令和６年度 データ&イノベーション学群 総合型選抜

英　　語　1/10

1　Read the following passage and answer the questions.

[1] Semiconductors, the building blocks of the digital economy, are in short supply. These shortages are a product of poor planning during the COVID-19 pandemic, as well as a production model that relies on global supply chains, which are subject to interruption. In January, global semiconductor industry sales rose 13.2% from a year ago, reaching $40 billion. Nevertheless, companies in almost every industrial sector continue to complain of shortages that prevent them from meeting production schedules. Consumer electronics makers, such as computer, video game and phone makers, have warned that they cannot keep pace with demand. Sony, for example, anticipates chip shortages will slow production of its PS5 device for another year. More ordinary appliance manufacturers are also impacted, cutting production of refrigerators, washing machines and even smart toilets.

[2] The proliferation* of technology throughout the economy means that the pinch will be felt in unexpected areas. Agriculture has gone high-tech, and many of the most modern and productive producers rely on semiconductors to get their goods to market. Steel makers, like other suppliers of the raw materials of the modern economy, need chips to operate their production facilities. The loudest complaints have come from automobile makers, who have responded to shortages in a variety of ways. Several manufacturers shut down entire plants. Others have removed options that require particular chips, like navigation systems or various screens within the vehicle.

[3] Shortages are the result of several factors. Semiconductor manufacturers first cut production during the pandemic, worried about falling demand as they and their customers sent workers home. Demand soared as homebound employees turned to electronic devices to stay connected or entertained. Many companies that are complaining now had canceled orders because they misread the trajectory* of the pandemic and resulting recovery in demand. Chip manufacturers shifted spare capacity to that needed for home electronics, anticipating that surge in demand, although they still fell short. Most experts forecast shortages for the remainder of the year, with imbalances continuing in some areas for another two years.

[4] Cognizant* of the importance of chip production, several national governments are providing funds to increase domestic production, either to national manufacturers or to entice* foreign manufacturers to set up shop in their country. Japan already has a ¥200 billion ($1.8 billion) fund to support domestic chipmakers and the Cabinet is weighing plans to supplement those funds with monies* it will spend on “strategic goods,” those that it deems* essential to the evolution and security of the nation. Those intentions rest on aggressive attempts to decarbonize the economy, and semiconductors will be critical to that transition.

[5] The Japanese government hopes to entice leading chipmakers to set up operations in the country. Since chips are designed for specific purposes, marrying Japanese R&D* with those manufacturers will give this country a lead in the green tech revolution that will be critical to engineering the transition to a more sustainable economy. U.S. companies are a priority target, as cooperation between the two countries' businesses will facilitate* the creation of secure supply chains, an item that dominates the agenda whenever officials from the two countries meet, including last month's summit between Prime Minister Yoshihide Suga and U.S. President Joe Biden. Biden already signed an executive order that requires certain U.S. government agencies to identify immediate steps they can take to address vulnerabilities in the semiconductor supply chain.

[6] There is danger that national security will be narrowly defined, however, and rather than pursuing the cooperative, alliance-based approaches that make economic and political sense, more narrowly defined national projects will prevail. The U.S. is ready to spend some $40 billion on semiconductor research and development and manufacturing. South Korea has announced that it will spend $450 billion to boost the competitiveness of its chipmakers. Europe, which seeks to double its share of global chip production to 20% has said that it is considering investing €20 to €30 billion ($24 to $36 billion) to that end. There is a risk that those plans will result in a competition among governments to secure partners or create overcapacity that will weaken the industry.

[7] Enhanced cooperation between Tokyo and Washington is a must. Success would be another sign of the vitality of our bilateral* security alliance and ways that our two countries can work together to protect national security broadly defined. And since it takes at least two years for a semiconductor manufacturing facility to go online, big national plans will not yield immediate results. Only multilateral cooperative solutions can provide that. Japan and the U.S. can and should be leading the way.

［出典］

"Make semiconductors a Japan-U.S. alliance priority", May 22, 2021, the japan times, https://www.japantimes.co.jp/opinion/2021/05/22/editorials/semiconductors-chips-u-s-japan-alliance/, ※一部略

注）*proliferation: a sudden increase in number or the amount of something
*trajectory: a series of events which often leads to a particular aim or result
*cognizant: having knowledge or awareness
*entice: persuade someone to do something
*monies > money
*deem: consider
*R&D: research and development
*facilitate: make an activity or process easier or more likely to happen
*bilateral: involving two groups or countries

(1) Why does the author refer to agriculture in paragraph [2]?

a. To give an example of an unexpected field of industry that depends heavily on semiconductors.
b. To explain how modern technologies have lowered the value of traditional industries.
c. To describe a both positive and negative impact on an unexpected area made by electronic devices.
d. To show how many modern and productive farmers have made use of high-tech equipment.

(2) According to paragraph [2], which of the following is **NOT** true of the effects or potential effects of the shortage of semiconductors?

a. Some farmers are likely to be less productive.
b. Some steel makers may be unable to operate their factories.
c. Some car manufacturers stopped operating their production facilities.
d. Some car makers had to remove chips from the navigation systems on vehicles.

(3) According to paragraph [3], which of the following has **NOTHING** to do with the reason semiconductors fell into short supply?

a. Semiconductor makers' adjustment of their production.
b. Sudden increase in demand for electronic devices at home.
c. Electronics makers' incorrect prediction of the course of the pandemic.
d. Chip makers' failure to make use of their available capacity.

(4) According to paragraph [4], which of the following is true of the Japanese fund?

a. The ¥200 billion fund was set up to attract foreign chipmakers to Japan.
b. The Japanese Cabinet is considering adding more money to the fund.
c. The fund was originally set up to be spent on strategic goods.
d. Some Japanese chipmakers have already set up shop in foreign countries using the fund.

(5) According to paragraph [5], which of the following is true of cooperation between Japan and the U.S.?

a. Government officials in both countries consider it to be crucial to ensure secure supply chains for chips.

b. It will enable the U.S. to establish competitive advantages in the green tech revolution.

c. It will contribute to increased domestic production of semiconductors in each country.

d. To promote cooperation, Japan is aggressively attempting to set up a specific fund.

(6) The author mentions the summit in paragraph [5] in order to

a. highlight the significance of the short supply of semiconductors in both countries.

b. emphasize how important it is to strengthen supply chains for semiconductors.

c. explain the strategies for the transition to a more sustainable economy.

d. show how vulnerable the relationship between Japan and the U.S. is.

(7) According to paragraph [6], which of the following is free from the danger of falling into unfriendly national strategies for manufacturing semiconductors?

a. The U.S.

b. South Korea.

c. Europe.

d. None.

(8) Which of the following best expresses the essential information in the underlined sentence in paragraph [7]?

a. Since they are the capitals of each country, Tokyo and Washington must form a security alliance.

b. Japan and the U.S. must invest in semiconductor manufacturing technologies independently.

c. It's vital for Japan and the U.S. to work together to ensure a secure supply chain of semiconductors.

d. Japan and the U.S. must enhance their bilateral alliance and compete against the other countries.

(9) An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the **THREE** answer choices that express the most important ideas in the passage.

Semiconductors are short in supply due to a lack of planning during the pandemic.
◆
◆
◆

a. Japan and the U.S. should cooperate to ensure a steady supply of chips.
b. Car manufacturers have been complaining about the shortage of semiconductors.
c. Whenever officials from Japan and the U.S. meet, they discuss the green tech revolution.
d. The president of the U.S. required the entire U.S. government to take steps to ensure the semiconductor supply chain.
e. Each government is supporting domestic semiconductor makers, which may lead to competition among them.
f. Almost every industrial sector is having trouble meeting the demand for their products because of the shortage of semiconductors.

2　Read the following passage and answer the questions.

[1] The prospect of autonomous cars in aiding, even replacing, human drivers, is exciting. Advertised benefits include reduced commuter stress and improved traffic flow. The prospect is also alarming. The growing number of accidents involving self-driving technology tests the risk appetites of even the most enthusiastic adopters. The challenges are real. Uber, an early adopter of self-driving car technology, recently abandoned its ambitions of full autonomy. The recent $2.5 billion fine against Boeing due to the 737 Max disaster exposes the underlying vulnerabilities associated with the introduction of technology.

[2] There has been ample* review of the underlying technology, but there are far too few discussions about the role of people. What happens when we replace human judgment with technology, a situation that psychologists call “cognitive offloading”? Cognitive offloading has become more common with the introduction of new technologies. Do you rely on your phone to store phone numbers you once memorized? Do you use GPS navigation instead of memorizing your driving routes? Then you know the benefits of cognitive offloading. Cognitive offloading transfers routine tasks to algorithms and robots and frees up your busy mind to deal with more important activities.

[3] In an upcoming edition of the peer-reviewed* journal, *Human Performance in Extreme Environments*, I review the unintended consequences of cognitive offloading in industries like aviation and aerospace. Despite its many benefits, cognitive offloading also introduces a new set of problems. When we offload activities, we also offload learning and judgment. In one study, researchers asked a group of subjects to navigate the streets of London using their own judgment. A second group relied on GPS technology as their guide. The GPS group saw significantly less activity in the brain associated with learning and judgment. In the instance of self-driving cars, drivers may see their driving skills degrade over time.

[4] Two primary deficits can accompany cognitive offloading. First, cognitive offloading can lead to forgetfulness or failure to learn even basic operating procedures. The problem becomes acute when equipment fails, when the weather is harsh, and when unexpected situations arise. In aviation, even carefully selected and highly trained pilots can experience these deficits. Pilots failed to perform basic tasks in the Air France 447 disaster. An airspeed sensor failed, and autopilot disengaged. The pilots were now in control of the plane but had never learned, or forgot, how to regain control of the aircraft as it quickly descended into disaster.

[5] Second, cognitive offloading also leads people to overestimate the value of offloading, and this can lead to overconfidence. People may fail to grasp how offloading may degrade their abilities or how it may encourage them to apply new technologies in

unintended ways. The result can be consequential. The Boeing 737 Max incidents were attributed, in part, to overconfidence in the technology. One pilot even celebrated that the new technology was so advanced, he could learn to master the newly equipped aircraft by training on a tablet computer. But the technology and engineering proved to be far more complicated to operate. This same type of overconfidence has led to accidents in self-driving cars. Some drivers of self-driving cars have slept at the wheel and others have left their seat completely, despite warnings that the driver should always be aware and engaged when in autodriving mode.

[6] Commercial aviation offers lessons for ways to address these deficits. Technological innovation has fueled remarkable gains in safety. The fatality rate in commercial airlines has been cut in half over the last decade. Importantly, implementation of new technology goes hand in hand with extensive training in human factors. Human factors consider the limitations of human decision-making, motor skills, and attention. The safe implementation of new technologies requires extensive training and constant updating that helps pilots understand the limits of the technology.

[7] Proposed solutions to the human factor problem in self-driving cars are promising but have yet to reach an acceptable level of transparency. Tesla's Safety Score Beta, for example, monitors the driving habits of Tesla owners and only activates the self-driving feature for drivers who meet their criteria* on five factors: number of forward collision warnings, hard braking, aggressive turning, unsafe following, and forced autopilot engagement. But much of the data lacks transparency, there is no ongoing training, and there is growing discontent among drivers who fail to make the safety cut* after shelling out* nearly $10,000 for the self-driving feature.

[8] The widespread adoption of self-driving cars will require more than just technology. Extensive human support systems such as oversight* and reporting, training, and attention to human limitations must also be addressed. The ultimate success of self-driving cars will depend on improving technology, but also on educating the drivers behind the wheel.

［出典］

Reprinted from OUPblog, by D.CHRISTOPHER KAYES, "The problem with self-driving cars is not technology, the problem is people". By permission of Oxford University Press
https://blog.oup.com/2022/04/the-problem-with-self-driving-cars-is-not-technology-the-problem-is-people/

注）*ample: more than enough
*peer-reviewed: having been read and checked by other experts in the same field
*criteria > criterion: 基準，尺度
*make the safety cut: 安全基準を満たす
*shell out: spend a lot of money on something
*oversight: systems or actions to control an activity and make sure that it is done correctly and legally

(1) Which of the sentences below best expresses the essential information in the underlined sentence in paragraph [1]?

a. Despite the high risk of causing accidents, many people still take the risk of driving autonomous cars.
b. Some potential adopters of self-driving cars are too enthusiastic to assess the risk of the technology accurately.
c. The frequency of accidents caused by self-driving cars is high enough to make most people hesitate to use the technology.
d. Most people who are looking forward to driving an autonomous car are unaware of how many accidents have occurred.

(2) According to paragraph [2], which of the following is appropriate as an explanation of "cognitive offloading"?

a. Leaving some mental tasks to external devices.
b. Introducing new technologies that psychologists have sufficiently reviewed.
c. Giving up trying to memorize phone numbers or driving routes.
d. Concentrating on something more important than routine tasks.

(3) In paragraph [4], the author believes the airplane disaster was caused mainly by

a. the breakdown of the aircraft's equipment.
b. pilots' failure to carry out basic operations.
c. the bad weather and unexpected situations.
d. the pilots' lack of flight experience.

(4) In paragraph [5], the author states that overconfidence

a. is another disadvantage of cognitive offloading.
b. has been the main cause of air accidents so far.
c. has a lot to do with learning new technology on a tablet.
d. enables pilots to operate complicated systems.

(5) Complete the table below from the answer choices and match them to each deficit discussed in paragraphs [4] and [5].

First Deficit	Second Deficit
▶	▶
▶	▶
	▶

a. a factor causing the Air France disaster
b. forgetting to learn basic skills
c. making drivers in autodriving mode less aware
d. making you poor at doing even primary operations
e. having less effect on autonomous driving compared with the other deficit
f. likely to lead to too much dependence on technologies
g. a factor causing the Boeing incidents

(6) Which of the following is true of "the safe implementation of new technologies" referred to in paragraph [6]?
a. Commercial aviation has yet to succeed in achieving it.
b. In cooperation with the car industry, commercial airlines are trying to achieve it.
c. To achieve it, either technological innovations or extensive training is crucial.
d. It cannot be achieved without extensive training in human factors.

(7) Which of the following is **NOT** true of "Tesla's Safety Score Beta" referred to in paragraph [7]?
a. It has a problem in terms of data transparency.
b. It evaluates drivers' behavior only when self-driving mode is active.
c. It assesses drivers' skills based on five factors including the number of forward collision warnings given.
d. Drivers are not allowed to use the self-driving feature unless their scores are high enough.

(8) Which of the following is **NOT** included in the "more than just technology" referred to in paragraph [8]?
a. Discussion of the role of people in self-driving technology.
b. Understanding of problems introduced by cognitive offloading.
c. A system that activates self-driving mode only for careful drivers.
d. Extensive training and constant education for self-driving car users.

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英　　語　10/10

3　次の英文の要旨を，句読点も含め 80 字以内の日本語でまとめ，解答欄に書きなさい。

What if you could share the texture* of fabric, the sensation of plucking a guitar string or shaping clay with another person thousands of kilometers away? Japanese researchers at NTT Docomo, Keio University and the Nagoya Institute of Technology have made this a reality. The researchers have developed what they claim to be the world's first "sensation sharing" technology, which allows users to send movements or tactile* sensations digitally via a remote sensor and reproduce them in small, subtle vibrations.

The "Feel Tech" technology detects the physical touch of a person through a device, sends the data online via Docomo's human augmentation platform* and recreates the feeling in another device for someone else to feel. The technology is also capable of adjusting the sensory data so that the recipient will be able to sense the "touch" being transmitted more clearly. Docomo plans to use 6G mobile networks to ensure that transmitted sensations are in sync with* the footage* being shown.　Online shoppers, for instance, will be able to use the technology to feel different types of fabrics used in clothing and judge its quality.

One of the developers said the technology also enables people to share skills and techniques. Artisans, for example, can remotely share their craft with others, which he hopes can help alleviate* the issue of the declining number of successors. The technology may also be similarly used by doctors to share their knowledge.

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"Can you feel that? Japan researchers develop haptic information sharing technology", KATHLEEN BENOZA, February 8, 2023, the japan times, https://www.japantimes.co.jp/news/2023/02/08/business/tech/haptic-information-sharing-technology/, ※一部略・改

注）*texture: 手触り
*tactile: 触覚の
*human augmentation platform: 人間拡張基盤
*in sync with ～: ～と同期して
*footage: 映像
*alleviate: ＝ease