2024 年度入学試験問題　211

情報科学部Ａ方式Ⅰ日程・デザイン工学部Ａ方式Ⅰ日程
理工学部Ａ方式Ⅰ日程・生命科学部Ａ方式Ⅰ日程

1　限　英　　語　（90 分）

〈注意事項〉

1. 試験開始の合図があるまで，問題冊子を開かないこと。
2. 解答はすべて解答用紙に記入しなさい。
3. マークシート解答方法については以下の注意事項を読みなさい。

マークシート解答方法についての注意

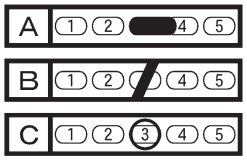
マークシート解答では，鉛筆でマークしたものを機械が直接読みとって採点する。したがって解答は HB の黒鉛筆でマークすること（万年筆，ボールペン，シャープペンシルなどを使用しないこと）。

記入上の注意

1. 記入例　　解答を 3 にマークする場合。

（1）正しいマークの例

（2）悪いマークの例



枠外にはみださないこと。

○でかこまないこと。

2. 解答を訂正する場合は，消しゴムでよく消してから，あらためてマークすること。
3. 解答用紙をよごしたり，折りまげたりしないこと。
4. 問題に指定された数よりも多くマークしないこと。

4. 問題冊子のページを切り離さないこと。

〔Ⅰ〕 つぎの(1)～(10)の英文中に入る最も適切な語(句)をそれぞれイ～ニの中から一つ選び，その記号を解答用紙にマークせよ。

(1) Have you heard the news that another typhoon [ ] Japan?

イ is approaching　　ロ is approaching to

ハ is approaching for　　ニ approaches

(2) The term SDGs [ ] Sustainable Development Goals.

イ constructs　ロ composes　ハ refines　ニ refers to

(3) I am [ ] to see you here this summer.

イ thrilled　　ロ exciting

ハ looking forward　　ニ used

(4) The nurse [ ] me my medicine.

イ advised　ロ brought　ハ took　ニ kept

(5) At the airport, you can [ ] your bag at the baggage claim.

イ take over　ロ serve　ハ wait　ニ collect

(6) The contest was quite competitive, but I [ ] .

イ managed to win　　ロ won to manage

ハ managed winning　　ニ won managing

(7) [ ] it be fun to go to a soccer game if I can get tickets?

イ Shall　ロ Let　ハ Wouldn't　ニ Doesn't

(8) Our English teacher told us to [ ] the report to him no later than the next class.

イ work　　ロ hand out　　ハ turn in　　ニ place

(9) Tokyo is no longer the city [ ] it was thirty years ago.

イ in which　　ロ where　　ハ what　　ニ which

(10) [ ] a fluent speaker of English, Yuki is often mistaken for a native speaker.

イ For　　ロ To be　　ハ Being　　ニ Having been

〔Ⅱ〕 つぎの(1)～(5)の対話の［　　］に入る最も適切な文をそれぞれイ～ニの中から一つ選び，その記号を解答用紙にマークせよ。

(1) Teacher: Hi, I noticed you're having trouble focusing on your studies. Any idea what might be causing it?
Student: Not really. ［　　］
Teacher: Have you tried creating a structured study schedule and taking care of your physical health?
Student: No, I haven't. Thank you. I'll give those ideas a try.

イ My mind just keeps wandering off.
ロ I am really into it.
ハ Recently, I've been keen to study.
ニ You can say that again.

(2) Doctor: Hello. What brings you in today?
Patient: I think I have a cold.
Doctor: I see, have you been experiencing any symptoms such as coughing or a runny nose?
Patient: Yes, I've been coughing a lot and my nose has been runny.
Doctor: It sounds like you may have a cold. ［　　］

イ Don't mention it.
ロ Give me something cold to drink.
ハ I would recommend getting plenty of rest and drinking lots of liquids.
ニ It was great to hear from you.

(3) Customer: Hi, can I get two tickets for the 7 p.m. showing in Theater 3?

Ticket seller: Sure! Would you like regular or premium seating?

Customer: [ ] How much does it cost per ticket?

Ticket seller: Regular tickets are $12 each. So, that'll be $24 for two tickets. Let me also remind you that tonight we have a special of two drinks and one large popcorn for just $15 at our snack bar.

Customer: Thanks for letting us know.

イ Either will do.

ロ I don't care.

ハ Regular seats are fine.

ニ I would rather have premium seats, please.

(4) Customer: Hi, do you have any books about chatbots or Artificial Intelligence?

Clerk: Yes, we do! Are you interested in learning about chatbots in general or a specific type of AI?

Customer: I'm interested in learning about ChatGPT. Do you have any books on that?

Clerk: Yes, we have *GPT-4: Language Models and Machine Learning* by Karan Jain. It's a great resource for learning about ChatGPT and its applications. [ ]

Customer: Absolutely. It sounds like it's worth reading.

イ We are very sorry but it is not available.

ロ Would you like me to show you where it is?

ハ Electronic books are getting more popular than printed books lately.

ニ Tell us what you are looking for, please.

(5) Mother: Have you made a decision about which universities you want to apply to?

Son: No, I haven't decided yet. I'm still considering a few different options.

Mother: [ ] It might help to get a better sense of the schools you're interested in.

Son: I've visited a couple, but I still need to check out a few more before I make a decision.

イ Have you visited any campuses?

ロ Making decisions is tough.

ハ Have you taken any practice tests yet?

ニ You don't have enough time to think.

〔Ⅲ〕 パラグラフ(段落)に関する設問に答えよ。

問1 つぎの(1)～(3)のパラグラフ(段落)には，まとまりをよくするために取り除いた方がよい文が一つずつある。取り除く文として最も適切なものをそれぞれ下線部イ～ニの中から一つ選び，その記号を解答用紙にマークせよ。

(1) Changing regular light bulbs to energy-efficient LED light bulbs is an easy way to both save money and help the planet. LEDs are made with high-quality materials, so they last longer.(イ) You will generate less greenhouse gases if you purchase an LED light bulb that will last for 10 years rather than something that will have to be thrown away after a short time.(ロ) Most importantly, LEDs use about 75% less energy than regular light bulbs.(ハ) Other high-quality products like good computers also last longer.(ニ) We predict that your electricity bill is going to look a lot better after this purchase!

Faroke, Sanah. "Twenty Simple Things You Can Do to Help Save the Planet." *Popular Mechanics*, 1 April 2023, https://www.popularmechanics.com/home/how-to-plans/g43457454/eco-friendly-products-packaging-clothing-tips/?slide=15. （一部改変）

出典追記：Copyrighted 2023. Hearst Magazine Media, Inc.

(2) Polar bears live in some of the harshest conditions on earth, dealing easily with Arctic temperatures as low as minus 5 degrees Celsius. The bears have many adaptations that allow them to do well when the temperature drops. (イ)One is their huge size. (ロ)Since the 1940s, scientists have known that part of the bear's secret is the white fur covering its body. (ハ)One might think that black fur would be better at absorbing heat, but it turns out that the hairs of polar bear fur are extremely effective at transmitting sunlight toward the bear's skin. (ニ)But the white fur is only half the answer. The other half is the polar bear's black skin. The hairs of the polar bear fur conduct sunlight down to the bear's black skin, which absorbs all of the light waves, heating the bear.

University of Massachusetts Amherst. "New Textile Unravels Warmth-Trapping Secrets of Polar Bear Fur: Engineers Invent Bilayered Fabric, 30% Lighter Than Cotton and Far Warmer." *ScienceDaily*, 10 April 2023, http://www.sciencedaily.com/releases/2023/04/230410111625.htm. （一部改変）

(3) In recent years, phase change materials (PCMs) contained in micro-capsules, are increasingly mixed with construction materials to improve the energy efficiency of buildings. (イ)PCMs can absorb and store heat from sunlight, creating a cooling effect in the interior. (ロ)The interior itself can be any color. (ハ)While doing so, they change from a solid state to a liquid state. (ニ)Later, at night, when outdoor temperatures drop, the absorbed heat is then released into the interior, providing a warming effect, as the PCMs turn from liquid to solid.

Kaunas University of Technology. "Energy-Efficient Construction Materials Work Better in Colder Climates, Say Researchers." *ScienceDaily*, 3 February 2023, http://www.sciencedaily.com/releases/2023/02/230203105332.htm. （一部改変）

問２　つぎの(1)と(2)のパラグラフ(段落)を完成させるために，［　　］に入る文として最もふさわしいものをそれぞれイ～ニの中から一つ選び，その記号を解答用紙にマークせよ。

(1) By 2020 two-thirds of knowledge workers in the U.S. worked in an open-plan office. Most people wish they didn't. The very first survey comparing this to other office designs was published in 1970. It found that few employees like a completely open plan with little privacy. The respondents—358 employees at 18 companies—complained about noise, difficulty concentrating, and lack of human warmth. The survey might as well have been conducted today. In fact, dozens of recent surveys have reached the same conclusions. It's now well established that open-plan offices fail to accomplish one of their major stated goals—increasing teamwork. ［　　］

イ　Rather, increased teamwork leads to higher productivity.

ロ　Moreover, fewer workers come on time to the office.

ハ　Instead, workers become more isolated.

ニ　Furthermore, teamwork increases company profits.

Musser, George. "Fixing the Hated Open-Design Office." *Scientific American*, 328, 1 April 2023, pp. 36-41, doi:10.1038/scientificamerican0423-36, https://www.scientificamerican.com/article/fixing-the-hated-open-design-office/. （一部改変）

(2) [ ] New research examined how the use of artificial intelligence (AI) in conversations impacts the way that people express themselves and view each other. Technology companies tend to emphasize how useful AI tools are to accomplish tasks faster and better, but they ignore the social influence of AI. The new research found that AI did increase efficiency, but when participants think their partner is using more AI-suggested responses, they perceive that partner as less cooperative, and feel less connection toward them. People tend to evaluate others more negatively simply because they suspect that you're using AI to help you write, regardless of whether you actually are. This finding illustrates the overall suspicion that people seem to have toward AI.

イ AI tools will probably improve efficiency, but may have negative social side effects.

ロ AI may not make our work more efficient, but it can help us improve working relationships.

ハ While AI has little impact on society, it has a major impact on business.

ニ AI tools may make communication more positive, but less efficient.

Fleischman, Tom. "Study Uncovers Social Cost of Using AI in Conversations." *Cornell Chronicle*, 4 April 2023, https://news.cornell.edu/stories/2023/04/study-uncovers-social-cost-using-ai-conversations. (一部改変)

〔Ⅳ〕 ニューヨーク市の賃貸住宅に関する表と図を含むつぎの英文記事を読み，設問に答えよ。

Finding a place to live is not always easy in the U.S. these days, particularly for low-income residents. In many major U.S. cities, there is often a gap between what people can afford to rent and what is available. To bridge this gap in New York City (NYC), the Affordable Housing System provides qualified residents with housing at below-market costs.

In order to be considered affordable, rent should be 30% or less of annual income. The Table below displays the amounts equal to 30% of annual median*1 income in 2019 for residents in the five main areas of NYC. For example, if residents living in Brooklyn spend $20,100 or more, or those in Queens spend $22,100 or more, then their housing costs are over 30% of the area median income. The exact amount, of course, varies depending on the number of family members.

Table. Amounts of rent payments equal to 30% of annual median income in 2019 for NYC residents in the five areas (US Dollars)

	Areas of New York City (NYC)				
Selected household categories*	Brooklyn	Queens	The Bronx	Staten Island	Manhattan
All households	$20,100	$22,100	$12,400	$26,900	$28,100
Families with children	$20,100	$22,700	$12,300	$31,400	$42,300
Families without children	$23,800	$26,000	$18,400	$31,800	$36,500

* Other categories are omitted.

Research shows that, on average, NYC renters spend 32.5% of their income on rent. However, the percentage differs significantly by income category. The Figure shows the percentage of low-income renters whose

rent made up between 30% and 50% and over 50% of their annual income. About 30% of them spend between 30% and 50%, whereas 43% to 47% spend over 50% of their annual income on rent. In short, rent imposes a heavy burden on low-income residents.

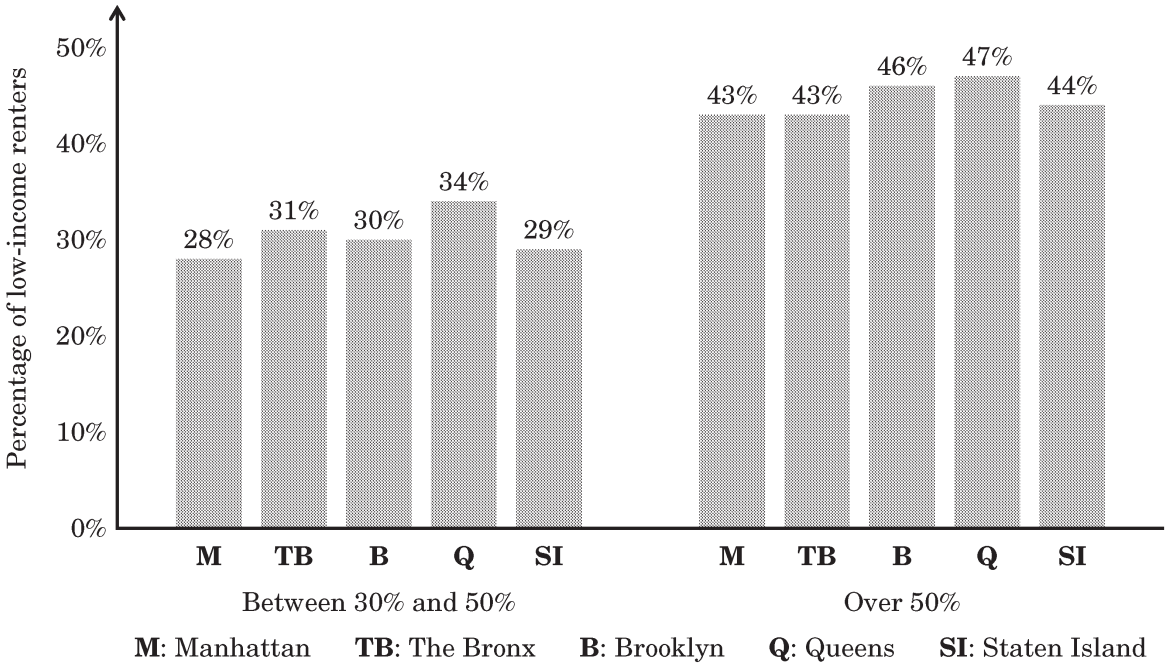


Figure. Percentage of low-income renter households paying between 30% and 50%, and over 50% of their annual income on rent

Though an increasing number of low-income families qualify for the Affordable Housing System, they are often not able to obtain housing quickly. Because so many low-income households apply for the affordable housing lottery[*2], it may take months or even years for them to finally receive such housing. Therefore, low-income families have to keep paying rent that they cannot afford. And since they spend so much on rent, they usually neglect other vital necessities.

[*1] median: 中央値

[*2] lottery: 抽選

Bardales, Angye, et al. "New York City Affordable Housing." *Across the Spectrum of Socioeconomics*, vol. 1, no. 4, 2021, pp. 38-57, DOI: 10.5281/zenodo.4740633. により作成.

問 1　What is the purpose of the Affordable Housing System in NYC?

イ　to bridge the wage gap between the areas of NYC

ロ　to lend money for housing to low-income households

ハ　to bridge the gap in unemployment rates among areas in NYC

ニ　to offer inexpensive housing to qualified residents

問 2　According to the Table, which of the following areas has the lowest rent considered to be affordable in NYC?

イ　Staten Island　　ロ　Brooklyn

ハ　Queens　　ニ　The Bronx

問 3　According to the Table, which of the following areas in NYC has the greatest difference between the rent payments considered to be affordable for families with children and without children?

イ　Manhattan　　ロ　Staten Island

ハ　Queens　　ニ　The Bronx

問 4　According to the Figure, which of the following statements is true?

イ　Approximately 50% of low-income New Yorkers spent between 30% and 50% of their income on rent.

ロ　Approximately 40% of low-income New Yorkers spent between 30% and 50% of their income on rent.

ハ　Over 40% of low-income New Yorkers spent at least 50% of their income on rent.

ニ　Over 70% of low-income New Yorkers spent at least 50% of their income on rent.

問5　What is the main reason it is difficult for low-income families in NYC to obtain affordable housing?

イ　overspending on food or childcare

ロ　high demand for affordable housing

ハ　complexity of the lottery process

ニ　lack of criteria for affordable housing

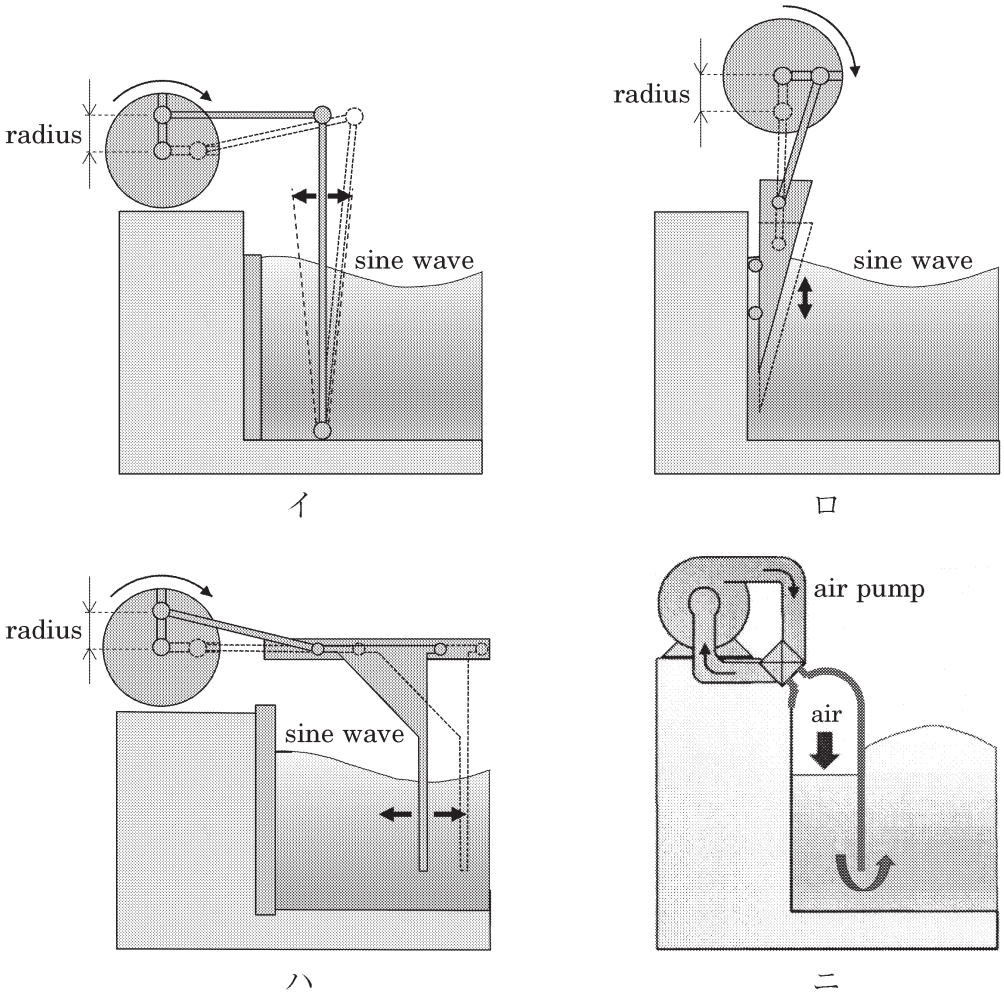
〔Ⅴ〕 波の作り方に関するつぎの英文と図を読み，設問に答えよ。

［1］For surfers, wave pools are the future of inland surfing. A new industry was even created to provide the perfect wave for surfing in limited outdoor and indoor spaces.

［2］The first experiments with human-made waves date back to the 19th century. Today, several facilities create experimental waves. They can be created in small laboratories or large, football-field-size water pools. The goal of these experiments is to understand how certain waves behave, what their shapes are, and how they spread.

［3］Waves have a daily impact on the world's coastlines, so it is critical to understand their potential threats to human activity. Waves also explain why seawalls and other barriers are built and how harbors are created. But they're also a factor that must be considered in the preservation of dune*1 systems and the protection of private and public property built near the shoreline. The same need for studies applies to ship building engineers, who need to determine how much waves affect ship structures.

［4］There are four main types of wave-making models. Each one of them has specific advantages, depending on the desired outcome. The four models of tank wavemakers use either a paddle, a plunger, a piston, or a pneumatic*2 mechanism, as seen in the Figure. The paddle, the plunger, and the piston are all connected by a rigid arm to a pin located off-center on a turning wheel and thus directly produce mathematically satisfying sine waves.



Figure

The piston type generates waves by the horizontal movement of the wave-making plate, while the paddle type generates waves by the back-and-forth tilting*3 motion of the wave-making plate. The plunger type generates waves by the vertical motion of the floating body. Whenever you reduce the speed of the driving wheel, the wave period lengthens; on the other hand, if you increase the radius of the pin connection, the wave height increases.

［5］ Pneumatic wavemakers are attached to the walls of large, square tanks. They create waves by changing the air pressure beneath a hood so that the water surface there rises and falls. As the water surface inside the hood is pushed down, the pressure is transmitted, according to Pascal's law, to the water on the other side of the hood where the surface is raised.

That's when the movement will start to travel across the tank. By controlling the amount and duration of air pressure blown by the motor, it is possible to control the size of the waves and the wavelength, respectively.

*1 dune　砂丘

*2 pneumatic　空気圧式

*3 tilt　傾く

"How to Make an Artificial Wave." *SurferToday*, https://www.surfertoday.com/surfing/how-to-make-an-artificial-wave （一部改変）

問1　Which of the following best describes the purpose for creating experimental waves?

イ　to understand the behavior and shape of waves

ロ　to simulate various wave sizes in narrow wave channels

ハ　to determine the impact of waves on coastlines

ニ　to create perfect surfable waves in limited spaces

問2　Which of the drawings イ～ニ in the Figure illustrates the plunger wave-making model?

問3　What does paragraph［5］explain about the pneumatic wave making model?

イ　the advantages and disadvantages of the wave making model

ロ　the weakness of the wave making model

ハ　how the wave making model works

ニ　the cost of the wave making model

問4　Who is least likely to have a professional interest in this article?

イ　marine architects

ロ　psychologists

ハ　geographers

ニ　surfers

問5　What is the main purpose of this article?

イ　to describe the types of wave-making models

ロ　to introduce a new theory relevant to wave-making models

ハ　to compare and identify the best wave-making models

ニ　to evaluate and assess the stability of the wave-making models

〔Ⅵ〕 大学教授が一人の学生とのやり取りを思い出しながら書いたつぎの英文を読み，設問に答えよ。

At the end of my opening lecture in my 1998 course on global health, most students headed for the coffee machine, but one remained behind. I saw her wander slowly toward the front of the room with tears in her eyes, then, when she understood that I had noticed her, she stopped, flipped her face away, and looked out the window. She was obviously moved. I expected her to share with me a sad personal problem that was going to prevent her participation in the course. Before I could say anything comforting, she turned around, gained control over her emotions, and in a steady voice said something completely unexpected:

"My family is from Iran. What you just said about the fast improvements in health and education in Iran was the first positive thing I've heard anyone from Sweden ever say about the Iranian people." My student said this to me in perfect Swedish with a clear Stockholm accent: she had obviously lived in Sweden her whole life. I was stunned(1). All I had done was to briefly show UN data for Iran on the increase in life expectancy and decrease in babies per woman. I had also mentioned that the decrease was quite an achievement; it was actually the fastest drop ever, from more than six babies per woman in 1984 down to fewer than three babies per woman nearly 15 years later.

The student said, "You stated that the fast fall in the number of babies per woman in Iran is a reflection(2) of improvements in health and education, especially for Iranian women. You also rightly said that most young Iranians now have modern values about family size. I have never heard anyone in Sweden say anything even close to that. Even highly educated Swedes seem completely unaware of the changes that have taken place: the improvements and the modernity."

The fastest drop in the number of babies per woman in world history went completely unreported in the free Western media. Iran has a highly educated population with excellent access to an advanced public health-care system. How many people in the West would guess that women in Iran today decide to have fewer babies than women in either the United States or Sweden? Do we Westerners love free speech so much that it makes us blind to any progress in a country whose (3)regime does not share our love of freedom of speech? It is, at least, clear that a free media is no (4)guarantee that the world's fastest cultural changes will be reported. So, based on the lack of media reporting, it is easy to understand why so many people (5)presuppose that women in some cultures give birth to more children.

The lack of reporting on the drop in the birthrate in Iran is just one example of how people tend to claim that certain values or behaviors are culture-specific, unchanging and unchangeable. It's just not true. Take my lovely home country, Sweden. We Swedes are known for being quite liberal and open, aren't we? Yet this hasn't always been our culture. These haven't always been our values. In my own living memory, Swedish values were extremely conservative. My father's father, Gustav, for example, was born in Sweden and was a quite typical Swedish man of his generation. He was extremely proud of his large family of seven children; he never changed a diaper, cooked meal, or cleaned the house. However, his conservative attitudes were not adopted by the next generation.

Rosling, Hans. *Factfulness*, Sceptre, 2018, pp. 172-177. （一部改変）

問１　本文中の下線部(1)～(5)の語(句)について，意味が最も近いものをそれぞれイ～ニの中から一つ選び，その記号を解答用紙にマークせよ。

(1) stunned

イ　impressed　　ロ　disgusted

ハ　angry　　ニ　shocked

(2) a reflection

イ　an indication　　ロ　a replacement

ハ　a revision　　ニ　a creation

(3) regime

イ　democracy　　ロ　border

ハ　religion　　ニ　government

(4) guarantee

イ　promise　　ロ　gauge

ハ　wonder　　ニ　testimony

(5) presuppose

イ　disagree　　ロ　assume

ハ　remember　　ニ　propose

問２　本文の内容に関する(1)～(7)の問いの答えとして最も適切なものをそれぞれイ～ニから一つ選び，その記号を解答用紙にマークせよ。

(1) Why was the student in the professor's class moved?

イ　because the UN data was informative and thought-provoking

ロ　because it was the first time she heard positive news about Iran

ハ　because the professor shared a personal story with her

ニ　because the professor spoke perfect Swedish with a real Stockholm accent

(2) What achievement in Iran was mentioned in the lecture?

イ　a decrease in the number of babies per woman

ロ　a decrease in the unemployment rate for women

ハ　an increase in the number of babies per woman

ニ　an increase in the income of a typical Iranian family

(3) What reason does the author give for the Western media NOT reporting on Iran's progress?

イ　The Iranian government restricts media coverage.

ロ　The Western media is biased against certain countries.

ハ　The Western media is not interested in health and education issues.

ニ　The Western media does not pay attention to Middle Eastern countries.

(4) What is the reason that many people still think that Iran has a high birth rate?

イ progressive attitudes

ロ little freedom of speech

ハ conservative values

ニ lack of information

(5) How does the author describe his grandfather?

イ liberal

ロ stubborn

ハ traditional

ニ progressive

(6) Which of the following would be the best title for this passage?

イ Difficulty in Overcoming our Stereotypes

ロ Gender Equality Can Be Achieved

ハ The Mass-Media's Role in Democracy

ニ Freedom of Speech and Culture

(7) What does this passage imply?

イ Multicultural society should be appreciated more.

ロ Aging society cannot be helped.

ハ Governments should help women to bear more children.

ニ Values are not fixed.

〔Ⅶ〕 エネルギー問題に関するつぎの英文を読み，設問に答えよ。

［1］ In response to the problem of global warming, increasing efforts are focused on switching energy resources from fossil fuels to electricity. The main goal is to reduce our carbon footprint, that is, to minimize the amount of carbon dioxide（CO_2）we release in our daily activities. One source of the release of this gas is the transportation of people and goods using gasoline-powered vehicles. An alternative could be the use of electric vehicles（EVs）. As EVs do not use gasoline, but electricity, they are supposed to be “clean” or “green” because they do not release carbon dioxide. However, we have (1) to be aware that since electricity can be produced by many methods, not all of them will necessarily reduce the carbon footprint to the same degree. In fact, the production of electricity itself, in many cases, generates carbon dioxide.

［2］ The oldest and most common way to produce electricity has been—and still is—to burn fossil fuels, that is, coal, oil, and natural gas, to obtain heat to produce steam. The pressure of the steam is used to drive devices called turbines that convert movement into electricity. These three fuels are indeed fossils of dead animals and plants that ended up contained in enormous underground (2) deposits. They cannot be created again, so they are non-renewable. Moreover, burning these fossil fuels produces carbon dioxide. This gas is the main cause of global warming.

［3］ Nuclear energy can also be used to produce electricity in special plants where the fuel uranium[*1] produces an enormous amount of heat through a nuclear reaction. This heat is used to produce steam to power turbines to generate electricity. This technology is low-carbon emission, but the fuel used is non-renewable.

［4］ Electricity can also be generated using renewable resources that Nature provides by means of technologies that do not release carbon dioxide,

called low-carbon emission technologies. The energy generated by flowing water or wind can be transformed into hydropower and wind power to generate electricity using turbines. Solar panels are another low-carbon emission technology: they convert sunlight energy directly into electricity without the use of turbines.

[5] A study done in 2021 by the U.S. government calculated how much carbon dioxide emissions would be reduced in each state if only EVs were used, against the case if only gasoline-powered vehicles were used. It makes it clear that the impact of EVs will be affected by the carbon emissions from the electricity generation methods themselves. Table 1 shows the cases of four states. The figures represent the percentages of electricity generated by the respective technologies, using resources that are renewable and non-renewable. The column "Other renewables" represents a variety of different technologies that are low-carbon emission. The percentage of reduction in carbon emissions if only EVs were used is shown in the last column on the right.

Table 1. Electricity production (in percentages) in four American states, and the effect on the reduction in carbon dioxide emissions if only EVs are used

State	Coal	Natural gas	Oil	Nuclear power	Hydro-power	Wind power	Solar power	Other renewables	Reduction in CO_2 if only EVs used
Connecticut	0.6	53.5	0.1	39.1	1.1	0.03	2.6	1.7	72%
Vermont	0	0.02	0.1	0	47.7	14.8	15.7	21.6	100%
Washington	2.9	14.5	0	7.8	65.5	8.5	0.3	0.4	89%
West Virginia	92.4	3	0.3	0	1.8	2.5	0.03	0	51%

(Data taken from https://www.afdc.energy.gov/vehicles/electric_emissions.html)

[6] The use of fossil fuels to produce electricity will generate considerable (3) amounts of carbon emissions, altering the degree of reductions in CO_2

depending on the state. For instance, in Vermont, almost all electricity is produced using renewable, low-carbon emission technologies. In consequence, the impact of EVs will be great (100% reduction of carbon dioxide). This is because neither electricity generation nor EVs will produce carbon dioxide. On the other hand, in West Virginia, electricity is generated using mostly coal; this produces large amounts of carbon dioxide. Despite the use of such a high percentage of fossil fuels, the calculated reduction of carbon dioxide achieved by EVs will be 51%. This indicates the positive impact of using EVs, even in places where fossil fuels are used for electricity generation. Likewise(4), in Connecticut, where 53.5% of the electricity is generated using natural gas, the additional use of nuclear power significantly reduces the amount of carbon dioxide emissions. Washington State uses several renewable resources, which compensate for the carbon emissions from the 14.5% use of natural gas.

[7] In the global arena, electricity generation is also diverse. Table 2 shows the sources of electricity production in four countries for the year 2021.

Table 2. Sources of electricity production (in percentages) in four countries

Country	Coal	Natural gas	Oil	Nuclear power	Hydro-power	Wind power	Solar power	Other renewables
France	1.8	6.3	2	72.2	10.9	3.8	1.6	1.4
Germany	28.3	16.4	3.9	11.9	3.4	19.7	8.5	7.9
China	62.9	3.2	0.1	4.8	15.3	7.7	3.9	2.1
Japan	32.1	35.1	3.4	6.4	8.3	0.9	9.3	4.5

(Data taken from https://www.ourworldindata.org/energy-mix)

France depends on fossil fuels to produce electricity to a lesser degree than the other three countries. Instead, France relies heavily on nuclear power and lags(5) in the use of renewables. Meanwhile, Germany seems to strike a

balance between fossil fuels and renewables; fossil fuels account for 48.6% and renewables account for 39.5%. In contrast, China and Japan are fairly dependent on fossil fuels for about two-thirds of their electricity production. China depends mostly on coal (62.9%), but depends very little on natural gas (3.2%). Japan relies on coal (32.1%) and natural gas (35.1%) to approximately the same extent. These figures in Table 2 suggest that the strongest impact of EVs in reducing the carbon footprint will be in countries where electricity is produced using "green" technologies.

[8] In conclusion, the data show that EVs will definitively reduce carbon emissions, but this reduction will vary depending on the technologies used to generate electricity. We should also note that world energy demand is not only for electricity. There is even greater demand for energy for transportation (ships and airplanes moving passengers and goods across the globe) and for heating during winter. Both activities consume almost exclusively fossil fuels. Given the energy demands of shipping and heating, the percentage of "green" energy gained from switching to EVs would represent less than 16% of the world total. This is indeed a rather bittersweet*2 conclusion.

*1 uranium: ウラン

*2 bittersweet: ほろ苦い

問1　本文の下線部(1)〜(5)の語(句)について，意味が最も近いものをそれぞれイ〜ニの中から一つ選び，その記号を解答用紙にマークせよ。

(1) to be aware

イ　to show　　ロ　to indicate

ハ　to understand　　ニ　to believe

(2) deposits

イ funds　　ロ accounts

ハ reserves　　ニ savings

(3) considerable

イ significant　　ロ minor

ハ some　　ニ slight

(4) Likewise

イ Similarly　　ロ At the same time

ハ Comparably　　ニ Therefore

(5) lags

イ consists　　ロ gives

ハ falls behind　　ニ leads

問2　本文と Table 1 に関する以下の(1)と(2)の問いの答えとして最も適切なものをそれぞれイ～ニから一つ選び，その記号を解答用紙にマークせよ。

(1) Among the four U.S. states in Table 1, which state is the most dependent on fossil fuels?

イ Connecticut　　ロ Vermont

ハ Washington　　ニ West Virginia

(2) Among the four U.S. states in Table 1, which state uses the most renewable energy?

イ Connecticut　　ロ Vermont

ハ Washington　　ニ West Virginia

問３　本文と Table 2 に関する以下の(1)と(2)の問いの答えとして最も適切なものをそれぞれイ～ニから一つ選び，その記号を解答用紙にマークせよ。

(1) Which of the countries best fit in the blanks (A) and (B)?

(A) leads in electricity production using mostly nuclear power; whereas (B) uses more renewables than the other countries.

イ　France　　ロ　Germany

ハ　China　　ニ　Japan

(2) What makes Japan unique compared to the other countries?

イ　Japan uses the least wind power for electricity production.

ロ　Japan uses more coal than other countries for electricity production.

ハ　Japan uses more oil than other countries for electricity production.

ニ　Japan uses the least nuclear power.

問４　本文の内容に関する以下の(1)～(4)の問いの答えとして最も適切なものをそれぞれイ～ニから一つ選び，その記号を解答用紙にマークせよ。

(1) What are the main topics about fossil fuels dealt with in paragraph [2]?

イ　how to use them to reduce both global warming and our carbon footprint

ロ　the way to produce heat and decrease carbon dioxide production

ハ　the process of burning them to obtain heat and the problem of releasing carbon dioxide

ニ　how to make them both low-carbon emission and renewable

(2) What does paragraph [3] describe about nuclear power?

イ its use to produce electricity

ロ threats from nuclear power

ハ its safe use in the production of “green” energy

ニ the problem of too much heat from the nuclear reaction

(3) What makes solar panels different from other renewable resources?

イ They operate all day long.

ロ They produce large amounts of carbon dioxide.

ハ They use less power.

ニ They do not use turbines to produce electricity.

(4) Which of the following is the major conclusion of the article?

イ Global warming will be solved by reducing the use of fossil fuels.

ロ EVs will solve the issue of global warming.

ハ Nuclear power is the key to reducing carbon emissions.

ニ EVs do reduce our carbon footprint, but their contribution will be rather limited.