

I Read the text and answer the questions below.

It was (①) 40 years ago, in a lab at the University of California, Los Angeles. Today it wraps the entire planet and features in the daily (②) of more than 1.5 billion people. It is easy to take the Internet for granted and forget that it is a work in progress.

What forces are shaping it, how big has it grown, and will it ever evolve a mind of its own? To (③) out, we posed six simple questions:

- (1) Who controls the Internet?
The official answer is no one, but this is a half-truth that few swallow.
- (2) Could the Internet become self-aware?
In engineering terms, it is easy to see similarities (④) the human brain and the Internet's complex network of nodes, but self-awareness seems unlikely.
- (3) How big is the Internet?
In 2008, Google announced [X] pages. (⑤), even this might represent a fraction of what is out there.
- (4) Where is the Internet?
The Internet is a disparate mix of interconnected computers, many of them on (⑥) networks run by universities, businesses, and so on.
- (5) Where are the Internet's dark corners?
There are plenty of places online that you should avoid. Some could leave your computer infected with worms or (⑦).
- (6) Is the Internet hurting the environment?
Sending an email across the Atlantic Ocean does not burn any jet (⑧), but the Internet is not without its own, huge carbon footprint.

1. Translate the underlined sentence into Japanese.
2. Change the order of the items to fill in [X].

Google announced

[A. a trillion, B. unique, C. had, D. that, E. its systems, F. registered] pages.

3. Choose the most appropriate word to fill in ①-⑧.

- | | | | | |
|---|--------------|------------|-----------------|------------------|
| ① | A. saved | B. grown | C. born | D. called |
| ② | A. network | B. routine | C. time | D. government |
| ③ | A. get | B. find | C. wear | D. take |
| ④ | A. between | B. of | C. with | D. such |
| ⑤ | A. Therefore | B. Perhaps | C. Consequently | D. However |
| ⑥ | A. their | B. serious | C. large | D. clear |
| ⑦ | A. viruses | B. insects | C. crashes | D. networks |
| ⑧ | A. problem | B. fuel | C. information | D. communication |

II Read the text and answer the questions below.

The results of a new study surprised researchers, said Dr. Ulfat Shaikh, a pediatrician at the University of California, who treats children with nutritional problems.

“We hypothesized that people who use minerals and vitamin supplements might be using them to cushion the effects of poor nutrition,” she said. “However, we actually found the (①).”

The children who used supplements the most were those who already drank a lot of milk, ate a lot of fiber and did not consume much (②) or cholesterol, Dr. Shaikh said. They were healthier overall, have health insurance and come from (③)-income families. They also tended to get a lot of exercise, were not overweight, considered themselves in good health and did not watch too much television or spend a lot of time playing video games.

Researchers found that about one-third of American children ages 2 to 17 had used a vitamin or mineral supplement within the previous month, but that most of them did not need to supplement their (④).

On the other hand, children who used vitamins the least tended to be at greatest risk for nutritional deficits. They did not eat as (⑤) as the children who were taking supplements, lived in low-income families that were short of food and had less access to health care, the study found.

“Poverty seems to be the overriding factor,” Dr. Shaikh said. Although supplements may not seem (⑥) to a middle-class family, the cost may seem very high for a low-income family, she said.

The American Academy of Pediatrics does not (⑦) supplement use for children over a year who eat a healthy diet. Vitamins may be recommended for children with chronic illnesses or eating disorders and for obese children trying to (⑧) weight.

1. Choose the most appropriate word to fill in ①-⑧.

- | | | | | |
|---|-----------|--------------|--------------|--------------|
| ① | A. same | B. fact | C. opposite | D. corner |
| ② | A. fat | B. vitamins | C. calcium | D. energy |
| ③ | A. grade | B. low | C. upper | D. cheap |
| ④ | A. weight | B. diet | C. body | D. work |
| ⑤ | A. low | B. fast | C. type | D. well |
| ⑥ | A. cheap | B. expensive | C. important | D. various |
| ⑦ | A. try | B. take | C. know | D. recommend |
| ⑧ | A. get | B. lose | C. gain | D. diet |

2. According to the text, which of the following statements is true?

- A. The children who take a lot of supplements get overweight.
- B. Some supplements are very expensive, while others are not.
- C. Researchers think that using many supplements is not good for children's health.
- D. Researchers made a wrong prediction that children who use supplements need to take them.

III Choose the most appropriate word from A-H to match the definitions ①-⑥.

- ① continuously moving or changing
- ② an arrangement of numbers, letters, or signs in rows and columns that you consider to be one amount
- ③ to say that something will happen in the future
- ④ happening regularly or all the time
- ⑤ involving a series of connected events that move from one stage to the next
- ⑥ the activity of producing conditions which are similar to real ones, especially in order to say that something will happen, before it happens

A	efficient	B	constant	C	dynamic	D	linear
E	matrix	F	predict	G	radiation	H	simulation

IV Read the text and answer the question below.

Solar water heaters are devices that use energy from the sun to heat water. Solar water heating is used around the world.

The solar water heater described (①) is based on a design developed some years ago in Afghanistan. Since then, it has been built and used in many countries. It can heat seventy liters of water to sixty degrees Celsius. It can do this between sunrise and noon (②) a clear day with an average outside temperature of thirty-two degrees Celsius.

There are two parts to the solar water heater. One part is made of a sheet of metal painted black. This metal surface, placed in contact (③) the water, will heat the water. Black-painted surfaces that receive the sun's heat become hotter than surfaces of any other color.

The black metal plate is called a collector. There are several kinds of metal sheets that can be used for the collector. Metal sheets that have raised sections will work very well. These corrugated sheets are often used to make the roofs (④) houses.

Once the water is heated, it is kept hot with material called insulation. This allows the water to stay warm for a long time.

The second part of the solar water heater holds the water for the system. This storage tank can be a container that holds about one hundred liters. Two rubber pipes are attached to the water storage tank. One pipe lets water flow into the system. The other lets water flow (⑤).

When the water heater is working correctly, water will flow from the storage tank to the collector and back again. You can use the hot water at the top of the tank for washing and cleaning. You can change the flow of water (⑥) that the temperature is hot or warm (⑦) desired.

This solar water heater is easy to build and operate. It will last about two years before the rubber pipes (⑧) to be replaced.

Question

Choose the most appropriate word to fill in ①-⑧.

A	as	B	here	C	need	D	of
E	on	F	out	G	so	H	with

V Read the text and answer the questions below.

Big technology comes in tiny packages. New cell phones, music players, and personal computers get smaller every year, which (①) these electronics require even smaller components on the inside. Engineers are looking for creative ways to build these components, and they have turned their (②) to graphene, a super-thin material that could change the future of electronics.

Graphene is not just small, it is “the thinnest possible material in this world,” says Kostya Novoselov, a scientist who studies graphene at the University of Manchester, in the United Kingdom. He (③) it a “wonder material.” It is so thin that you would need to stack about 25,000 sheets just to make a pile as thick as a piece of ordinary white paper. If you were to hold a sheet of graphene in your fingers, you’d have no idea because you wouldn’t be able to see it.

In addition to being nearly invisible, graphene is also super-strong. In July, engineers at Columbia University in New York City showed that graphene is 200 times stronger than steel, making it the strongest known substance on the planet.

Graphene is made of carbon, one of the most abundant (④) in the universe. Every known kind of life (⑤) carbon; so do diamonds and coal. Graphene is a sheet of carbon, but only one atom thick. (An atom is the smallest possible piece of an element. If you change an atom of carbon, then it’s not carbon anymore.) You don’t have to look far to find graphene — it’s all around you. You can even try to find some right now.

If you want a sneak peek of this high-tech wonderstuff, all you need (⑥) a pencil, paper and a little adhesive tape. [X] When you write with a pencil, you’re actually leaving a trail of graphite on the paper.

1. Choose the most appropriate word to fill in ①-⑥.

A	calls	B	contains	C	elements
D	eyes	E	is	F	means

2. Rearrange A-D to fill in [X].

- A. That layer is called graphite, one of the softest minerals in the world.
- B. Then apply a small piece of adhesive tape over the area.
- C. When you pull up the tape, you’ll see that it pulls up a thin layer of some of the shading from your pencil.
- D. Use the pencil to shade a small area on the paper.