1. 次の英文はエネルギーの貯蔵について書かれたものである。これを読み，設問に答えなさい。

Energy storage attracts so much (1) because a breakthrough in cost and performance could make the electric grid cleaner and more reliable. Every day, utilities operate a constant (2) act: to ensure reliable service, the amount of power generated at power plants needs to match what's being consumed at homes and businesses. If there's a spike in demand from air conditioners on a hot summer day, for example, power plants need to crank out more electricity and dial it back down when demand subsides at night.

Energy storage acts as a reserve, or an energy bank account. During times of peak demand, storage can deliver power in the place of fossil fuel plants. The technology can firm up the variable output from wind and solar farms or augment the capacity of maxed-out substations that deliver power to local neighborhoods. When placed in or near buildings, energy storage can provide backup during a power outage. Many of these applications, though, require a device that can provide power for a few hours or perhaps half a day. [A]

For multi-hour storage, there are compelling reasons to pursue mechanical storage systems over electrochemical batteries, say industry executives. Batteries require more expensive materials, such as lithium or cobalt, which can be subject to supply constraints. Unlike a mechanical system, a rechargeable battery's storage capacity decreases over time, as most laptop users have experienced. [B]

Then there's the pace of (3). In general, the pace of development in battery research is slow—measured in years, rather than months—and performance improvements are often incremental. Also, making new types of batteries in large volume requires big upfront investments in factories. An innovative mechanical system, by contrast, could be assembled from slightly modified engines, industrial gas tanks, and other equipment that is already well understood and produced at large scale. "It's a sort of a systems integration challenge, rather than having to invent and build a particular device to make it all work," says Gareth Brett, the CEO of Highview Power Storage, which uses (4) air—air pressurized and cooled until it turns liquid—to store energy on the grid. "Our intellectual property is in how the system is engineered and brought together in a way that is efficient and low cost." [C]

When it comes to storing electricity for use on the power grid, pump storage hydropower is considered the gold standard—a relatively cheap technology that has delivered energy in the United States for more than 80 years. [X] (1. pumped 2. is 3. implies 4. name 5. water 6. up 7. the 8. as 9. ,) to a reservoir when electricity demand is low, and released when needed to generate electricity through a hydroelectric turbine. Pumped hydro stations can deliver big bursts of power for several hours, allowing grid operators to fill gaps in electricity supply without having to tap fossil fuel-burning power plants. They're mostly (5), however, to mountainous terrain, which provides the elevation gain needed between reservoirs, and environmental reviews take many years.

The other proven, low-cost bulk storage method is compressed air energy storage, or CAES, in which compressors pump air into underground caverns. When power is needed, pressurized air is released and heated by burning natural gas. That air is then blasted into a turbine to generate electricity. There are two geological compressed air energy storage plants in the world, including one opened in Germany in 1978 and another opened in Alabama in 1991. Both units still operate and are considered successful. But no others have been built because it's difficult to find locations with a suitable geological formation and to finance these projects. [D]

(Adapted from Martin LaMonica, "A Big Bet on How to Store Energy, Cheaply", *smithsonian.com*, June 24, 2014)

［1］ 空所（1）～（5）に入る最も適切な語を選択肢1～4の中から選び，マークシートの解答欄 （1） から （5） にマークしなさい。

（1）	1. attention	2. criticism	3. customers	4. following
（2）	1. balancing	2. commercial	3. deliberate	4. random
（3）	1. conservation	2. innovation	3. renovation	4. reservation
（4）	1. acidified	2. liquefied	3. purified	4. solidified
（5）	1. accustomed	2. established	3. limited	4. related

［2］ 下記の【 】内の文が入る本文中の位置として最も適切なものを選択肢1～4の中から選び，マークシートの解答欄 （6） にマークしなさい。

【And it has to be done safely and at low cost.】

1. [A]　　2. [B]　　3. [C]　　4. [D]

［3］ X の（ ）内にある語句を文法的・内容的に最も適切な順序に並べ替えたとき，3番目と7番目に位置するものを選択肢1～9の中からそれぞれ選び，マークシートの解答欄 （7） と （8） に順にマークしなさい。なお，文頭にくる語の一文字目も小文字にしてある。また，選択肢9はカンマである。

［4］ 英文の内容と一致するように，（ ）に入る最も適切な語を選択肢1～4の中から選び，マークシートの解答欄 （9） から （12） にマークしなさい。

① Energy storage in a building can be useful when there is a ( ).

1. blackout　　2. lockout　　3. whiteout　　4. workout

② Generated power must be ( ) than or equal to consumed power.

1. greater　　2. heavier　　3. stronger　　4. superior

③ Improvements in mechanical storage systems tend to ( ) than for batteries.

1. be more costly　　2. have more supply constraints
3. make wider use of available technology　　4. take more research time

④ Both pump storage hydropower and CAES plants ( ).

1. burn gas　　2. can be built quickly
3. need special locations　　4. use hydroelectric turbines

［5］ 英文の内容に一致するものを選択肢1～9の中から5つ選び，マークシートの解答欄 （13） から （17） にマークしなさい。

1. Battery research has led to rapid performance improvements in energy storage.
2. Electrochemical batteries are the most economical way to provide power during peak demand.
3. Energy storage based on mechanical systems can be built by changing and combining parts of existing equipment.
4. Energy storage is useful when power plants cannot provide enough electricity during peak periods.
5. Energy storage systems are like bank accounts because they both earn interest.
6. It takes less than one year to assess the impact of pumped hydro stations on the environment.
7. Pumped hydro stations become useful when demand for electricity suddenly increases.
8. There are few plants that take the CAES approach to accumulating energy.
9. Wind and solar energy have problems providing power consistently.

2. 次の英文を読み，設問に答えなさい。

A man in a town married twenty women. There have been no divorces, and everyone in question is still alive and well. The man is not a bigamist, and he has broken no laws. How is this possible?

This is the so-called marrying-man problem, which psychologists often use to study creative insight: the process by which we suddenly discover the answer to something that had previously ①stumped us. A problem makes no sense at first. But then we turn it around in our minds and, presto, the answer comes. So, naturally, Mark Beeman, a cognitive neuroscientist who studies insight and creativity, likes to pose questions like this one to applicants who want to work in his lab. (The answer to this particular problem is that the man is a (1).)

Beeman studies insight because it's a key component in how creativity works. Creativity is the whole process of how we come up with new ideas; insight is just a step along the way, albeit an important one. A composer who writes a new, beautiful song has done something creative; the moment when she realized that she could end it on a minor chord was insight. In general, creativity seems to come when insight is combined with the hard work of analytical processing. A person can't discover the theory of general relativity in a dream if he isn't a physicist who's done some heavy thinking about the subject beforehand.

In the field of psychology, there's long been a certain haziness surrounding the definition of creativity that has ②eluded a precise formulation. We know that someone is creative if he produces new things or has new ideas. And [X], as John Kounios, a psychologist who collaborates frequently with Beeman, points out, that view is wrong, or at least not entirely right. "Creativity is the process, not the product," he says.

Insight, [Y], has proved less difficult to define and to study. Because it arrives at a specific moment in time, you can isolate it, examine it, and analyze its characteristics. "Insight is only one part of creativity," Beeman says. "But we can measure it. We have a ③temporal marker that something just happened in the brain. I'd never say that's all of creativity, but it's a central, identifiable component." When scientists examine insight in the lab, they are looking at what types of attention and thought processes lead to that moment of synthesis: If you feel stuck on a problem, are there tricks to get you through?

In a recent study, Beeman and Kounios followed people's gazes as they attempted to solve what's called the remote-associates test, in which the subject is given a series of words, like "pine," "crab," and "sauce," and has to think of a single word that can logically be paired with all of them. They wanted to see if the direction of a person's eyes and her rate of blinking could shed light on her approach and on her likelihood of success. It turned out that if the subject looked directly at a word and focused on it—that is, blinked less frequently, showing a higher degree of close attention—she was more likely to be thinking in an analytical, convergent fashion, going through possibilities that made sense and systematically ④discarding those that didn't. If she looked at "pine," say, she might be thinking of words like "tree," "cone," and "needle," then testing each option to see if it fit with the other words. When the subject stopped looking at any specific word, either by moving her eyes or by blinking, she was more likely to think of broader, more abstract associations. That is a more insight-oriented approach. "You need to learn not just to stare but to look outside your focus," Beeman says. (The solution to this remote-associates test: "(2).")

[Z] it turns out, by simply following someone's eyes and measuring her blinks and fixation times (how long she looks at something before either looking away or closing her eyes), Beeman's

group can predict how someone will likely solve a problem and when she is nearing that solution. Beeman says, "Your state of attention both before you get a problem and when you're solving it matters."

(Adapted from Maria Konnikova, "Where Do Eureka Moments Come From?" *The New Yorker*, May 28, 2014)

*bigamist：重婚者

［1］ 下線部①～④の意味に最も近いものを選択肢1～5の中から選び，マークシートの解答欄 (18) から (21) にマークしなさい。

①	1. battled	2. bumped	3. puzzled	4. stamped	5. stomped
②	1. deluded	2. escaped	3. faked	4. prevented	5. questioned
③	1. temple	2. tempo	3. temporary	4. tentative	5. time
④	1. hanging up	2. marking down	3. putting off	4. throwing away	5. working out

［2］ 空所（1）と（2）に入る最も適切な語を選択肢1～5の中から選び，マークシートの解答欄 (22) と (23) にマークしなさい。

(1)	1. doctor	2. priest	3. psychologist	4. surgeon	5. teacher
(2)	1. apple	2. banana	3. cherry	4. orange	5. pear

［3］ 空所 X ～ Z に入る最も適切な接続詞を選択肢1～6の中から選び，マークシートの解答欄 (24) から (26) にマークしなさい。ただし，選択肢1～6では，語頭はすべて小文字で表記されている。また，それぞれの選択肢は1度のみ使うこと。

1. as　2. but　3. if　4. however　5. that　6. yet

［4］ 次の英文全体の要旨を述べた文章中の空所（ア）～（ケ）に入る表現として最も適切なものを選択肢1～4の中から選び，マークシートの解答欄 (27) から (35) にマークしなさい。

The passage begins with (ア), which, as the author explains in the second paragraph, scientists often employ as a way of (イ) creative insight. In the third paragraph, the author explains that Beeman is interested in creative insights because they are (ウ) the field of creativity. In the fourth paragraph, the author writes about the difficulty of (エ) creativity. In the next paragraph she describes how (オ) has been easier to study than (カ). Beeman and Kounios carried out (キ) examining the gaze of subjects as they tried to solve problems. As the final paragraph reveals, by focusing on gaze and blinks, they can predict the probable (ク) and final (ケ) involved in finding the solution.

(ア)	1. an allegory	2. an anecdote	3. a proverb	4. a riddle
(イ)	1. challenging	2. encouraging	3. exploring	4. improving
(ウ)	1. greater than	2. part of	3. similar to	4. the same as
(エ)	1. assisting	2. contrasting	3. defining	4. producing
(オ)	1. components	2. creativity	3. insight	4. time
(カ)	1. components	2. creativity	3. insight	4. time
(キ)	1. a conclusion	2. a survey	3. an example	4. an experiment
(ク)	1. message	2. potential	3. process	4. purpose
(ケ)	1. attention	2. measure	3. occasion	4. timing

3. The following dialogue involves three friends talking about the 2020 Tokyo Olympics. Read the dialogue and answer the questions which follow.

Ahmed: So what do you think? Are you (1) to the Tokyo Olympics or not?

Jiro: I don't know. To be (2), I think most of the events will probably be too expensive for me to attend anyway. And that's (3) I could get my (4) on a ticket to begin with. It really makes no difference to me if the Games are held in Tokyo or Timbuktu. I'm probably going to end (5) watching them on TV.

Carol: But that's why you have to get more creative. I'm not planning on watching the Games. I'm planning on (6).

Ahmed: (laughing) And which event would that be in?

Carol: Not as an athlete, silly. As a volunteer.

Jiro: That's not such a bad idea, you know. It would certainly make for a more (7) experience. But won't they need people with good language skills?

Carol: Yes and no. I'm sure there are lots of jobs that will need to be done. But my Olympic dream is to be an interpreter. I already speak English and some Japanese, but if I can (8) up on my French and Italian, who knows what might be possible? I start training tomorrow.

[1] Complete the dialogue by choosing the most appropriate answer for each gap (1) through (8). Mark your answers on the mark sheet ((36) through (43)).

(1)	1. for looking	2. forward looking	3. looking for	4. looking forward
(2)	1. clearly	2. frankly	3. honest	4. true
(3)	1. accounting	2. assessing	3. assigning	4. assuming
(4)	1. eyes	2. hands	3. mind	4. nose
(5)	1. at	2. in	3. on	4. up
(6)	1. participating	2. petitioning	3. playing	4. practicing
(7)	1. memorable	2. memorial	3. momentary	4. monotonous
(8)	1. brush	2. make	3. match	4. touch

[2] Why isn't Carol planning on watching the Olympic Games? Choose the most appropriate answer and mark it on the mark sheet in space (44).

1. She doesn't believe in the Olympic dream.
2. She believes we should do sports rather than watch them.
3. She plans to volunteer behind the scenes instead.
4. She plans to study French and Italian instead.

[3] What is being encouraged by Carol in the underlined sentence? Choose the most appropriate answer and mark it on the mark sheet in space (45).

1. More aesthetic thinking
2. More artistic thinking
3. More flexible thinking
4. More logical thinking

4. 次の（1）～（4）の文において下線部に文法上の誤りがあれば，その箇所の番号を，また誤りがなければ9を，それぞれマークシートの解答欄 (46) から (49) にマークしなさい。

（1） There are ①much reasons ②why someone ③would choose to attend university. ④Naturally, some reasons are better than others.

（2） ①For some, it's just a rite of passage ②into the working world. Let's face ③to it, we all ④have to make a living.

（3） For others, it's a chance to ①broadening their intellectual ②horizons and learn ③about things they normally wouldn't have time ④for.

（4） ①Because university is a considerable investment ②in time and money, it is important to think about what you want to get out ③of the experience before you even ④begin. Is university really for everybody?

5. 次の（1）～（5）の文の［ ］内の語を最も適切な語形に書き直しなさい。ただし，語尾に "-ed" と "-ing" の付くものは不可とします。解答は解答用紙（記述式）に記入しなさい。

（1） Some religions have special [diet] rules.

（2） I can't skip class because my teacher takes [attend].

（3） Any request for a return or exchange must be accompanied by a [receive].

（4） He has won the tournament five times in [succeed].

（5） My teeth are extremely [sense] to cold.

6. 和文の内容とほぼ同じ意味になるように，指定された文字または文字列から始まる適切な1語を空所①～⑧に入れて，英文を完成させなさい。解答は解答用紙（記述式）に記入しなさい。

No one has yet ①(**f**) out how to splice together nerves and electrical wires in a way that allows them to control an artificial limb as if it were a natural ②(**e**) of the body. For one thing, nerves and the electrical wires needed to ③(**r**) the electronics in a prosthesis transmit entirely different kinds of ④(**s**). For another, the linkage would require implanting wires and other kinds of electronics into the body, which normally ⑤(**p**) such implants as foreign and thus unleashes attacks that would generate scar tissue around an interface and ⑥(**dis**) its functioning.

⑦(**A**) in nanotechnology and tissue engineering over the past few years, however, are addressing both challenges. Rather than trying to force nerves to communicate directly with the standard electronics, scientists are building new kinds of bridges between nerves and artificial limbs—linkages that take ⑧(**a**) of the nervous system's inborn ability to adapt itself to new situations.

(Adapted from D. Kacy Cullen and Douglas H. Smith, "Bionic Connections", *Scientific American*, January 2013)

神経と電線をどのように接続すれば義肢を身体の延長のようにコントロールできるようになるのかは，まだ解明されていない。一つには，義肢の電子回路を制御する電線と神経とでは，伝わる信号の種類がまったく異なる。また，両者を接続するには電線などの電子部品を身体に埋め込む必要があるが，通常，身体はそれらを異物とみなして攻撃するので，インターフェースの周辺に傷跡ができ，装置の機能が妨害される。

だが，ここ数年のナノテクノロジーと組織工学の進歩により，これら二つの課題が解決されつつある。科学者は義肢の電子回路と神経との間で信号を直接やりとりさせるかわりに，神経系と義肢の間に新たな「橋」を設けてつなぐ方法を開発中である。神経系には新しい状況に順応する能力がもともと備わっているので，それを利用して電線と接続するのである。