Ⅰ　次の英文を読み，下の問いに答えなさい。

Who was the first person to notice Mars? When and where did people first start observing the motions of Mars and the other planets(ア)? What did Mars mean to them? These simple questions are impossible to answer them(イ), as these events likely happened in many places around the world long before people kept written records. We have records of such a small fraction — less than 2 percent — of the three-hundred-thousand-year existence(ウ) of our species, *Homo sapiens*, and this moment is certainly buried unreachably deep in our past. But we can be sure of at least one thing: no matter where people were(エ), they experienced the sky. They experienced it in a way that few humans today can.

If you've ever been far from the city on a clear and cloudless night(オ), then maybe you've seen the sky in its full glory — with between two and three thousand stars visible to the naked eye along with the glowing plane of our Milky Way galaxy, and the planets slowly making their way(カ) through them. Today we live largely cut off from this spectacle, with smog and light pollution *obscuring our view of this *perpetual cosmic drama, the unfolding of which once seemed intimately connected to questions of both natural and social order(キ). But if we want to see Mars as it appeared ancient humans(ク), access to a clear night sky is only half of our problem. We also have to put ourselves in their minds.

[①] We have seen the surface of the Sun, the landscapes of Mars, the atmospheres of Venus and even Jupiter. We've discovered moons around other planets, and have found icy ocean worlds among them. We've used modern physics to *infer the existence of black holes, and have now even "seen" them with powerful radio telescopes. We know that stars are bright orbs powered by *thermonuclear fusion. We know that within the observable universe, many billions of them (a septillion, in fact, with twenty-four zeros) are packed into 170 billion galaxies occupying an expanding universe with a *radius of around 46 billion light years (each light year is nearly six trillion miles). We know, in other

words, that the universe is vaster than we can ever truly comprehend, that the starlight we see is millions of years older than we are (billions, if we go beyond what we can see with our eyes), and that there are more stars than we can count.

We might believe that we know the "true" nature of our universe, the objects held within it, and the forces that shape it. But the fact is that we aren't really any smarter than our ancient counterparts. The worldview of modern science and the technological capabilities we've developed for bringing the questions of science to the most distant objects of our universe are powerful. We've used them to construct a 13.8-billion-year history of our universe and the 4.5-billion-year history of our solar system and our planet, Earth. These tools have allowed us to detect and measure particles and electromagnetic wavelengths that we cannot otherwise see or feel; and on the basis of what we've found, we have constructed stories about ourselves and our universe.

[②] Another thing science tells us is that the human brain has changed very little, if at all, over these thousands of years. Scientists disagree about when humans became capable of more abstract ways of thinking, but cave paintings suggest that it happened more than 150,000 years ago. The humans who developed early astronomical knowledge were fully modern from a biological and cognitive perspective. We know that prehistoric and ancient people paid very close attention to the world around them and constructed complex worldviews to make sense of their universe(s). They did not live in intellectual darkness any more than we do today. They asked questions. They solved the problems that were important to them. They learned about themselves and their world: the cycles and forces they saw or felt at work in ordering their existence. Myth helped them to see beyond what was apparent in their world, and to create *holistic knowledge systems — to make connections that weren't otherwise obvious and create complete, coherent, and comprehensible worlds.

[③] There exist calendars of *lunar cycles carved into bone as much

as thirty-four thousand years old. We also know that some of the most famous *megalithic structures in the world, such as Stonehenge in England (ca. 3000 *BCE) and Nabta Playa in southern Egypt (5000–4000 BCE), were used to unite the social lives of *seminomadic groups of people with sky events. While most archaeologists no longer consider these sites to have been "ancient observatories" for predicting *eclipses or the movements of the planets, the evidence remains convincing that ancient peoples gathered, performed rites, and worshipped in these spaces designed to celebrate celestial motions and alignments. Anthony Aveni suggests that we consider these "sacred" observatories: "consecrated space[s] for watching the sky" in which "cosmic encounters were celebrated because they served to call people together to conduct rites to their gods." Rather than attempt to make these observers conform to our idea of what an astronomer is or does, we can think of them as "skywatchers" whose beliefs and practices varied across time and place. The truth is that we know very little about what preliterate societies knew or believed. But they left behind *ample evidence of their attention to the movements of the Sun and the phases of the Moon. (A) And we can be sure that whatever questions they asked of the heavens were very different from those that motivate space exploration today.

In reality, the difference between ancient and modern knowledge systems is more qualitative than quantitative; it is not about how much is known, but about what questions are important and about the acceptable ways of asking and answering those questions. And while we may not easily be able to slip between our modern worldview and those of others, we can nonetheless attempt to do so by asking not what ancient people knew about the world, but what their questions were when they looked at it. If we do (B) this in the case of Mars, examining a few of the earliest known examples from around the world, we can see how sky knowledge was considered important to the functioning of the state — whether it was *astrological knowledge in the service of good governance, or knowledge of bloodlines and relationships with the gods and other sky entities, which was used

to *legitimate power.

(Adapted from Matthew Shindell, *For the Love of Mars: A Human History of the Red Planet*)

(注)

*obscure　さえぎる

*perpetual　永遠に続く

*infer　推測する

*thermonuclear fusion　熱核融合

*radius　半径

*holistic　全体論的な

*lunar　月の

*megalithic　巨石を使った

*BCE　紀元前

*seminomadic　半遊牧民の

*eclipse　日食／月食

*ample　十分な

*astrological　占星術の

*legitimate　正当性を示す

問 1　下線部(ア)～(ク)のうち，文法的な間違いを含むものを 2 つ選び，記号で答えなさい。

問 2　空欄[　①　]～[　③　]に入る最も適切な文を，次の(ア)～(ウ)の中から1つずつ選び，記号で答えなさい。ただし，同じ選択肢を複数回使用することはできない。

(ア) But we aren't so different from those who came before us.

(イ) It's tempting to say that we know more than the ancients.

(ウ) We know that early humans observed the night sky and saw patterns.

問 3　下線部(A)について，they と those が指すものを明らかにして，日本語に訳しなさい。

問 4　下線部(B)が指す内容を日本語で説明しなさい。

問 5　本文の内容から正しいと判断できる英文を，次の(ア)～(オ)の中から2つ選び，記号で答えなさい。

(ア) Evidence suggests that Stonehenge was a place where people gathered and performed rites.

(イ) Thanks to modern physics and powerful radio telescopes, we now know exactly how vast the entire universe is and exactly how many stars there are.

(ウ) The brains of prehistoric and ancient people were not well developed and thus they relied entirely on myths and had incorrect knowledge.

(エ) Facts indicate that ancient people were more intelligent than modern humans.

(オ) We now have the tools with which we can detect and measure particles and electromagnetic wavelengths.

Ⅱ　次の英文を読み，下の問いに答えなさい。

In our society, a college degree can mean many things. For some, it is an expression of social status — a symbol of success and connection. For others, higher education is a familial expectation, a transition to adulthood, and a rite of passage.

But many do not realize what a primary role that college completion has assumed in our economy. What was once a matter of status is now often a matter of survival.

Over the last few decades, the world economy has undergone the largest, most *dislocating changes since the Industrial Revolution, with results that reach down into every American community. The dislocating has been particularly obvious in manufacturing, and in regions of the country dependent on manufacturing. In many places, lower-skilled, decent-paying jobs are simply gone. A high school diploma qualifies people for little. At the same time, technology has reduced the availability of routine-heavy jobs, not just on the factory line, but also in professions like sales and administrative support.

A few years ago, I sat down with a group of men at a job training program in Martinsville, *VA, which had, at that time, the highest unemployment rate in the state. This town was once a center for textile and furniture manufacturing. "If you were fired from one job," a middle-aged man told me, "you could go to another immediately. Unless you wanted to take time for lunch." [　①　]

The work that remains is mainly in retail and fast food or in service industries such as health care and call centers. The call centers — outsourced customer service for large companies — demand typing skills, which don't come easily to former factory workers. Another former factory worker I met at the training center told me he was engaged in "education out of desperation."

These trends of globalization and technology, of course, have had some massively positive outcomes: increased productivity, economic growth, and the

relief of poverty in much of the globe. (The share of people living in extreme poverty around the world has been cut in half since 1990.) But one undeniable result of this economic revolution for developed economies has been to put a premium on education and training. Workers with higher skills have greater opportunities. Workers with lower skills often have trouble finding work, and the dignity that comes from work.

[②] In 1980, people with a four-year college degree earned, on average, 64 percent more than people without a degree. Now that figure is nearly 100 percent more. Among Americans with a BA degree or more, about 5.8 percent live below the poverty line; among those with just a high school degree, the figure is 22 percent. (A) Education has never been more essential to economic survival.

Here is the good news: getting a college education remains one of the most powerful sources of (B) economic mobility in America. When children from the poorest families (the lowest 20 percent in income) lack a college degree, only about 14 percent of them will reach the *top two quintiles of income over their lifetimes. But if they earn a degree, 41 percent will make this dramatic economic advance.

Here is the bad news: there's a graduation gap in America. According to recent research, only 11 percent of low-income, first generation students who enroll in college will earn a bachelor's degree after six years. But among higher income peers with similar grades, more than 50 percent will earn their degree in the same period.

A college degree has a disproportionate influence on the shape of our future. Yet the price tag on higher education has risen faster than many other goods or services in our economy. And those who get discouraged and drop out often are left with serious debt and left without a useful *credential.

[③] They must navigate a complex financial aid system. They often have difficult family circumstances that create stress and few examples of collegiate success among relatives and friends. At college, they can become discouraged

by early *setbacks and (C)[(ア) belong (イ) whether (ウ) there (エ) question (オ) they] at all.

College graduation is essential to economic mobility and often comes harder for the poor. So closing the graduation gap is a requirement of equal opportunity.

(中略)

The reasons for the graduation gap are straightforward. In many cases, low-income students who have worked hard to attend college discover early on that they can't overcome what are simple obstacles for someone from a different socioeconomic background. Unlike students from secure economic backgrounds, low-income students tend not to have family or friends who can come up with relatively small amounts of cash (often less than $500) for unforeseen expenses like purchasing unanticipated course materials or repairing a laptop.

In addition to a lack of access to financial resources, many students from low-income backgrounds don't have a parent with college experience. The value of someone who can give experience-based guidance can't be quantified, but its absence has real impact. For example, who can help resolve the problem that arises when a student misses a critical deadline for on-campus housing, and as its consequence the only housing options available are ones that the student can't afford?

For students from low-income backgrounds, the obstacles of unanticipated financial needs or navigating unfamiliar systems aren't simple. They are often the beginning of a painful journey of the degradation of their dignity. (D)Facing financial problems not of their own making, these students feel anxious about failing to live up to the high expectations of the many people who have helped them get to where they are.

Even worse, on a campus full of people who could help, they often feel alone and invisible. As they try to think of ways to address the kinds of problems no one else around them appears to have, they come to believe they don't belong.

(Adapted from Michael Gerson, Stephanie Summers and Katie Thompson,

Unleashing Opportunity: Why Escaping Poverty Requires a Shared Vision of Justice)

(注)

*dislocating　混乱をもたらす

*VA　バージニア州

*top two quintiles　上位40%

*credential　資格

*setback　挫折

問 1　空欄[　①　]～[　③　]に入る最も適切な文を，次の(ア)～(ウ)の中から1つずつ選び，記号で答えなさい。ただし，同じ選択肢を複数回使用することはできない。

(ア) These problems are magnified for low-income students.

(イ) Most of those jobs have now fled abroad.

(ウ) The economic statistics illustrate what is at stake.

問 2　下線部(A)を日本語に訳しなさい。

問 3　下線部(B)はどのようなことを意味しているか，本文に即して日本語で説明しなさい。

問 4　下線部(C)の[　]内の単語を並べ替えて，最も適切で意味の通る文を作り，並べ替えた部分の2番目と4番目に来る単語を記号で答えなさい。

問 5　下線部(D)を日本語に訳しなさい。

問 6　本文全体のタイトルとして最も適切なものを次の(ア)～(エ)の中から１つ選び，記号で答えなさい。

(ア) The Industrial Revolution as a Cause of Poverty

(イ) The Psychology of Low-income Workers

(ウ) The Graduation Gap in American Society

(エ) The Role of College Graduates in the Globalized World

Ⅲ Read the conversation below between the teacher and students of a Japanese language class for international students and answer questions 1) and 2) at the end of the passage.

Professor Miller: Today I'd like to talk about the number of Japanese speakers in the world. Before we begin, does anyone know which of the world's languages has the highest number of speakers?

Lily: Is it Chinese?

Professor Miller: If you're only counting native speakers, then, yes, that's right. Currently, there are over 900 million native speakers of Chinese. However, when we ___①___ second language speakers, English is the winner, with over 1.4 billion speakers worldwide.

Lily: I see. That makes sense since English is a required subject at school in many countries.

Professor Miller: Does anyone know how many Japanese speakers there are in the world?

Mark: Well, the population of Japan is 125 million, so it must be ___②___ that.

Professor Miller: You're actually not too far off. While it is hard to count the exact number of second language speakers, according to the most recent data, there are just under four million people studying Japanese in foreign countries and about the same number of ethnic Japanese, or Nikkeijin, living outside of Japan. ___③___, there are a little over a million Japanese nationals who live in foreign countries. If we assume that most of the people living in Japan and roughly half of the people mentioned above speak Japanese, the number of Japanese speakers worldwide is probably somewhere around 130 million.

Mark: I see. So, the number of second language speakers is much smaller than that of English.

Professor Miller: Yes, that's correct. While the number of people studying

Japanese has been increasing in recent years, it is still ④ as popular as other major languages such as English, French, Spanish or Chinese. Promoting the study of Japanese as a foreign language is thus a major topic of interest for the Japanese government. Next, I'd like to ask all of you, why did you choose to study Japanese? And how did you study Japanese before coming to Japan?

Indah: I chose to study Japanese because I want to work at a Japanese company in the future. Japanese is very popular in my home country of Indonesia, so there were many Japanese classes available at my university.

Lily: Japanese is very popular in China too. I started studying Japanese because I love anime. There were some Japanese classes at my university, but they only covered up to the intermediate level, so I did most of my studying on my own by watching anime.

Mark: A lot of people in the United States ⑤ Japanese through subculture such as anime and video games too, but my motivation was architecture. After taking a course in Japanese architecture at college, I was so impressed that I decided to study abroad in Japan for a year. There were Japanese classes at my university too, but I thought the best way to learn a foreign language is to study abroad, so here I am!

1) What phrase most likely goes in each of the blanks? Choose the letter of the best answer and write it on your answer sheet.

① (A) forget about (B) take into consideration
(C) fail to mention (D) rule out

② (A) at least (B) much smaller than
(C) several times (D) about half of

③ (A) For example (B) On the one hand
(C) In addition (D) In other words

④ (A) just about (B) much less
(C) not so much (D) not nearly

⑤ (A) take over (B) get into
(C) put off (D) give up

2) Do you agree that it is important for the Japanese government to promote the study of Japanese as a foreign language? State your opinion, giving two reasons why or why not. Start your response simply with "Yes" or "No," directly followed by your reasons. Your response should be written in English and be about 80 words long.

Ⅳ　次の文章を読み，下の問いに答えなさい。

「科学(サイエンス)」とは，物事の真理を明らかにする学問である。科学と関連した中国の言葉に「格物」があり，日本語では「物に格(いた)る」と読む。これは物事の理(ことわり)を追究するという意味であり，後の西洋科学も中国では「格物」と呼ばれた。その心は，物事の奥義(おうぎ)を明らかにするという科学の大原則である。

自然科学(自然現象に関する科学)はギリシャ時代の芽生えを経て，近代科学の誕生以降(今からおよそ400年前)，理論および実験上の数々の発見によって発展してきた。(A)その発展を支えたのは，「仮説と実証」，あるいは「理論と実験」の緊密な結びつきだった。理論的な仮説が実験の可能性を広げ，新たな実験結果が理論のさらなる開拓を促してきたのである。

また，原理と法則を基礎とする物理学の方法論は，自然科学はもちろん，人文科学(人間に関する科学)にも大いに役立つ。「自然法則(natural laws)」に対する深い理解があれば，特異な例を一般化してしまったり，例外に惑わされて一般化できなくなったりするような失敗が避けられよう。科学は単なる知識の集積ではない。(B)新たな法則を発見するためにも，知識より「理解」の方がはるかに大切である。大事なのは「知るより分かる」という原則だ。

そして，科学が扱う問題の多くは，論理的な思考力を培うための糧(かて)となる。実際，一見単純だが奥深く，そして実際に解ける問題が，物理にはたくさんある。(C)「自然界の謎は，人知で解きうる」という確信，あるいは信念があって初めて，人間や社会のように難しい問題にも，ひるむことなく向かって行けるだろう。

(酒井邦嘉『科学という考え方 — アインシュタインの宇宙』より一部改変)

問 1　下線部(A)の英訳として最も適切な文となるように，次の(ア)～(コ)から8つを選び，並べ替えて，英文を完成させなさい。解答は空欄(　①　)(　②　)(　③　)に入るものを記号で答えなさい。同じ選択肢を複数回使用しないこと。なお，文頭に来るものも小文字で表記してある。

(　　)(　①　)(　　)(　②　)(　　)(　　)(　③　)(　　)
between "hypothesis and proof" or "theory and experiment."

(ア) close　(イ) connection　(ウ) development　(エ) help　(オ) its
(カ) supported　(キ) the　(ク) tightly　(ケ) was　(コ) what

問 2　下線部(B)の英訳として最も適切な文となるように，次の(ア)～(コ)から8つを選び，並べ替えて，英文を完成させなさい。解答は空欄(　①　)(　②　)(　③　)に入るものを記号で答えなさい。同じ選択肢を複数回使用しないこと。

"Understanding" (　　)(　①　)(　　)(　②　)(　　) knowledge
(　　)(　③　)(　　) discover new laws as well.

(ア) as　(イ) far　(ウ) for　(エ) important　(オ) in
(カ) is　(キ) more　(ク) order　(ケ) than　(コ) to

問 3　下線部(C)を英語に訳しなさい。