英　　語　1/10

1　Answer questions (1) ～ (5).

(1) Choose the word or phrase that best fits the blank.

Fifty years ago, on July 20, 1969, Neil Armstrong became the first human to step outside of planet Earth when US Apollo 11 landed on the moon. That space race was driven by the rivalry between the United States and the Soviet Union, the two Cold War superpowers. Today, _____, international cooperation and private-sector support has become indispensable* to the enormous funding needed for space exploration. Japan lagged* far behind the Americans and Soviets in launching its first artificial satellite and sending its first astronaut into space, but in recent years the country has become a world leader in the field of asteroid* exploration through its Hayabusa and Hayabusa2 spacecraft.

注) *indispensable: important and necessary
*lagged: was delayed
*asteroid: a small rocky planet

a. additionally
b. likewise
c. in contrast
d. similarly

(2) Choose the sentence that best represents the main idea of the following passage.

There are some scary insects in this world. Few of them are as scary and as venomous* as the Asian giant hornet*. These fearsome creatures are common in Japan and Korea but are now moving across the Pacific Ocean to the USA and Canada. The hornets kill around 40 people a year in Japan. They also destroy and wipe out colonies of honeybees. A hornet attack can leave piles of dead bees, most of them headless, in their beehive. A few dozen hornets can kill an entire colony of 30,000 bees in a few hours. Authorities in Washington State on the west coast of the USA have warned people to look out for the hornets. Beekeepers are now worried about their beehives.

注) * venomous: poisonous
* hornet: a flying insect that stings

a. A fearsome new creature has been found in North America.
b. Asian giant hornets have become less common in Japan and Korea.
c. Giant hornets are moving across the Pacific from the USA to Japan and Korea.
d. Giant hornets seldom kill people or wipe out beehives.

(3) Choose the sentence that fits the blank and is the best topic sentence.

_____ The discovery supports existing evidence that Mars—which today is dry and cold—was once a water-rich planet. The researchers say their findings suggest rivers may have flowed on the surface of Mars for hundreds of thousands of years. The evidence came from new satellite pictures of the Martian surface. These images were captured by a camera on NASA's Mars Reconnaissance Orbiter. The camera is able to take detailed pictures of the surface while orbiting the planet from about 400 kilometers away.

a. Scientists have found a new way to capture satellite pictures of the Martian surface.
b. Scientists have found detailed images of the Mars Reconnaissance Orbiter about 400 km away.
c. Scientists have found the most detailed evidence yet of long-flowing, ancient rivers on Mars.
d. Scientists say they have not yet found detailed evidence of water on Mars.

(4)　Choose the sentence that best fits the blank.

Scientists have long wondered how Australia's koalas get enough water to live. _____ In the wild, koalas get water from the plant leaves they eat. But they also get it from water running down the side of tree trunks during rainfall—what we might call "tree-licking." Scientists have a term for this process—"stemflow." The lead author of the new report on koalas is Valentina Mella of the University of Sydney. It was earlier thought, she explains, that the animals got most of their water from moisture in the leaves they ate. Mella and other researchers based their findings on 46 observations of koalas in the wild from 2006 to 2019. Most of the animals were observed at You Yangs Regional Park in the Australian state of Victoria.

a. A new plant provides some clues.
b. A new study provides an answer.
c. A newly discovered koala provided a clue.
d. Scientists still cannot find an answer.

(5) Choose the sentence that is true according to the following passage.

Starting Wednesday, plastic shopping bags now cost money in principle. These bags, which customers have taken for granted they would get for free when shopping at supermarkets and convenience stores, have to be purchased for about ¥2 to ¥5 each. This move can be described as a major step in the history of environmental measures. It has not been stipulated* how companies should use the money collected from charging for plastic shopping bags, but some are applying it to activities to protect the environment. It is important for businesses to promote their position in this regard, to gain understanding from customers. Charging for plastic shopping bags has been prompted by the serious level of marine pollution. Plastic waste does not decay, and is washed ashore around the world. It has also been discovered in the stomachs of whales and seabirds. There are further concerns over what impact microplastics——very small fragments of plastic broken down by waves and sunlight——will have on the ecosystem.

注) *stipulated: clearly explained

a. Charging for plastic bags was introduced because of the increase in marine pollution.
b. Customers will now be able to save ¥2 to ¥5 when purchasing plastic bags.
c. Plastic waste will not be recycled to make plastic bags used in supermarkets and convenience stores.
d. Supermarket and convenience store companies feel that marine pollution is not a serious problem.

［出典］

(1) “Japan’s Space Program”, July 26, 2019, nippon.com, https://www.nippon.com/en/japan-data/h00501/
(2) “Giant hornets reach North America”, May 7, 2020, Breaking News English, https://breakingnewsenglish.com/2005/200507-asian-giant-hornet.html
(3) “New Evidence Found of Ancient Rivers on Mars”, May 17, 2020, Learning English, https://learningenglish.voanews.com/a/new-evidence-found-of-ancient-rivers-on-mars/5420119.html
(4) “Study Finds How Koalas Drink”, May 10, 2020, Learning English, https://learningenglish.voanews.com/a/study-finds-how-koalas-drink/5411632.html
(5) https://the-japan-news.com/news/article/0006649380　2020 年 7 月 3 日　The Japan News より抜粋

2　Read the following article and answer questions (1) ～ (5).

[1] As major players jostle* for market share in large-scale power storage, American Electric Power and Nissan Motor Co. are testing new technology that reuses old electric vehicle batteries to slash* costs. The pilot study in Ohio will road-test technology that could lower system costs by about half and extend the life of lithium-ion batteries by about a third, according to its Australian developer. The costs of energy storage systems are falling globally on technological improvements, larger manufacturing volumes, increased competition between suppliers and growing expertise in the sector, BloombergNEF said in an October report. That's driving an expansion in investment in projects to store power, with as much as $5 billion worth of deals possible this year for systems paired with renewable energy, according to the forecaster.

[2] American Electric's Ohio study is using expired Nissan Leaf batteries and is intended to test the innovations at scale after laboratory work in Australia and Japan. Results so far appear promising, Ram Sastry, American Electric's vice president for innovation and technology said by phone. "It's in a facility that we own, but connected to the real grid*," he said. The technology is developed by Melbourne-based Relectrify and uses old, or second-life, vehicle batteries and reduces the number of components needed, the company said. That can reduce costs for key parts in typical industrial or grid storage systems to about $150 per kilowatt-hour.

[3] That compares with a current average price of $289 per kWh* for similar technology using new batteries, according to the BloombergNEF 2019 Energy Storage System Costs Survey. Companies like BMW AG and Toyota Motor Corp. are already putting reused cells to work in applications including renewable energy storage and electric vehicle charging, and to power street lights and homes. About three-quarters of vehicle batteries are eventually likely to be reused, according to London-based researcher Circular Energy Storage.

[4] Cheaper energy storage with batteries could provide an alternative to adding more capacity at electricity substations, or building more transformers. It could also be harnessed to provide backup power and bolster* reliability for consumers, according to American Electric's Sastry. "There are many use cases that we have for batteries that are predicated on the cost," he said. "If the battery goes lower in cost, it can compete with the wires*."

[5] Yet even as the price of lithium-ion battery cells has fallen, it's been difficult to reduce the costs of components such as inverters, which convert direct current electricity into alternating current.

"The inverter is the Achilles heel* of energy storage," said Bradley Smith, president of Covington, Louisiana-based Beauvoir Consulting Services and previously an executive developing second-life battery products at Nissan. Relectrify's system reduces the need for separate electronics for both the inverter and battery management system, lowering costs, Smith said.

[6] The technology can also extend the lifespan of either reused or new batteries by offering more precise management of individual cells, according to Valentin Muenzel, CEO of Relectrify, a 14-person firm launched in 2015 that has collaborated with companies including Volkswagen and IBM. Some potential end users remain wary* of reusing lithium-ion batteries over concerns about their longevity* and the cost of repurposing cells, according to BNEF's head of clean power Logan Goldie-Scot. "Many customers are not yet comfortable with second-life batteries even at a steep discount," he said. Relectrify, which is in talks with battery companies, sees the potential to eventually help improve performance of batteries for the auto sector, in addition to energy storage. "We see stationary* storage as the low hanging fruit*," Muenzel said. "We're already getting demand for use in some mobility applications and we expect that is an area that will continue to grow with time."

［出典］
"Japanese and U.S. firms tie up in bid to use old EV batteries to slash power storage costs", David Stringer, January 28, 2020, The Japan Times,
https://www.japantimes.co.jp/news/2020/01/28/business/old-ev-batteries-power-storage-cost/

注) *jostle: push against others to try to get ahead
*slash: cut by a large amount
*the real grid: the electricity supply network
*kWh: kilowatt-hour
*bolster: support
*the wires: the electricity supply network
*Achilles heel: weak point
*wary: not having complete trust
*longevity: length of life
*stationary: not moving
*the low hanging fruit: an easy target to achieve

(1) In which of the following paragraphs does the author give several reasons why energy storage systems are becoming cheaper?

a. Paragraph 1
b. Paragraph 3
c. Paragraph 4
d. Paragraph 6

(2) In which of the following paragraphs does the author provide examples of how old batteries are being used?

a. Paragraph 3
b. Paragraph 4
c. Paragraph 5
d. Paragraph 6

(3) In which of the following paragraphs does the author discuss the need to lower costs of energy storage parts other than the batteries?

a. Paragraph 3
b. Paragraph 4
c. Paragraph 5
d. Paragraph 6

(4) According to this article, why are some people not comfortable with reusing batteries?

a. Some people are concerned that reusing batteries may not be safe.
b. Some people feel that reusing batteries may not help save the environment.
c. Some people think that repurposing old batteries can reduce the load on the grid.
d. Some people worry that older batteries may have a short lifespan.

(5) What is the main point of this article?

a. Environmental concerns have forced people to rethink renewable energy solutions.
b. Large-scale power storage is proving to be a very challenging task.
c. Repurposing old batteries is one solution to reducing the costs of energy storage.
d. Reusing electric car batteries has been in practice for many years now.

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。

著作権の関係で問題は掲載できません。

[出典]

“A Brief History of Chimps in Space”, Eric Betz, April 22, 2020, Discover magazine, https://www.discovermagazine.com/the-sciences/a-brief-history-of-chimps-in-space

注）
* G-force: a force you feel when you accelerate
* counterparts: something having the same characteristics as another
* winnowed: reduced
* hominids: ヒト科の動物
* veterinarian: an animal doctor
* feisty: having a strong and determined character
* traits: distinguishing qualities
* capsule: a compact often sealed and detachable container
* chamber: a small room
* a tad: a little

4　Read the passage, and explain the main point in your own words. Write your answer in English within 30 words.

What do we want for children and teenagers? What do they need to succeed in school, in their future careers, and in the pursuit of their dreams? Wherever their ambitions lead them, they will benefit from becoming creative problem solvers, analytical thinkers, and effective communicators and collaborators. Guiding students to recognize that they can learn these vital skills and improve them provides a pathway to achieve the goals they set for themselves. Some of the most vital and versatile* skillsets we can teach students to develop are the abilities to think about their learning; to be aware of factors that affect their intellectual performance; to know how, when, where, and why to use particular cognitive strategies*; and to monitor and adjust their performance of learning tasks.

These abilities fall under the umbrella of metacognition, which refers to knowledge about and regulation of one's thinking. At the core of being metacognitive is taking a step back and observing one's thinking, which is sometimes called the reflective process. Questions that might be asked during this process include *What is the problem to be solved? What should I do? How am I doing? How well did I do? What can I do differently and better next time?*

[出典]
Donna Wilson, Marcus Conyers. Teaching Students to Drive Their Brains. ASCD, 2016, PP.1, 一部略

注) *versatile: flexible
*cognitive strategies: specific ways of thinking to solve problems

5　Introduce your favorite place in English within 50 words.

6　Do you prefer indoor or outdoor activities? Write your opinion in English within 50 words.