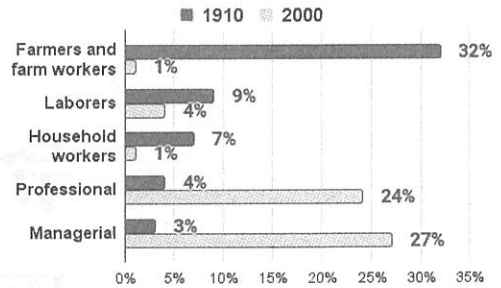


- 1 Read the passage below and then answer the questions 1–6 about it. Boxes ( ) in the passage indicate missing information. Choose the most appropriate answers based on what is stated or implied in the passage.

We begin our discussion with the issue of how the industrial situation will change. Figure 1 shows how the nature of employment in the US has changed over the last 100 years. In 1910,  of American workers were either farmers or farm workers, but now these occupations make up a mere one percent of the workforce. Adding laborers and household service workers to these jobs accounted for  of US employment in 1910. By the year 2000, the employment situation had changed dramatically, with  of US jobs becoming office-based: professional and managerial. Looking forward, there will be more shifts as the economy responds to the rise of information technology, rapid developments in robotics and Artificial <1>Intelligence, growing environmental concerns, and the impact of an ageing population.

Figure 1: Composition of Employment



Over time, the structure of an economy goes through dramatic changes in response to the primitive economic forces of supply and demand. Some sectors fall dramatically. Consider, for example, the agricultural sector, which in 1869 accounted for nearly 40 percent of US GDP\* and by 2013 was only one percent. This was because of technological improvements, particularly in machinery and fertilizers\*, which led to significant increases in agricultural productivity and therefore potential supply. However, while the population became richer, their demand for food didn't increase proportionally to their income, so supply exceeded demand and food prices fell. The result of lower prices was a sharp fall in the total value of agricultural production and the laying off of many workers employed in the sector.

Other sectors rose dramatically.  agriculture, the service sector's share in the economy rose from 40 percent in 1929 to around 65 percent in 2013. This shift is explained by the fact that as people got richer, they wanted to consume more services. The leisure <2>industry illustrates this story very well. Over the twentieth century, as leisure time increased, so did the leisure industry, with far more cinemas, sports clubs, fitness centers, and so on. However, unlike the agricultural sector, where productivity increased substantially, productivity in the leisure industry tended not to increase—how do you substantially increase the productivity of a yoga instructor or a hairdresser? So rising demand wasn't met by rising productivity, and therefore the prices of services increased,  more workers into the sector. Higher prices, together with greater employment, combined to substantially increase the share of services in terms of GDP.

Such changes are a historical constant, but precisely because they are a constant, the following generations of workers will experience more transitions and changes. So what future shifts will we see, and where will the jobs be?

One factor to consider is the impact of demography\* on jobs. As populations age, this has a substantial effect on the economy. Greater numbers of older people will create a demand effect,  sectors and market prices will respond. For example, it is likely that medical research focused on long life and bioengineering will be significant growth sectors and that the service sector will shift towards healthcare and service provision.

Environmental concerns and sustainability will substantially impact prices and resources and the relative size of different sectors. We are about to experience substantial shifts in energy provision and, if energy scarcity continues and energy prices rise, then there will be significant innovations in energy creation and resource conservation. The same is true of food supply, for which there is an expectation of radical innovation, especially in combination with genetic engineering and health concerns. Growing water shortages will also lead to major changes in pricing and growth in the commercial importance of water efficiency, provision, and recycling.

Similarly, concerns about environmental sustainability and the release of CO<sub>2</sub>  likely to lead to carbon taxes. This, in turn, will lead to substantial shifts in value and the rise of new sectors, new firms, and new technologies, as carbon reduction, capture, and substitution become multi-billion-dollar industries.

<<NOTES\*>>

GDP = Gross Domestic Product (国内総生産)

fertilizers = chemicals or natural substances added to soil to make plants grow better

demography = the composition of a particular population

1.  –  Use data from Figure 1 to choose the most appropriate expressions.

- |                         |                      |                         |                       |
|-------------------------|----------------------|-------------------------|-----------------------|
| ① nearly a tenth        | ② exactly a tenth    | ③ less than a quarter   | ④ more than a quarter |
| ⑤ approximately a third | ⑥ just over a third  | ⑦ a little under half   | ⑧ just over half      |
| ⑨ about two-thirds      | ⑩ exactly two-thirds | ⑪ almost three-quarters | ⑫ over three-quarters |

2. Which is the most stressed syllable in each word?

<1>Intelligence                      in-tel-li-gence  
① ② ③ ④

<2>industry                              in-dus-try  
① ② ③

3. Choose the most appropriate answers.

- |                      |              |                |                  |                    |                |
|----------------------|--------------|----------------|------------------|--------------------|----------------|
| <input type="text"/> | ① Instead of | ② According to | ③ In contrast to | ④ In relation with | ⑤ As regard to |
| <input type="text"/> | ① drawing    | ② governing    | ③ growing        | ④ yielding         | ⑤ producing    |
| <input type="text"/> | ① which      | ② in which     | ③ to which       | ④ whose            | ⑤ what         |
| <input type="text"/> | ① is         | ② are          | ③ will           | ④ can              | ⑤ has          |

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4.  10 According to paragraph 2, which TWO reasons best explain why the agricultural sector's contribution to GDP fell dramatically?
- ① Productivity increased.
  - ② The demand for food fell.
  - ③ The population decreased.
  - ④ People had less income.
  - ⑤ Supply was greater than demand.
  - ⑥ Many workers lost their jobs.
5.  11 Which ONE of the following is NOT mentioned as a sector that is likely to change?
- ① healthcare
  - ② energy provision
  - ③ food supply
  - ④ transportation
  - ⑤ water services
  - ⑥ carbon management
6.  12 What is this passage mostly about? Choose ONE answer.
- ① job losses due to technology
  - ② emerging environmental issues
  - ③ changes across economic sectors
  - ④ the need for higher GDP
  - ⑤ impact of an ageing population
  - ⑥ importance of sustainability in new sectors

2 Read the passage below and then answer the questions 1–8 about it. Boxes (  ) in the passage indicate missing information. Choose the most appropriate answers based on what is stated or implied in the passage.

The Alamo Drafthouse Cinema in Austin, Texas, doesn't allow you to use phones once the film begins. The glow of the screen disturbs the audience's cinematic experience, and the Alamo Drafthouse is the type of place where people respect cinematic experience. Most movie theaters, of course, politely ask the audience to put  13 their phones, but this particular movie theater takes this prohibition very seriously. Here's their official policy, taken from their website:

*We have zero tolerance\* for talking or cellphone use of any kind during films.  
We'll kick you out, promise. We've got backup.*

This policy is remarkable in part because it's so exceptional in the movie business. The standard cinema complex has completely given up on the idea that people can make it through a film without using their phones. Some are even considering formalizing this retreat. "You can't tell a 22-year-old to turn off their cellphone," said the CEO\* of the AMC theater chain in a 2016 interview with *Variety* magazine. "That's not how they live their lives." He then revealed that the company is considering relaxing <1> their existing (though largely ignored) cellphone ban.

The failed fight against cellphones in movie theaters is a specific consequence of a more general shift that's occurred over the past decade: the transformation of the cellphone from an occasionally useful tool to something we can never be apart  14. This rise of the cellphone as a vital attachment is supported by many different explanations. Young people, for example, worry that a disconnection, even if only temporary, might lead them to miss  15 on something better that they could be doing. Parents worry that their kids won't be able to reach <2> them in an emergency. Travelers need directions and recommendations for places to eat. Workers fear the idea of being both needed and unreachable. Lastly, everyone secretly fears being bored.

What's remarkable about these concerns is how recently we started really caring about them. People born before the mid-1980s have strong memories of life without cellphones. All of the concerns listed above still existed  16 theory, but no one worried much about them. Before I had my driver's license, for example, if I needed someone to pick me up from school after sports practice, I'd use a payphone. Sometimes my parents were home, and sometimes I had to leave a message and hope they got it. Getting lost and asking for directions was just a regular part of driving in a new city, and not really a big deal—learning to read maps was one of the first things we all did after learning to drive. Parents were comfortable  17 the idea that when they were out for dinner and a movie, the babysitter had no easy way to reach them in the case of an emergency.

« ① » I don't mean to create a false sense of sentimentality for these pre-cellphone times. « ② » All of the above situations are somewhat improved by better communication tools. « ③ » Put another way, in 90 percent of your daily life, the presence of a cellphone either doesn't matter or makes things only slightly more convenient. « ④ » They are useful, but to believe that it's vital to have one at all times is going too far. « ⑤ »

This claim can be proven in part by turning to the surprisingly active subculture of people who go for extended periods of time without cellular communication. We know about this group because many of them publish essays describing their experiences. If you read enough of these essays, a common theme  21: life without a cellphone is occasionally inconvenient, but it's much less limiting than you might expect.

A young woman named Hope King, for example, ended up  22 a little over four months without a phone after her iPhone was stolen at a clothing store. She could have replaced it right away, but, at the time, delaying this decision  23 her as an act of symbolic resistance against the thief—a perhaps misguided, but well-intentioned way of saying,

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“See, you didn’t hurt me.” In an article she wrote about her experience, King listed several “inconveniences” of life without a phone, including the need to look up maps in advance before heading to a new destination, and the slightly increased complexity of talking with her family (which she did over Skype on her computer). She also experienced a small number of major inconveniences, such as the time she was stuck in the back of a taxi, running late for a meeting with her boss, desperately hoping to find a Wi-Fi signal from a nearby Starbucks on her iPad so she could send him a note. However, for the most part, the experience was less drastic than she had feared. Indeed, as she writes, some of the things that had originally concerned her about post-cellphone life “were surprisingly easy,” and when she was finally forced to buy a new phone (a new job required it), she actually felt anxious about the return to being constantly connected.

The purpose of these observations is to emphasize the following point: the urgency we feel to always have a phone with us is overstated. To live permanently without these devices would be needlessly inconvenient, but to regularly spend a few hours away from them should not be an issue.

<<NOTES\*>>

tolerance = willingness to accept somebody or something; patience

CEO = chief executive officer

1.  -  Choose the most appropriate answers.

- ① out                      ② by                      ③ over                      ④ from                      ⑤ on                      ⑥ off  
⑦ in                          ⑧ for                      ⑨ away                      ⑩ of                          ⑪ at                          ⑫ with

2.  What does <1> their refer to? Choose ONE answer.

- ① Alamo Draffhouse Cinema                      ② movie business                      ③ standard cinema complex                      ④ the idea  
⑤ people    ⑥ film    ⑦ this retreat    ⑧ a 22-year-old  
⑨ cellphone    ⑩ CEO    ⑪ AMC theater chain    ⑫ *Variety* magazine

3.  What does <2> them refer to? Choose ONE answer.

- ① cellphones                      ② movie theaters                      ③ useful tool                      ④ a vital attachment  
⑤ explanations                      ⑥ young people                      ⑦ a disconnection                      ⑧ parents  
⑨ their kids                      ⑩ travelers                      ⑪ directions and recommendations                      ⑫ workers

4.  The following sentence was taken from the passage. Which location indicated by << ① >> - << ⑤ >> was it taken from?

<< What I do want to emphasize, however, is that most of this improvement is minor. >>

5. Choose the most appropriate answers.

- |                                 |            |             |              |                 |               |
|---------------------------------|------------|-------------|--------------|-----------------|---------------|
| <input type="text" value="21"/> | ① displays | ② describes | ③ attracts   | ④ demonstrates  | ⑤ emerges     |
| <input type="text" value="22"/> | ① spends   | ② spent     | ③ spending   | ④ to have spent | ⑤ to spend    |
| <input type="text" value="23"/> | ① struck   | ② damaged   | ③ approached | ④ figured out   | ⑤ pointed out |

6.  Choose the most appropriate answer to complete the following statement.

The author discusses the Alamo Draffhouse Cinema cellphone policy in order to \_\_\_\_\_.

- ① highlight that people in Austin prefer to live without cellphones  
② explain how using cellphones in a movie theater can disturb the movie experience  
③ criticize people in their 20s for not following rules of any kind regarding use of cellphones  
④ express the idea that it is difficult to stop people from using their cellphones  
⑤ emphasize that cinemas need strong cellphone policies to avoid problems

7.  According to paragraph 4, why was the author able to read maps? Choose ONE answer.

- ① It was required to get a driver’s license.  
② He was often late getting to places.  
③ He did not like asking strangers for directions.  
④ It was a common skill to learn at the time.  
⑤ He did not like using a cellphone.

8.  Which ONE of the following is TRUE of Hope King’s experience of life without a cellphone?

- ① She learned how to find places without a map.  
② She had some difficulty contacting her family.  
③ She lost her job for being late to meetings.  
④ She started to spend more time with friends.  
⑤ She continuously felt anxious without it.

3 Read the passage below and then answer the questions 1–9 about it. Boxes (  ) in the passage indicate missing information. Choose the most appropriate answers based on what is stated or implied in the passage.

Why does <1> alternating studying and testing have such positive effects? Because it uses one of the most effective strategies that educational science has discovered—the spacing out of training sessions. This is the golden rule: it is always better to spread out training periods rather than cram\* them into a single session. The best way to ensure remembering something in the long term is with a series of study periods, scattered with tests and spaced at increasingly larger intervals.

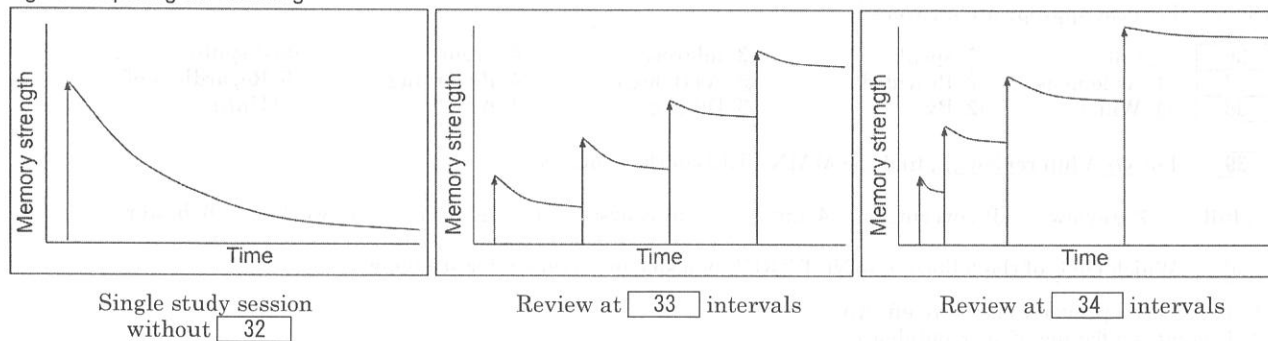
Decades of psychological research show that if you have a fixed amount of time to learn something, spacing out the lessons is a much more effective strategy than grouping them. The distribution of learning over several days has a <2> tremendous effect. Experiments show that you can multiply your memory by a factor of three when you review at regular intervals, rather than trying to learn everything at once. The rule is simple: fifteen minutes of work every day of the week is better than two hours on a single day per week.

Why is the spacing strategy so <3> efficient? Brain imaging shows that cramming the problems into a single session decreases the brain activity they could bring about, perhaps because repeated information gradually loses its freshness. Repetition also seems to create a false impression of knowledge, an overconfidence due to the presence of information in working memory. The knowledge seems available. We have it in mind, so we do not see the point of working any harder. On the other hand, spacing out the learning increases brain activity. It seems to create an effect of “desirable difficulty” by prohibiting simple storage in working memory, and thus forcing the relevant circuits to work more.

What is the most effective time interval between two repetitions of the same lesson? A strong improvement is observed when the interval reaches twenty-four hours—probably because sleep plays a central role in enhancing what we learn. Nevertheless, American psychologist Hal Pashler and his <4> colleagues have shown that the most effective interval depends on the desired duration of the memory. For example, if you need to remember the information for only a few days or weeks, then it is ideal to review it every day for about a week. If, on the other hand, knowledge must be maintained for several months or years, the interval between reviews should be extended accordingly. The general rule is to review the information at intervals of approximately 20 percent of the desired memory duration—for instance, review after every two months if you want a memory to last about ten months. The effect is substantial. A single repetition of a lesson at a delay of a few weeks triples the number of items that can be recalled a few months later!

To keep the information in memory as long as possible, it is best to gradually increase the time intervals themselves. Start with reviews every day, then review the information after a week, a month, then a year. This strategy <5> guarantees peak memory at all points in time. Figure 1 below shows you why. Each review reinforces learning. It refreshes the strength of mental representations and helps fight the expanding forgetfulness that characterizes our memory. Above all, the spacing out of learning sessions seems to select, out of all the available memory circuits in our brain, the one with the slowest forgetting curve, that is, the one that projects the information farthest into the future.

Figure 1: Spacing the Learning



Indeed, we have been wrong about memory. It is not a system which is oriented toward the past, but one whose role is to send data to the future, so that we may later access <6> it. By repeating the same information several times, at long intervals, we help the brain convince itself that this information is valuable enough to be delivered to our future self.

Hal Pashler draws several practical lessons from this research. First, learning always benefits from being spread over several sessions. Second, for school topics, reviewing after a few days or weeks is not enough. If you want to memorize something in the long run, you should review it again after an interval of at least a few months. From this perspective, we have to rethink the entire organization of textbooks. Most of them are organized into chapters that focus on a specific topic and are followed by questions and problems that focus only on that lesson. This organization has two negative consequences. The lessons are not reviewed regularly or with sufficient spacing, and the complexity of exercises is reduced. This happens because students do not have to determine for themselves what knowledge or strategies should be used to <6> 36 a given problem. Experiments show that it is better to mix all sorts of different problems, instead of limiting oneself to the most recent lesson, in order to regularly put all of one's knowledge to the test.

What about finals or end-of-year exams? The science of learning suggests that they are not ideal because they encourage last-minute studying rather than regular practice. Nevertheless, they are still a useful test of acquired knowledge. Last-minute studying is not necessarily ineffective. <7> 37 that the student has already made efforts to learn in the preceding months, intense study just before an exam can refresh the knowledge in memory and will help it last. However, a regular review of knowledge, year after year, is likely to yield even greater benefit. Short-term exams, which focus only on what was learned in the preceding weeks, do not guarantee long-term memory. <7> A full review covering the entire course from the beginning of the year works much better.

What is the point—you may be asking—of students studying the same things over the course of the school year? Why make them repeat an exercise that they have already completed several times? If they get perfect scores, will they learn

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anything at all? Of course they will. The benefit of feedback is not limited to mistakes or problems that students get wrong. On the contrary, receiving feedback improves memory even when the right answer was chosen. Why? Because as long as knowledge is not perfectly mastered, the brain will continue to learn, even if only weakly. As long as there is uncertainty, error signals will continue to spread in the brain. The difference between the initial low-confidence answer and the subsequent 100-percent-certain information acts as a useful feedback signal. It indicates a virtual error that we could have made and from which we can therefore learn.

This is why overlearning is always beneficial. [38] our knowledge is absolutely certain, reviewing and testing it will continue to improve our performance, especially in the long run. Moreover, repetition has other benefits for the brain. It automates our mental operations until they become unconscious.

<<NOTES\*>>

cram = to force too many things into a small space

1. Choose ONE answer that is closest in meaning.

- |    |                        |             |              |                   |                  |                 |
|----|------------------------|-------------|--------------|-------------------|------------------|-----------------|
| 27 | <1> <u>alternating</u> | ① adjusting | ② shifting   | ③ keeping up with | ④ doing in turns | ⑤ branching off |
| 28 | <2> <u>tremendous</u>  | ① massive   | ② exhausting | ③ concluding      | ④ delightful     | ⑤ attractive    |

2. Identify the most stressed vowel in the following words, and choose ONE word for each that has the same vowel pronunciation.

- |    |                       |
|----|-----------------------|
| 29 | <3> <u>efficient</u>  |
| 30 | <4> <u>colleagues</u> |
| 31 | <5> <u>guarantees</u> |

- ① heat    ② sit    ③ wet    ④ cat    ⑤ bird    ⑥ cut    ⑦ food    ⑧ book    ⑨ stop    ⑩ stay    ⑪ sky    ⑫ old

3. [32] - [34] Some words are missing under Figure 1. Choose the most appropriate words.

- |           |              |          |              |
|-----------|--------------|----------|--------------|
| ① tests   | ② increasing | ③ strong | ④ review     |
| ⑤ regular | ⑥ common     | ⑦ memory | ⑧ forgetting |

4. [35] What does <6> it refer to? Choose ONE answer.

- ① memory    ② system    ③ the past    ④ one    ⑤ role    ⑥ data    ⑦ future

5. Choose the most appropriate answers.

- |    |              |            |             |             |                 |
|----|--------------|------------|-------------|-------------|-----------------|
| 36 | ① tell       | ② speak    | ③ address   | ④ argue     | ⑤ dispute       |
| 37 | ① As long as | ② Provided | ③ As though | ④ Regarding | ⑤ Regardless of |
| 38 | ① While      | ② By       | ③ During    | ④ As        | ⑤ Until         |

6. [39] For <7> A full review ..., find the MAIN VERB of the sentence.

- ① full    ② review    ③ covering    ④ entire    ⑤ course    ⑥ beginning    ⑦ works    ⑧ better

7. [40] Which ONE of the following is NOT TRUE of a spacing strategy for studying?

- ① It has been proven to be more effective.  
② It creates a feeling of overconfidence.  
③ It increases brain activity.  
④ It relies less on working memory.

8. [41] A student wants to take an important exam 5 months (20 weeks) from now. According to paragraph 4, what is the most effective time interval between two repetitions of the same information?

- |                     |              |              |
|---------------------|--------------|--------------|
| ① twenty-four hours | ② one week   | ③ two weeks  |
| ④ three weeks       | ⑤ four weeks | ⑥ five weeks |

9. [42] Why does the author suggest that we have to rethink the entire organization of textbooks?  
Choose THREE answers.

- ① Textbooks often focus on a single topic in each chapter.  
② It takes at least a few months to completely review a textbook.  
③ The questions asked in a textbook are usually only about a specific topic.  
④ There is no opportunity to regularly review previous topics.  
⑤ The exercises in the textbook are often too complex.  
⑥ There are not enough topics covered in most textbooks.