)－3
	(カ)－1	(キ)－3	(ク)－1	(ケ)－2	(コ)－3
Ⅴ.	(ア)－5	(イ)－4	(ウ)－4	(エ)－5	(オ)－1
Ⅵ.	(ア)－③	(イ)－③	(ウ)－①	(エ)－③	(オ)－②