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READING PASSAGE 1

You should spend about 20 minutes on **Questions 1-13**, which are based on Reading Passage 1 below.

The Impact of the Potato

Jeff Chapman relates the story of history's most important vegetable

The potato was first cultivated in South America between three and seven thousand years ago, though scientists believe they may have grown wild in the region as long as 13,000 years ago. The genetic patterns of potato distribution indicate that the potato probably originated in the mountainous west-central region of the continent.

Early Spanish chroniclers who misused the Indian word batata (sweet potato) as the name for the potato noted the importance of the tuber to the Incan Empire. The Incas had learned to preserve the potato for storage by dehydrating and mashing potatoes into a substance called Chuño. Chuño could be stored in a room for up to 10 years, providing excellent insurance against possible crop failures. As well as using the food as a staple crop, the Incas thought potatoes made childbirth easier and used it to treat injuries.

The Spanish conquistadors first encountered the potato when they arrived in Peru in 1532 in search of gold, and noted Inca miners eating Chuño. At the time the Spaniards failed to realise that the potato represented a far more important treasure than either silver or gold, but they did gradually begin to use potatoes as basic rations aboard their ships. After the arrival of the potato in Spain in 1570, a few Spanish farmers began to cultivate them on a small scale, mostly as food for livestock.

Throughout Europe, potatoes were regarded with suspicion, distaste and fear. Generally considered to be unfit for human consumption, they were used only as animal fodder and sustenance for the starving. In northern Europe, potatoes were primarily grown in botanical gardens as an exotic novelty. Even peasants refused to eat from a plant that produced ugly, misshapen tubers and that had come from a heathen civilisation. Some felt that the potato plant's resemblance to plants in the nightshade family hinted that it was the creation of witches or devils.

In meat-loving England, farmers and urban workers regarded potatoes with extreme distaste. In 1662, the Royal Society recommended the cultivation of the tuber to the English government and the nation, but this recommendation had little impact. Potatoes did not become a staple until, during the food shortages associated with the Revolutionary Wars, the English government began to officially encourage potato cultivation. In 1795, the Board of Agriculture

issued a pamphlet entitled "Hints Respecting the Culture and Use of Potatoes"; this was followed shortly by pro-potato editorials and potato recipes in *The Times*. Gradually, the lower classes began to follow the lead of the upper classes.

A similar pattern emerged across the English Channel in the Netherlands, Belgium and France. While the potato slowly gained ground in eastern France (where it was often the only crop remaining after marauding soldiers plundered wheat fields and vineyards), it did not achieve widespread acceptance until the late 1700s. The peasants remained suspicious, in spite of a 1771 paper from the Faculté de Paris testifying that the potato was not harmful but beneficial. The people began to overcome their distaste when the plant received the royal seal of approval: Louis XVI began to sport a potato flower in his buttonhole, and Marie-Antoinette wore the purple potato blossom in her hair.

Frederick the Great of Prussia saw the potato's potential to help feed his nation and lower the price of bread, but faced the challenge of overcoming the people's prejudice against the plant. When he issued a 1774 order for his subjects to grow potatoes as protection against famine, the town of Kolberg replied: "The things have neither smell nor taste, not even the dogs will eat them, so what use are they to us?" Trying a less direct approach to encourage his subjects to begin planting potatoes, Frederick used a bit of reverse psychology: he planted a royal field of potato plants and stationed a heavy guard to protect this field from thieves. Nearby peasants naturally assumed that anything worth guarding was worth stealing, and so snuck into the field and snatched the plants for their home gardens. Of course, this was entirely in line with Frederick's wishes.

Historians debate whether the potato was primarily a cause or an effect of the huge population boom in industrial-era England and Wales. Prior to 1800, the English diet had consisted primarily of meat, supplemented by bread, butter and cheese. Few vegetables were consumed, most vegetables being regarded as nutritionally worthless and potentially harmful. This view began to change gradually in the late 1700s. The Industrial Revolution was drawing an ever increasing percentage of the populace into crowded cities, where only the richest could afford homes with ovens or coal storage rooms, and people were working 12-16 hour days which left them with little time or energy to prepare food. High yielding, easily prepared potato crops were the obvious solution to England's food problems.

Whereas most of their neighbours regarded the potato with suspicion and had to be persuaded to use it by the upper classes, the Irish peasantry embraced the tuber more passionately than anyone since the Incas. The potato was well suited to the Irish soil and climate, and its high yield suited the most important concern of most Irish farmers: to feed their families.

The most dramatic example of the potato's potential to alter population patterns occurred in Ireland, where the potato had become a staple by 1800. The Irish population doubled to eight million between 1780 and 1841, this without any significant expansion of industry or reform of agricultural techniques beyond the widespread cultivation of the potato. Though Irish landholding practices were primitive in comparison with those of England, the potato's high yields allowed even the poorest farmers to produce more healthy food than they needed with scarcely any investment or hard labour. Even children could easily plant, harvest and cook potatoes, which of course required no threshing, curing or grinding. The abundance provided by potatoes greatly decreased infant mortality and encouraged early marriage.

Questions 1-5

Do the following statements agree with the information given in Reading Passage 1?

In boxes 1-5 on your answer sheet, write

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

- 1 The early Spanish called potato as the Incan name ‘Chuño’.
- 2 The purpose of Spanish coming to Peru was to find potatoes.
- 3 The Spanish believed that the potato has the same nutrients as other vegetables.
- 4 Peasants at that time did not like to eat potatoes because they were ugly.
- 5 The popularity of potatoes in the UK was due to food shortages during the war.

Questions 6-13

Complete the sentences below.

Choose **ONE WORD ONLY** from the passage for each answer.

Write your answers in boxes 6-13 on your answer sheet.

- 6 In France, people started to overcome their disgusting about potatoes because the King put a potato _____ in his button hole.
- 7 Frederick realised the potential of potato but he had to handle the _____ against potatoes from ordinary people.
- 8 The King of Prussia adopted some _____ psychology to make people accept potatoes.
- 9 Before 1800, the English people preferred eating _____ with bread, butter and cheese.
- 10 The obvious way to deal with England food problems was to grow high yielding potato _____.
- 11 The Irish _____ and climate suited potatoes well.
- 12 Between 1780 and 1841, based on the _____ of the potatoes, the Irish population doubled to eight million.
- 13 The potato's high yields helped the poorest farmers to produce more healthy food almost without _____ or hard physical work.

READING PASSAGE 2

You should spend about 20 minutes on Questions 14-26, which are based on Reading Passage 2 below.

Ancient Chinese Chariots

The Shang Dynasty or Yin Dynasty, according to traditional historiography, ruled in the Yellow River valley in the second millennium BC. Archaeological work at the Ruins of Yin (near modern-day Anyang), which has been identified as the last Shang capital, uncovered eleven major Yin royal tombs and the foundations of palaces and ritual sites, containing weapons of war and remains from both animal and human sacrifices.

The Tomb of Fu Hao is an archaeological site at Yinxu, the ruins of the ancient Shang Dynasty's capital Yin, within the modern city of Anyang in Henan Province, China. Discovered in 1976, it was identified as the final resting place of the queen and military general Fu Hao. The artefacts unearthed within the grave included jade objects, bone objects, bronze objects etc. These grave goods are confirmed by the oracle texts, which constitute almost all of the first hand written record we possess of the Shang Dynasty. Below the corpse was a small pit holding the remains of six sacrificial dogs and along the edge lay the skeletons of human slaves, evidence of human sacrifice.

The Terracotta Army was discovered on 29 March 1974 to the east of Xi'an in Shaanxi. The terracotta soldiers were accidentally discovered when a group of local farmers was digging a well during a drought around 1.6 km (1 mile) east of the Qin Emperor's tomb around at Mount Li (Lishan), a region riddled with underground springs and watercourses. Experts currently place the entire number of soldiers at 8,000 – with 130 chariots (130 cm long), 530 horses and 150 cavalry horses helping to ward off any dangers in the afterlife. In contrast, the burial of Tutankhamun yielded six complete but dismantled chariots of unparalleled richness and sophistication. Each was designed for two people (90 cm long) and had its axle sawn through to enable it to be brought along the narrow corridor into the tomb.

Excavation of ancient Chinese chariots has confirmed the descriptions of them in the earliest texts. Wheels were constructed from a variety of woods: elm provided the hub, rose-wood the spokes and oak the felloes. The hub was drilled through to form an empty space into which the tempered axle was fitted, the whole being covered with leather to retain lubricating oil. Though the number of spokes varied, a wheel by the fourth century BC usually had eighteen to thirty-two of them. Records show how elaborate was the testing of each completed wheel: flotation and weighing were regarded as the best measures of balance, but even the empty spaces in the assembly were checked with millet grains. One outstanding constructional asset of the ancient Chinese wheel was dishing. Dishing refers to the dish-like shape of an advanced wooden wheel, which looks rather like a flat cone. On occasion they chose to strengthen a dished wheel with a pair of struts running from rim to rim on each of the hub. As these extra supports were inserted separately into the felloes, they would have added even greater strength to the wheel. Leather wrapped up the edge of the wheel aimed to retain bronze.

Within a millennium, however, Chinese chariot-makers had developed a vehicle with shafts, the precursor of the true carriage or cart. This design did not make its appearance in Europe until the end of the Roman Empire. Because the shafts curved upwards, and the harness pressed against a horse's shoulders, not his neck, the shaft chariot was incredibly efficient. The halberd was also part of a chariot standard weaponry. This halberd usually measured well over 3 metres in length, which meant that a chariot warrior wielding it sideways could strike down the charioteer in a passing chariot. The speed of the chariot which was tested on the sand was quite fast. At speed these passes were very dangerous for the crews of both chariots.

The advantages offered by the new chariots were not entirely missed. They could see how there were literally the Warring States, whose conflicts lasted down the Qin unification of China. Qin Shi Huang was buried in the most opulent tomb complex ever constructed in China, a sprawling, city-size collection of underground caverns containing everything the emperor would need for the afterlife. Even a collection of terracotta armies called Terra-Cotta Warriors was buried in it. The ancient Chinese, along with many cultures including ancient Egyptians, believed that items and even people buried with a person could be taken with him to the afterlife.

Do the following statements agree with the information given in Reading Passage 2?

In boxes 14-17 on your answer sheet, write

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

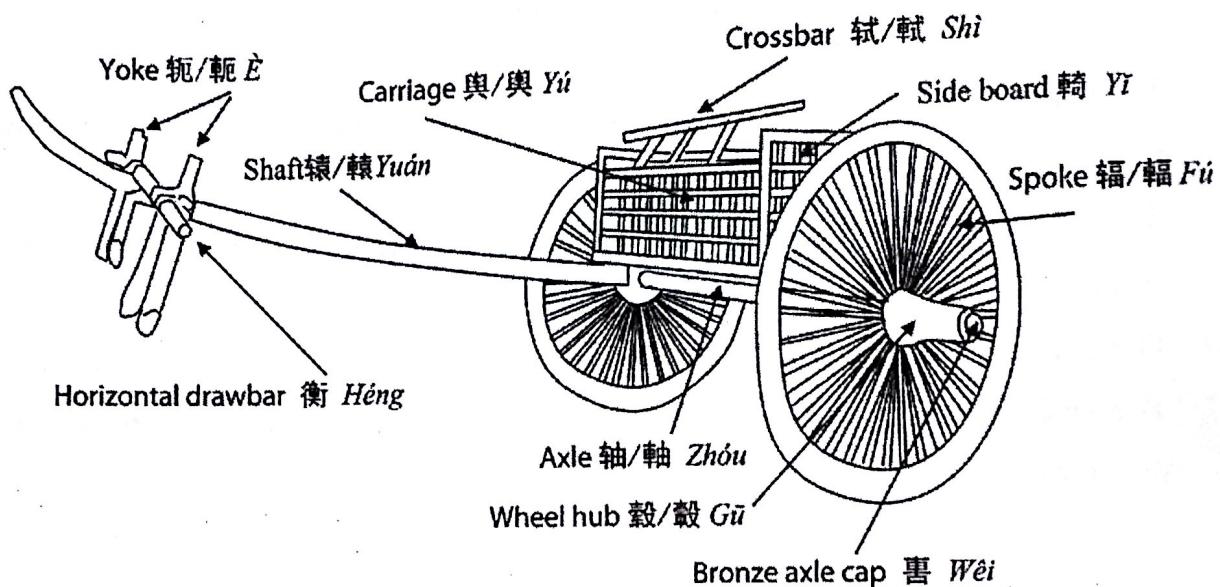
- 14 When Tomb of Fu Hao was discovered, the written records of the grave goods proved to be accurate.
- 15 Human skeletons in Anyang tomb were identified as soldiers who were killed in the war.
- 16 The Terracotta Army was discovered by people who lived nearby by chance.
- 17 The size of the King Tutankhamun's tomb is bigger than that of Qin Emperor's tomb.

Questions 18-23

Complete the notes below.

Choose NO MORE THAN TWO WORDS AND/OR NUMBERS from the passage for each answer.

Write your answers in boxes 18-23 on your answer sheet.



- 18 The hub is made of wood from the tree of _____.
- 19 The room through the hub was to put tempered axle, which is wrapped up by leather, aiming to retain _____.
- 20 The number of spokes varies from _____.
- 21 The shape of wheel resembles a _____.
- 22 Two _____ was used to strengthen the wheel.
- 23 The edge of the wheel was wrapped up by leather aiming to retain _____.

Questions 24-26

Answer the questions below.

Choose **NO MORE THAN TWO WORDS** from the passage for each answer.

Write your answers in boxes 24-26 on your answer sheet.

- 24 What body part of the horse was released from pressure to the horse shoulder after the appearance of the shafts?
- 25 What kind of road surface did the researchers measure the speed of the chariot on?
- 26 What part of the afterlife palace was the Emperor Qin Shi Huang buried in?

READING PASSAGE 3

You should spend about 20 minutes on Questions 27-40, which are based on Reading Passage 3 below.

Stealth Forces in Weight Loss

The field of weight loss is like the ancient fable about the blind men and the elephant. Each man investigates a different part of the animal and reports back, only to discover their findings are bafflingly incompatible.

- A The various findings by public-health experts, physicians, psychologists, geneticists, molecular biologists, and nutritionists are about as similar as an elephant's tusk is to its tail. Some say obesity is largely predetermined by our genes and biology; others attribute it to an overabundance of fries, soda, and screen-sucking; still others think we're fat because of viral infection, insulin, or the metabolic conditions we encountered in the womb. "Everyone subscribes to their own little theory," says Robert Berkowitz, medical director of the Center for Weight and Eating Disorders at the University of Pennsylvania School of Medicine. We're programmed to hang onto the fat we have, and some people are predisposed to create and carry more fat than others. Diet and exercise help, but in the end the solution will inevitably be more complicated than pushing away the plate and going for a walk. "It's not as simple as 'You're fat because you're lazy,'" says Nikhil Dhurandhar, an associate professor at Pennington Biomedical Research Center in Baton Rouge. "Willpower is not a prerogative of thin people. It's distributed equally."
- B Science may still be years away from giving us a miracle formula for fat-loss. Hormone leptin is a crucial player in the brain's weight-management circuitry. Some people produce too little leptin; others become desensitised to it. And when obese people lose weight, their leptin levels plummet along with their metabolism. The body becomes more efficient at using fuel and conserving fat, which makes it tough to keep the weight off. Obese dieters' bodies go into a state of chronic hunger, a feeling Rudolph Leibel, an obesity researcher at Columbia University, compares to thirst. "Some people might be able to tolerate chronic thirst, but the majority couldn't stand it," says Leibel. "Is that a behavioural problem — a lack of willpower? I don't think so."
- C The government has long espoused moderate daily exercise — of the evening-walk or take-the-stairs variety — but that may not do much to budge the needle on the scale. A 150-pound person burns only 150 calories on a half-hour walk, the equivalent of two apples. It's good for the heart, less so for the gut. "Radical changes are necessary," says Deirdre Barrett, a psychologist at Harvard Medical School and author of *Waistland*. "People don't lose weight by choosing the small fries or taking a little walk every other day." Barrett suggests taking a cue from the members of the National Weight Control Registry (NWCR), a self-selected group of more than 5,000 successful weight-losers who have shed an average of 66 pounds and kept it off 5.5 years. Some registry members lost weight using low-carb diets; some went low-fat; others eliminated refined foods. Some did it on their own; others relied on counselling. That said, not everyone can lose 66 pounds and not everyone needs to. The goal shouldn't

be getting thin, but getting healthy. It's enough to whittle your weight down to the low end of your set range, says Jeffrey Friedman, a geneticist at Rockefeller University. Losing even 10 pounds vastly decreases your risk of diabetes, heart disease, and high blood pressure. The point is to not give up just because you don't look like a swimsuit model.

- D The negotiation between your genes and the environment begins on day one. Your optimal weight, writ by genes, appears to get edited early on by conditions even before birth, inside the womb. If a woman has high blood-sugar levels while she's pregnant, her children are more likely to be overweight or obese, according to a study of almost 10,000 mother-child pairs. Maternal diabetes may influence a child's obesity risk through a process called metabolic imprinting, says Teresa Hillier, an endocrinologist with Kaiser Permanente's Center for Health Research and the study's lead author. The implication is clear: Weight may be established very early on, and obesity largely passed from mother to child. Numerous studies in both animals and humans have shown that a mother's obesity directly increases her child's risk for weight gain. The best advice for moms-to-be: Get fit before you get pregnant. You'll reduce your risk of complications during pregnancy and increase your chances of having a normal-weight child.
- E It's the \$64,000 question: Which diets work? It got people wondering: Isn't there a better way to diet? A study seemed to offer an answer. The paper compared two groups of adults: those who, after eating, secreted high levels of insulin, a hormone that sweeps blood sugar out of the bloodstream and promotes its storage as fat, and those who secreted less. Within each group, half were put on a low-fat diet and half on a low-glycemic-load diet. On average, the low-insulin-secreting group fared the same on both diets, losing nearly 10 pounds in the first six months — but they gained about half of it back by the end of the 18-month study. The high-insulin group didn't do as well on the low-fat plan, losing about 4.5 pounds, and gaining back more than half by the end. But the most successful were the high-insulin-secretors on the low-glycemic-load diet. They lost nearly 13 pounds and kept it off.
- F What if your fat is caused not by diet or genes, but by germs — say, a virus? It sounds like a sci-fi horror movie, but research suggests some dimension of the obesity epidemic may be attributable to infection by common viruses, says Dhurandhar. The idea of "infectobesity" came to him 20 years ago when he was a young doctor treating obesity in Bombay. He discovered that a local avian virus, SMAM-1, caused chickens to die, sickened with organ damage but also, strangely, with lots of abdominal fat. In experiments, Dhurandhar found that SMAM-1-infected chickens became obese on the same diet as uninfected ones, which stayed svelte.
- G He later moved to the U.S. and onto a bona fide human virus, adenovirus 36 (AD-36). In the lab, every species of animal Dhurandhar infected with the virus became obese — chickens got fat, mice got fat, even rhesus monkeys at the zoo that picked up the virus from the environment suddenly gained 15 percent of their body weight upon exposure. In his latest studies, Dhurandhar has isolated a gene that, when blocked from expressing itself, seems to turn off the virus's fattening power. Stem cells extracted from fat cells and then exposed to AD-36 reliably blossom into fat cells — but when stem cells are exposed to an AD-36 virus with the key gene inhibited, the stems cells don't differentiate. The gene appears to be necessary and sufficient to trigger AD-36-related obesity, and the goal is to use the research to create a sort of obesity vaccine.

Reading Passage 3 has seven paragraphs, A-G.

Which paragraph contains the following information?

Write the Correct letter, A-G, in boxes 27-31 on your answer sheet.

NB You may use any letter more than once.

- 27 evaluation on the effect of weight loss on different kinds of diets
- 28 an example of a research which includes the relatives of the participants
- 29 an example of a group of people who did not regain weight immediately after weight loss
- 30 long term hunger may appear to be acceptable to some of the participants during the period of losing weight program
- 31 a continuous experiment may lead to a practical application besides diet or hereditary resort

Questions 32-36

Look at the following findings (Questions 32-36) and the list of researchers below.

Match each finding with the correct researcher, A-F.

Write the correct letter, A-F, in boxes 32-36 on your answer sheet.

NB You may use any letter more than once.

- 32 A person's weight is determined by the interaction of his/her DNA and the environment.
- 33 Pregnant mothers who are overweight may risk their fetus in gaining weight.
- 34 The aim of losing weight should be keeping healthy rather than being attractive.
- 35 Small changes in lifestyle will not help in reducing much weight.
- 36 Researchers can be divided into different groups with their own point of view about weight loss.

List of Researchers

- A Robert Berkowitz
- B Rudolph Leibel
- C Nikhil Dhurandhar
- D Deirdre Barrett
- E Jeffrey Friedman
- F Teresa Hillier

Questions 37-40

Complete the sentences below.

Choose **ONE WORD AND/OR A NUMBER** from the passage for each answer.

Write your answers in boxes 37-40 on your answer sheet.

In Bombay Clinic, a young doctor who came up with the concept ‘infectobesity’ believed that the obesity is caused by a kind of virus. For years, he conducted experiments on 37 _____. Finally, later as he moved to America, he identified a new virus named 38 _____ which proved to be a significant breakthrough in inducing more weight. Although there seems no way to eliminate the virus till now, a kind of 39 _____ can be separated as to block the effectiveness of the virus. In the future, the doctor is aiming at developing a new 40 _____ which might effectively combat against the virus.

TEST 2

READING PASSAGE 1

You should spend about 20 minutes on Questions 1-13, which are based on Reading Passage 1 below.

Andrea Palladio: Italian Architect

A new exhibition celebrates Palladio's architecture 500 years on

Vicenza is a pleasant, prosperous city in the Veneto, 60 km west of Venice. Its grand families settled and farmed the area from the 16th century. But its principal claim to fame is Andrea Palladio, who is such an influential architect that a neoclassical style is known as Palladian. The city is a permanent exhibition of some of his finest buildings, and as he was born — in Padua, to be precise — 500 years ago, the International Centre for the Study of Palladio's Architecture has an excellent excuse for mounting *la grande mostra*, the big show.

The exhibition has the special advantage of being held in one of Palladio's buildings, Palazzo Barbaran da Porto. Its bold façade is a mixture of rustication and decoration set between two rows of elegant columns. On the second floor the pediments are alternately curved or pointed, a Palladian trademark. The harmonious proportions of the atrium at the entrance lead through to a dramatic interior of fine fireplaces and painted ceilings. Palladio's design is simple, clear and not over-crowded. The show has been organised on the same principles, according to Howard Burns, the architectural historian who co-curated it.

Palladio's father was a miller who settled in Vicenza, where the young Andrea was apprenticed to a skilled stonemason. How did a humble miller's son become a world renowned architect? The answer in the exhibition is that, as a young man, Palladio excelled at carving decorative stonework on columns, doorways and fireplaces. He was plainly intelligent, and lucky enough to come across a rich patron, Gian Giorgio Trissino, a landowner and scholar, who organised his education, taking him to Rome in the 1540s, where he studied the mas-

Burns argues that social mobility was also important. Entrepreneurs, prosperous from agriculture in the Veneto, commissioned the promising local architect to design their country villas and their urban mansions. In Venice the aristocracy were anxious to co-opt talented artists, and Palladio was given the chance to design the buildings that have made him famous — the churches of San Giorgio Maggiore and the Redentore, both easy to admire because they can be seen from the city's historical centre across a stretch of water.

He tried his hand at bridges — his unbuilt version of the Rialto Bridge was decorated with the large pediment and columns of a temple — and, after a fire at the Ducal Palace, he offered an alternative design which bears an uncanny resemblance to the Banqueting House in Whitehall in London. Since it was designed by Inigo Jones, Palladio's first foreign disciple, this is not as surprising as it sounds.

Jones, who visited Italy in 1614, bought a trunk full of the master's architectural drawings; they passed through the hands of the Dukes of Burlington and Devonshire before settling at the Royal Institute of British Architects in 1894. Many are now on display at Palazzo Barbaran. What they show is how Palladio drew on the buildings of ancient Rome as models. The major theme of both his rural and urban building was temple architecture, with a strong pointed pediment supported by columns and approached by wide steps.

Palladio's work for rich landowners alienates unreconstructed critics on the Italian left, but among the papers in the show are designs for cheap housing in Venice. In the wider world, Palladio's reputation has been nurtured by a text he wrote and illustrated, "Quattro Libri dell'Architettura". His influence spread to St Petersburg and to Charlottesville in Virginia, where Thomas Jefferson commissioned a Palladian villa he called Monticello.

Vicenza's show contains detailed models of the major buildings and is leavened by portraits of Palladio's teachers and clients by Titian, Veronese and Tintoretto; the paintings of his Venetian buildings are all by Canaletto, no less. This is an uncompromising exhibition; many of the drawings are small and faint, and there are no sideshows for children, but the impact of harmonious lines and satisfying proportions is to impart in a viewer a feeling of benevolent calm. Palladio is history's most therapeutic architect.

"Palladio, 500 Anni: *La Grande Mostra*" is at Palazzo Barbaran da Porto, Vicenza, until January 6th 2009. The exhibition continues at the Royal Academy of Arts, London, from January 31st to April 13th, and travels afterwards to Barcelona and Madrid.

Questions 1-7

Do the following statements agree with the information given in Reading Passage 1?

In boxes 1-7 on your answer sheet, write

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

- 1 The building where the exhibition is staged has been newly renovated.
- 2 Palazzo Barbaran da Porto typically represents the Palladio's design.
- 3 Palladio's father worked as an architect.
- 4 Palladio's family refused to pay for his architectural studies.
- 5 Palladio's alternative design for the Ducal Palace in Venice was based on an English building.
- 6 Palladio designed for both wealthy and poor people.
- 7 The exhibition includes paintings of people by famous artists.

Questions 8-13

Complete the sentences below.

Choose **NO MORE THAN THREE WORDS** from the passage for each answer.

Write your answers in boxes 8-13 on your answer sheet.

- 8 What job was Palladio training for before he became an architect?
- 9 Who arranged Palladio's architectural studies?
- 10 Who was the first non-Italian architect influenced by Palladio?
- 11 What type of Ancient Roman buildings most heavily influenced Palladio's work?
- 12 What did Palladio write that strengthened his reputation?
- 13 In the writer's opinion, what feeling will visitors to the exhibition experience?

READING PASSAGE 2

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You should spend about 20 minutes on Questions 14-26, which are based on Reading Passage 2 on the following pages.

Questions 14-20

Reading passage 2 has seven paragraphs, A-G.

Choose the correct heading for each paragraph from the list of headings below.

Write the correct number, i-viii, in boxes 14-20 on your answer sheet.

List of Headings

- i How CSR may help one business to expand
- ii CSR in many aspects of a company's business
- iii A CSR initiative without a financial gain
- iv Lack of action by the state of social issues
- v Drives or pressures motivate companies to address CSR
- vi The past illustrates business are responsible for future outcomes
- vii Companies applying CSR should be selective
- viii Reasons that business and society benefit each other

14 Paragraph A

15 Paragraph B

16 Paragraph C

17 Paragraph D

18 Paragraph E

19 Paragraph F

20 Paragraph G

Broadly speaking, proponents of CSR have used four arguments to make their case: moral obligation, sustainability, license to operate, and reputation. The moral appeal — arguing that companies have a duty to be good citizens and to "do the right thing" — is prominent in the goal of Business for Social Responsibility, the leading nonprofit CSR business association in the United States. It asks that its members "achieve commercial success in ways that honour ethical values and respect people, communities, and the natural environment." Sustainability emphasises environmental and community stewardship.

- A An excellent definition was developed in the 1980s by Norwegian Prime Minister Gro Harlem Brundtland and used by the World Business Council for Sustainable Development: "Meeting the needs of the present without compromising the ability of future generations to meet their own needs." Nowadays, governments and companies need to account for the social consequences of their actions. As a result, corporate social responsibility (CSR) has become a priority for business leaders around the world. When a well-run business applies its vast resources and expertise to social problems that it understands and in which it has a stake, it can have a greater impact than any other organization. The notion of license to operate derives from the fact that every company needs tacit or explicit permission from governments, communities, and numerous other stakeholders to justify CSR initiatives to improve a company's image, strengthen its brand, enliven morale and even raise the value of its stock.
- B To advance CSR, we must root it in a broad understanding of the interrelationship between a corporation and society. Successful corporations need a healthy society. Education, health care, and equal opportunity are essential to a productive workforce. Safe products and working conditions not only attract customers but lower the internal costs of accidents. Efficient utilization of land, water, energy, and other natural resources makes business more productive. Good government, the rule of law, and property rights are essential for efficiency and innovation. Strong regulatory standards protect both consumers and competitive companies from exploitation. Ultimately, a healthy society creates expanding demand for business, as more human needs are met and aspirations grow. Any business that pursues its ends at the expense of the society in which it operates will find its success to be illusory and ultimately temporary. At the same time, a healthy society needs successful companies. No social program can rival the business sector when it comes to creating the jobs, wealth, and innovation that improve standards of living and social conditions over time.
- C A company's impact on society also changes over time, as social standards evolve and science progresses. Asbestos, now understood as a serious health risk, was thought to be safe in the early 1900s, given the scientific knowledge then available. Evidence of its risks gradually mounted for more than 50 years before any company was held liable for the harms it can cause. Many firms that failed to anticipate the consequences of this evolving body of research have been bankrupted by the results. No longer can companies be content to monitor only the obvious social impacts of today. Without a careful process for identifying evolving social effects of tomorrow, firms may risk their very survival.
- D No business can solve all of society's problems or bear the cost of doing so. Instead, each company must select issues that intersect with its particular business. Other social agendas are best left to those companies in other industries, NGOs, or government institutions that are better positioned to address them. The essential test that should guide CSR is not whether a cause is worthy but whether it presents an opportunity to create shared value — that is, a meaningful benefit for society that is also

- E The best corporate citizenship initiatives involve far more than writing a check: They specify clear, measurable goals and track results over time. A good example is General Electronics's program to adopt underperforming public high schools near several of its major U.S. facilities. The company contributes between \$250,000 and \$1 million over a five-year period to each school and makes in-kind donations as well. GE managers and employees take an active role by working with school administrators to assess needs and mentor or tutor students. In an independent study of ten schools in the program between 1989 and 1999, nearly all showed significant improvement, while the graduation rate in four of the five worst performing schools doubled from an average of 30% to 60%. Effective corporate citizenship initiatives such as this one create goodwill and improve relations with local governments and other important constituencies. What's more, GE's employees feel great pride in their participation. Their effect is inherently limited, however. No matter how beneficial the program is, it remains incidental to the company's business, and the direct effect on GE's recruiting and retention is modest.
- F Microsoft's Working Connections partnership with the American Association of Community Colleges (AACC) is a good example of a shared-value opportunity arising from investments in context. The shortage of information technology workers is a significant constraint on Microsoft's growth; currently, there are more than 450,000 unfilled IT positions in the United States alone. Community colleges, with an enrollment of 11.6 million students, representing 45% of all U.S. undergraduates, could be a major solution. Microsoft recognizes, however, that community colleges face special challenges: IT curricula are not standardized, technology used in classrooms is often outdated, and there are no systematic professional development programs to keep faculty up to date. Microsoft's \$50 million five-year initiative was aimed at all three problems. In addition to contributing money and products, Microsoft sent employee volunteers to colleges to assess needs, contribute to curriculum development, and create faculty development institutes. Microsoft has achieved results that have benefited many communities while having a direct-and potentially significant-impact on the company.
- G At the heart of any strategy is a unique value proposition: a set of needs a company can meet for its chosen customers that others cannot. The most strategic CSR occurs when a company adds a social dimension to its value proposition, making social impact integral to the overall strategy. Consider Whole Foods Market, whose value proposition is to sell organic, natural, and healthy food products to customers who are passionate about food and the environment. The company's sourcing emphasises purchases from local farmers through each store's procurement process. Buyers screen out foods containing any of nearly 100 common ingredients that the company considers unhealthy or environmentally damaging. The same standards apply to products made internally. Whole Foods' commitment to natural and environmentally friendly operating practices extends well beyond sourcing. Stores are constructed using a minimum of virgin raw materials. Recently, the company purchased renewable wind energy credits equal to 100% of its electricity use in all of its stores and facilities, the only Fortune 500 company to offset its electricity consumption entirely. Spoiled produce and biodegradable waste are trucked to regional centers for composting. Whole Foods' vehicles are being converted to run on biofuels. Even the cleaning products used in its stores are environmentally friendly. And through its philanthropy, the company has created the Animal Compassion Foundation to develop more natural and humane ways of raising farm animals. In short, nearly every aspect of the company's value chain reinforces the social dimensions of its value proposition, distinguishing Whole Foods from its competitors.

Questions 21-22

Complete the summary below.

Choose **NO MORE THAN TWO WORDS** from the passage for each answer.

Write your answers in boxes 21-22 on your answer sheet.

The implement of CSR, HOW?

Promotion of CSR requires the understanding of interdependence between business and society. Corporations workers' productivity generally needs health care, education, and given 21 _____. Restrictions imposed by government and companies both protect consumers from being treated unfairly. Improvement of the safety standard can reduce the 22 _____ of accidents in the workplace. Similarly society becomes a pool of more human needs and aspirations.

Questions 23-26

Look at the following opinions or deeds (Questions 23-26) and the list of companies below.

Match each opinion or deed with the correct company, A, B or C.

Write the correct letter, A, B or C in boxes 23-26 on your answer sheet.

NB You may use any letter more than once.

- 23 The disposable waste
- 24 The way company purchases as goods
- 25 Helping the undeveloped
- 26 Ensuring the people have the latest information

List of Companies

- A General Electronics
- B Microsoft
- C Whole Foods Market

READING PASSAGE 3

You should spend about 20 minutes on Questions 27-40, which are based on Reading Passage 3 below.

The Significant Role of Mother Tongue in Education

One consequence of population mobility is an increasing diversity within schools. To illustrate, in the city of Toronto in Canada, 58% of kindergarten pupils come from homes where English is not the usual language of communication. Schools in Europe and North America have experienced this diversity for years, and educational policies and practices vary widely between countries and even within countries. Some political parties and groups search for ways to solve the problem of diverse communities and their integration in schools and society. However, they see few positive consequences for the host society and worry that this diversity threatens the identity of the host society. Consequently, they promote unfortunate educational policies that will make the "problem" disappear. If students retain their culture and language, they are viewed as less capable of identifying with the mainstream culture and learning the mainstream language of the society.

The challenge for educators and policy-makers is to shape the evolution of national identity in such a way that the rights of all citizens (including school children) are respected, and the cultural, linguistic, and economic resources of the nation are maximised. To waste the resources of the nation by discouraging children from developing their mother tongues is quite simply unintelligent from the point of view of national self-interest. A first step in providing an appropriate education for culturally and linguistically diverse children is to examine what the existing research says about the role of children's mother tongues in their educational development.

In fact, the research is very clear. When children continue to develop their abilities in two or more languages throughout their primary school, they gain a deeper understanding of language and how to use it effectively. They have more practice in processing language, especially when they develop literacy in both. More than 150 research studies conducted during the past 35 years strongly support what Goethe, the famous eighteenth-century German philosopher, once said: the person who knows only one language does not truly know that language. Research suggests that bilingual children may also develop more flexibility in their thinking as a result of processing information through two different languages.

The level of development of children's mother tongue is a strong predictor of their second language development. Children who come to school with a solid foundation in their mother tongue develop stronger literacy abilities in the school language. When parents and other caregivers (e.g. grandparents) are able to spend time with their children and tell stories or discuss issues with them in a way that

develops their mother tongue, children come to school well-prepared to learn the school language and succeed educationally. Children's knowledge and skills transfer across languages from the mother tongue to the school language. Transfer across languages can be two-way: both languages nurture each other when the educational environment permits children access to both languages.

Some educators and parents are suspicious of mother tongue-based teaching programs because they worry that they take time away from the majority language. For example, in a bilingual program where 50% of the time is spent teaching through children's home language and 50% through the majority language, surely children won't progress as far in the latter? One of the most strongly established findings of educational research, however, is that well-implemented bilingual programs can promote literacy and subject-matter knowledge in a minority language without any negative effects on children's development in the majority language. Within Europe, the Foyer program in Belgium, which develops children's speaking and literacy abilities in three languages (their mother tongue, Dutch and French), most clearly illustrates the benefits of bilingual and trilingual education (see Cummins, 2000).

It is easy to understand how this happens. When children are learning through a minority language, they are learning concepts and intellectual skills too. Pupils who know how to tell the time in their mother tongue understand the concept of telling time. In order to tell time in the majority language, they do not need to re-learn the concept. Similarly, at more advanced stages, there is transfer across languages in other skills such as knowing how to distinguish the main idea from the supporting details of a written passage or story, and distinguishing fact from opinion. Studies of secondary school pupils are providing interesting findings in this area, and it would be worth extending this research.

Many people marvel at how quickly bilingual children seem to "pick up" conversational skills in the majority language at school (although it takes much longer for them to catch up with native speakers in academic language skills). However, educators are often much less aware of how quickly children can lose their ability to use their mother tongue, even in the home context. The extent and rapidity of language loss will vary according to the concentration of families from a particular linguistic group in the neighborhood. Where the mother tongue is used extensively in the community, then language loss among young children will be less. However, where language communities are not concentrated in particular neighborhoods, children can lose their ability to communicate in their mother tongue within 2-3 years of starting school. They may retain receptive skills in the language but they will use the majority language in speaking with their peers and siblings and in responding to their parents. By the time children become adolescents, the linguistic division between parents and children has become an emotional chasm. Pupils frequently become alienated from the cultures of both home and school with predictable results.

Questions 27-30

Choose the correct letter, **A**, **B**, **C** or **D**.

Write the correct letter in boxes 27-30 on your answer sheet.

- 27 What point did the writer make in the second paragraph?
- A Some present studies on children's mother tongues are misleading.
 - B A culturally rich education programme benefits some children more than others.
 - C Bilingual children can make a valuable contribution to the wealth of a country.
 - D The law on mother tongue use at school should be strengthened.
- 28 Why does the writer refer to something that Goethe said?
- A to lend weight to his argument
 - B to contradict some research
 - C to introduce a new concept
 - D to update current thinking
- 29 The writer believes that when young children have a firm grasp of their mother tongue
- A they can teach older family members what they learnt at school.
 - B they go on to do much better throughout their time at school.
 - C they can read stories about their cultural background.
 - D they develop stronger relationships with their family than with their peers.
- 30 Why are some people suspicious about mother tongue-based teaching programmes?
- A They worry that children will be slow to learn to read in either language.
 - B They think that children will confuse words in the two languages.
 - C They believe that the programmes will make children less interested in their lessons.
 - D They fear that the programmes will use up valuable time in the school day.

Questions 31-35

Complete the summary using the list of words, A-J, below.

Write the correct letter, A-J, in boxes 31-35 on your answer sheet.

Bilingual Children

It was often recorded that bilingual children acquire the 31 _____ to converse in the majority language remarkable quickly. The fact that the mother tongue can disappear at a similar 32 _____ is less well understood. This phenomenon depends, to a certain extent, on the proposition of people with the same linguistic background that have settled in a particular 33 _____. If this is limited, children are likely to lose the active use of their mother tongue. And thus no longer employ it even with 34 _____, although they may still understand it. It follows that teenager children in these circumstances experience a sense of 35 _____ in relation to all aspects of their lives.

- | | | |
|-----------------|----------|---------------|
| A teachers | B school | C dislocation |
| D rate | E time | F family |
| G communication | H type | I ability |
| J area | | |

Questions 36-40

Do the following statements agree with the views of the writer in Reading passage 3?

In boxes 36-40 on your answer sheet, write

YES if the statement agrees with the views of the writer

NO if the statement contradicts the views of the writer

NOT GIVEN if it is impossible to say what the writer thinks about this

- 36 Less than half of the children who attend kindergarten in Toronto have English as their mother tongue.
- 37 Research proves that learning the host country language at school can have an adverse effect on a child's mother tongue.
- 38 The Foyer program is accepted by the French education system.
- 39 Bilingual children are taught to tell the time earlier than monolingual children.
- 40 Bilingual children can apply reading comprehension strategies acquired in one language when reading in the other.

TEST 3

READING PASSAGE 1

You should spend about 20 minutes on Questions 1-13, which are based on Reading Passage 1 below.

Voyage of Going: Beyond the Blue Line 2

- A One feels a certain sympathy for Captain James Cook on the day in 1778 that he “discovered” Hawaii. Then on his third expedition to the Pacific, the British navigator had explored scores of islands across the breadth of the sea, from lush New Zealand to the lonely wastes of Easter Island. This latest voyage had taken him thousands of miles north from the Society Islands to an archipelago so remote that even the old Polynesians back on Tahiti knew nothing about it. Imagine Cook’s surprise, then, when the natives of Hawaii came paddling out in their canoes and greeted him in a familiar tongue, one he had heard on virtually every mote of inhabited land he had visited. Marveling at the ubiquity of this Pacific language and culture, he later wondered in his journal: “How shall we account for this Nation spreading itself so far over this vast ocean?”
- B Answers have been slow in coming. But now a startling archaeological find on the island of Éfaté, in the Pacific nation of Vanuatu, has revealed an ancient seafaring people, the distant ancestors of today’s Polynesians, taking their first step into the unknown. The discoveries there have also opened a window into the shadowy world of those early voyagers. At the same time, other pieces of this human puzzle are turning up in unlikely places. Climate data gleaned from slow-growing corals around the Pacific and from sediments in alpine lakes in South America may help explain how, more than a thousand years later, a second wave of seafarers beat their way across the entire Pacific.
- C “What we have is a first- or second-generation site containing the graves of some of the Pacific’s first explorers,” says Spriggs, professor of archaeology at the Australian National University and co-leader of an international team excavating the site. It came to light only by luck. A backhoe operator, digging up topsoil in the ground of a derelict coconut plantation, scraped open a grave — the first of dozens in a burial ground some 3,000 years old. It is the oldest cemetery ever found in the Pacific islands, and it harbors the bones of an ancient people archaeologists call the Lapita, a label that derives from a beach in New Caledonia, where a landmark cache of their pottery was found in the 1950s. They were daring blue-water adventurers who roved the sea not just as explorers but also as pioneers, bringing along everything they would need to build new lives — their families and livestock, taro seedlings and stone tools.
- D Within the span of a few centuries the Lapita stretched the boundaries of their world from the jungle-clad volcanoes of Papua New Guinea to the loneliest coral outliers of Tonga, at least 2,000 miles eastward in the Pacific. Along the way they explored millions of square miles of unknown sea, discovering and colonizing scores of tropical islands never before seen by human eyes: Vanuatu, New Caledonia, Fiji, Samoa.
- E What little is known or surmised about them has been pieced together from fragments of pottery, animal bones, obsidian flakes, and such oblique sources as comparative linguistics and geochemistry. Although their voyages can be traced back to the northern islands of Papua New Guinea, their language — variants of which are still

spoken across the Pacific — came from Taiwan. And their peculiar style of pottery decoration, created by pressing a carved stamp into the clay, probably had its roots in the northern Philippines. With the discovery of the Lapita cemetery on Éfaté, the volume of data available to researchers has expanded dramatically. The bones of at least 62 individuals have been uncovered so far — including old men, young women, even babies — and more skeletons are known to be in the ground. Archaeologists were also thrilled to discover six complete Lapita pots. It's an important find, Spriggs says, for it conclusively identifies the remains as Lapita. "It would be hard for anyone to argue that these aren't Lapita when you have human bones enshrined inside what is unmistakably a Lapita urn."

- F Several lines of evidence also undergird Spriggs's conclusion that this was a community of pioneers making their first voyages into the remote reaches of Oceania. For one thing, the radiocarbon dating of bones and charcoal places them early in the Lapita expansion. For another, the chemical makeup of the obsidian flakes littering the site indicates that the rock wasn't local; instead it was imported from a large island in Papua New Guinea's Bismarck Archipelago, the springboard for the Lapita's thrust into the Pacific. A particularly intriguing clue comes from chemical tests on the teeth of several skeletons. DNA teased from these ancient bones may also help answer one of the most puzzling questions in Pacific anthropology: Did all Pacific islanders spring from one source or many? Was there only one outward migration from a single point in Asia, or several from different points? "This represents the best opportunity we've had yet," says Spriggs, "to find out who the Lapita actually were, where they came from, and who their closest descendants are today."
- G There is one stubborn question for which archaeology has yet to provide any answers: How did the Lapita accomplish the ancient equivalent of a moon landing, many times over? No one has found one of their canoes or any rigging, which could reveal how the canoes were sailed. Nor do the oral histories and traditions of later Polynesians offer any insights, for they segue into myth long before they reach as far back in time as the Lapita. "All we can say for certain is that the Lapita had canoes that were capable of ocean voyages, and they had the ability to sail them," says Geoff Irwin, a professor of archaeology at the University of Auckland and an avid yachtsman. Those sailing skills, he says, were developed and passed down over thousands of years by earlier mariners who worked their way through the archipelagoes of the western Pacific, making short crossings to islands within sight of each other. Reaching Fiji, as they did a century or so later, meant crossing more than 500 miles of ocean, pressing on day after day into the great blue void of the Pacific. What gave them the courage to launch out on such a risky voyage?
- H The Lapita's thrust into the Pacific was eastward, against the prevailing trade winds, Irwin notes. Those nagging headwinds, he argues, may have been the key to their success. "They could sail out for days into the unknown and reconnoiter, secure in the knowledge that if they didn't find anything, they could turn about and catch a swift ride home on the trade winds. It's what made the whole thing work." Once out there, skilled seafarers would detect abundant leads to follow to land: seabirds and turtles, coconuts and twigs carried out to sea by the tides, and the afternoon pileup of clouds on the horizon that often betokens an island in the distance. Some islands may have broadcast their presence with far less subtlety than a cloud bank. Some of the most violent eruptions anywhere on the planet during the past 10,000 years occurred in Melanesia, which sits nervously in one of the most explosive volcanic regions on Earth. Even less spectacular eruptions would have sent plumes of smoke billowing into the stratosphere and rained ash for hundreds of miles. It's possible that the Lapita saw these signs of distant islands and later sailed off in their direction, knowing they would find land. For returning explorers, successful or not, the geography of their own archipelagoes provided a safety net to keep them from overshooting their home ports and sailing off into eternity.
- I However they did it, the Lapita spread themselves a third of the way across the Pacific, then called it quits for reasons known only to them. Ahead lay the vast emptiness of the central Pacific, and perhaps they were too thinly stretched to venture farther. They probably never numbered more than a few thousand in total, and in their rapid migration eastward they encountered hundreds of islands — more than 300 in Fiji alone. Still, more than a millennium would pass before the Lapita's descendants, a people we now call the Polynesians, struck out in search of new territory.

Questions 1-7

Do the following statements agree with the claims of the writer in Reading Passage 1?

In boxes 1-7 on your answer sheet, write

- | | |
|------------------|---|
| YES | <i>if the statement agrees with the claims of the writer</i> |
| NO | <i>if the statement contradicts the claims of the writer</i> |
| NOT GIVEN | <i>if it is impossible to say what the writer thinks about this</i> |

- 1 Captain Cook once expected the Hawaiians to speak another language.
- 2 Captain Cook depicted numbers of cultural aspects of Polynesians in his journal.
- 3 Professor Spriggs and his research team went to the Éfaté to try to find the site of ancient cemetery.
- 4 The Lapita completed a journey of around 2,000 miles in a period less than a century.
- 5 The Lapita were the first inhabitants in many Pacific islands.
- 6 The urn buried in Éfaté site was plain as it was without any decoration.
- 7 The unknown pots discovered in Éfaté had once been used for cooking.

Questions 8-10

Complete the summary below.

Choose **ONE WORD ONLY** from the passage for each answer.

Write your answers in boxes 8-10 on your answer sheet.

Scientific Evidence Found in the Éfaté Site

Tests show the human remains and the charcoal found in the buried urn are from the start of the Lapita period. Yet the 8 _____ covering many of the Éfaté site did not come from that area.

Then examinations carried out on the 9 _____ discovered at the Éfaté site reveal that not everyone buried there was a native living in the area. In fact, DNA could assist in the identifying of the Lapita's nearest present-day 10 _____.

Questions 11-13

Answer the questions below.

Choose **NO MORE THAN THREE WORDS** from the passage for each answer.

Write your answers in boxes 11-13 on your answer sheet.

- 11 What did the Lapita travel in when they crossed the ocean?
- 12 In Irwin's view, what would the Latipa have relied on to bring them fast back to the base?
- 13 Which sea creatures would have been an indication to the Lapita of where to find land?



You should spend about 20 minutes on Questions 14-26, which are based on
Reading Passage 2 below.

Does IQ Test Prove Creativity?

Everyone has creativity, some a lot more than others. The development of humans, and possibly the universe, depends on it. Yet creativity is an elusive creature. What do we mean by it? What is going on in our brains when ideas form? Does it feel the same for artists and scientists? We asked writers and neuroscientists, pop stars and AI gurus to try to deconstruct the creative process — and learn how we can all ignite the spark within.

In the early 1970s, creativity was still seen as a type of intelligence. But when more subtle tests of IQ and creative skills were developed in the 1970s, particularly by the father of creativity testing, Paul Torrance, it became clear that the link was not so simple. Creative people are intelligent, in terms of IQ tests at least, but only averagely or just above. While it depends on the discipline, in general beyond a certain level IQ does not help boost creativity; it is necessary, but not sufficient to make someone creative.

Because of the difficulty of studying the actual process, most early attempts to study creativity concentrated on personality. According to creativity specialist Mark Runco of California State University, Fullerton, the “creative personality” tends to place a high value on aesthetic qualities and to have broad interests, providing lots of resources to draw on and knowledge to recombine into novel solutions. “Creatives” have an attraction to complexity and an ability to handle conflict. They are also usually highly self-motivated, perhaps even a little obsessive.

But there may be a price to pay for having a creative personality. For centuries, a link has been made between creativity and mental illness. Psychiatrist Jamison of Johns Hopkins University in Baltimore, Maryland, found that established artists are significantly more likely to have mood disorders. But she also suggests that a change of mood state might be the key to triggering a creative event, rather than the negative mood itself. Intelligence can help channel this thought style into great creativity, but when combined with emotional problems, lateral, divergent or open thinking can lead to mental illness instead.

Jordan Peterson, a psychologist at the University of Toronto, Canada, believes he has identified a mechanism that could help explain this. He says that the brains of creative people seem more open to incoming stimuli than less creative types. Our senses are continuously feeding a mass of information into our brains, which have to block or ignore most of it to save us from being snowed under. Peterson calls this process latent inhibition, and argues that people who have less of it, and who have a reasonably high IQ with a good working memory can juggle more of the data, and so may be open to more possibilities and ideas. The downside of extremely low latent inhibition may be a confused thought style that predisposes people to mental illness. So for Peterson, mental illness is not a prerequisite for creativity, but it shares

But what of the creative act itself? One of the first studies of the creative brain at work was by Colin Martindale, a psychologist from the University of Maine in Orono. Back in 1978, he used a network of scalp electrodes to record an electroencephalogram, a record of the pattern of brain waves, as people made up stories. Creativity has two stages: inspiration and elaboration, each characterised by very different states of mind. While people were dreaming up their stories, he found their brains were surprisingly quiet. The dominant activity was alpha waves, indicating a very low level of cortical arousal: a relaxed state, as though the conscious mind was quiet while the brain was making connections behind the scenes. It's the same sort of brain activity as in some stages of sleep, dreaming or rest, which could explain why sleep and relaxation can help people be creative. However, when these quiet-minded people were asked to work on their stories, the alpha wave activity dropped off and the brain became busier, revealing increased cortical arousal, more corraling of activity and more organised thinking. Strikingly, it was the people who showed the biggest difference in brain activity between the inspiration and development stages who produced the most creative storylines. Nothing in their background brain activity marked them as creative or uncreative. "It's as if the less creative person can't shift gear," says Guy Claxton, a psychologist at the University of Bristol, UK. "Creativity requires different kinds of thinking. Very creative people move between these states intuitively." Creativity, it seems, is about mental flexibility: perhaps not a two-step process, but a toggling between two states.

Paul Howard-Jones, who works with Claxton at Bristol, believes he has found another aspect of creativity. He asked people to make up a story based on three words and scanned their brains using functional magnetic resonance imaging. In one trial, people were asked not to try too hard and just report the most obvious story suggested by the words. In another, they were asked to be inventive. He also varied the words so it was easier or harder to link them. As people tried harder and came up with more creative tales, there was a lot more activity in a particular prefrontal brain region on the right-hand side. So part of creativity is a conscious process of evaluating and analysing ideas. The test also shows that the more we try and are stretched, the more creative our minds can be.

And creativity need not always be a solitary, tortured affair, according to Teresa Amabile of Harvard Business School. Though there is a slight association between solitary writing or painting and negative moods or emotional disturbances, scientific creativity and workplace creativity seem much more likely to occur when people are positive and buoyant. In a decade-long study of real businesses, to be published soon, Amabile found that positive moods relate positively to creativity in organisations, and that the relationship is a simple linear one. Creative thought also improves people's moods, her team found, so the process is circular.

Another often forgotten aspect of creativity is social. Vera John-Steiner of the University of New Mexico says that to be really creative you need strong social networks and trusting relationships, not just active neural networks. One vital characteristic of a highly creative person, she says, is that they have at least one other person in their life who doesn't think they are completely nuts.

Questions 14-17

Do the following statements agree with the information given in Reading Passage 2?

In boxes 14-17 on your answer sheet, write

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

- 14 High IQ guarantees better creative ability in one person than that who achieves an average score in an IQ test.
- 15 In a competitive society, individuals' language proficiency is more important than other abilities.
- 16 A wider range of resources and knowledge can be integrated by more creative people into bringing about creative approaches.
- 17 A creative person does not necessarily suffer more mental illness.

Questions 18-22

Use the information in the passage to match the people (listed A-F) with the opinions or deeds below.

Write the appropriate letter, A-F, in boxes 18-22 on your answer sheet.

List of People

- A Jamison
- B Jordan Peterson
- C Guy Claxton
- D Paul Howard-Jones
- E Teresa Amabile
- F Vera John-Steiner

- 18 Instead of producing a negative mood, the shift of mood states may be an important factor of inducing a creative thinking.
- 19 Where the more positive moods individuals achieve, there is higher creativity in organisations.
- 20 Good interpersonal relationship and trust contribute to a person with more creativity.
- 21 Creativity demands an ability that can easily change among different kinds of thinking.
- 22 Creative minds can be upgraded if we put into more practice in assessing and processing ideas.

Questions 23-26

Complete the sentences below.

Choose **NO MORE THAN THREE WORDS** from the passage for each answer.

Write your answers in boxes 23-26 on your answer sheet.

But what of the creative act itself? In 1978, Colin Martindale made records of the pattern of brain waves as people made up stories by applying a system constituted of many 23 _____. The two phases of creativity, such as 24 _____ were found. While people were still planning their stories, their brains showed little active sign and the mental activity showed a very relaxed state as the same sort of brain activity as in sleep, dreaming or rest. However, experiment proved the signal of 25 _____ went down and the brain became busier, revealing increased cortical arousal, when these people who were in a laidback state were required to produce their stories. Strikingly, it was found the person who was perceived to have the greatest 26 _____ in brain activity between the two stages, produced storylines with highest level of creativity.

You should spend about 20 minutes on Questions 27-40, which are based on Reading Passage 3 below.

MONKEYS AND FORESTS

AS AN EAST WIND blasts through a gap in the Cordillera de Tilarán, a rugged mountain range that splits northern Costa Rica in half, a female mantled howler monkey moves through the swaying trees of the forest canopy.

- A Ken Glander, a primatologist from Duke University, gazes into the canopy, tracking the female's movements. Holding a dart gun, he waits with infinite patience for the right moment to shoot. With great care, Glander aims and fires. Hit in the rump, the monkey wobbles. This howler belongs to a population that has lived for decades at Hacienda La Pacifica, a working cattle ranch in Guanacaste province. Other native primates — white-faced capuchin monkeys and spider monkeys — once were common in this area, too, but vanished after the Pan-American Highway was built nearby in the 1950s. Most of the surrounding land was clear-cut for pasture.
- B Howlers persist at La Pacifica, Glander explains, because they are leaf-eaters. They eat fruit, when it's available but, unlike capuchin and spider monkeys, do not depend on large areas of fruiting trees. "Howlers can survive anywhere you have half a dozen trees, because their eating habits are so flexible," he says. In forests, life is an arms race between trees and the myriad creatures that feed on leaves. Plants have evolved a variety of chemical defenses, ranging from bad-tasting tannins, which bind with plant-produced nutrients, rendering them indigestible, to deadly poisons, such as alkaloids and cyanide.
- C All primates, including humans, have some ability to handle plant toxins. "We can detoxify a dangerous poison known as caffeine, which is deadly to a lot of animals," Glander says. For leaf-eaters, long-term exposure to a specific plant toxin can increase their ability to defuse the poison and absorb the leaf nutrients. The leaves that grow in regenerating forests, like those at La Pacifica, are actually more howler friendly than those produced by the undisturbed, centuries-old trees that survive farther south, in the Amazon Basin. In younger forests, trees put most of their limited energy into growing wood, leaves and fruit, so they produce much lower levels of toxin than do well-established, old-growth trees.
- D The value of maturing forests to primates is a subject of study at Santa Rosa National Park, about 35 miles northwest of Hacienda La Pacifica. The park hosts populations not only of mantled howlers but also of white-faced capuchins and spider monkeys. Yet the forests there are young, most of them less than 50 years old. Capuchins were the first

to begin using the reborn forests when the trees were as young as 14 years. Howlers, larger and heavier than capuchins, need somewhat older trees, with limbs that can support their greater body weight. A working ranch at Hacienda La Pacifica also explains spider monkeys for several reasons," Fedigan explains. "They can live within a small home range, as long as the trees have the right food for them. Spider monkeys, on the other hand, occupy a huge home range, so they can't make it in fragmented habitat."

- E Howlers also reproduce faster than do other monkey species in the area. Capuchins don't bear their first young until about 7 years old, and spider monkeys do so even later, but howlers give birth for the first time at about 3.5 years of age. Also, while a female spider monkey will have a baby about once every four years, well-fed howlers can produce an infant every two years.
- F The leaves howlers eat hold plenty of water, so the monkeys can survive away from open streams and water holes. This ability gives them a real advantage over capuchin and spider monkeys, which have suffered during the long, ongoing drought in Guanacaste.
- G Growing human population pressures in Central and South America have led to persistent destruction of forests. During the 1990s, about 1.1 million acres of Central American forest were felled yearly. Alejandro Estrada, an ecologist at *Estacion de Biología Los Tuxtlas* in Veracruz, Mexico, has been exploring how monkeys survive in a landscape increasingly shaped by humans. He and his colleagues recently studied the ecology of a group of mantled howler monkeys that thrive in a habitat completely altered by humans: a cacao plantation in Tabasco, Mexico. Like many varieties of coffee, cacao plants need shade to grow, so 40 years ago the landowners planted fig, monkey pod and other tall trees to form a protective canopy over their crop. The howlers moved in about 25 years ago after nearby forests were cut. This strange habitat, a hodgepodge of cultivated native and exotic plants, seems to support about as many monkeys as would a same-sized patch of wild forest. The howlers eat the leaves and fruit of the shade trees, leaving the valuable cacao pods alone, so the farmers tolerate them.
- H Estrada believes the monkeys bring underappreciated benefits to such farms, dispersing the seeds of fig and other shade trees and fertilizing the soil with feces. He points out that howler monkeys live in shade coffee and cacao plantations in Nicaragua and Costa Rica as well as in Mexico. Spider monkeys also forage in such plantations, though they need nearby areas of forest to survive in the long term. He hopes that farmers will begin to see the advantages of associating with wild monkeys, which includes potential ecotourism projects.

"Conservation is usually viewed as a conflict between agricultural practices and the need to preserve nature," Estrada says. "We're moving away from that vision and beginning to consider ways in which agricultural activities may become a tool for the conservation of primates in human-modified landscapes."

Questions 27-32

Reading Passage 3 has eight paragraphs, A-H.

Which paragraph contains the following information?

Write the correct letter, A-H, in boxes 27-32 on your answer sheet.

- 27 A reference of rate of reduction in forest habitats
- 28 An area where only one species of monkey survived while other two species vanished
- 29 A reason for howler monkeys to choose new leaves as food over old ones
- 30 Mention of howler monkey's diet and eating habits
- 31 A reference of asking farmers' to change attitude towards wildlife
- 32 The advantage of howler monkey's flexibility in living in a segmented habitat

Questions 33-35

Look at the list of places and the following descriptions below.

Match each description with the correct place, A-E.

Write your answers, A-E, in boxes 33-35 on your answer sheet.

List of Places

- A Hacienda La Pacifica
- B Santa Rosa National Park
- C A cacao plantation in Tabasco, Mexico
- D Estacion de Biologia Los Tuxtlas in Veracruz, Mexico
- E Amazon Basin

- 33 A place where howler monkeys benefit the local region's agriculture
- 34 A place where it is the original home for all three native monkeys
- 35 A place where capuchin monkeys came to a better habitat

Questions 36-40

Complete the sentences below.

Choose **NO MORE THAN TWO WORDS** from the passage for each answer.

Write your answers in boxes 36-40 on your answer sheet.

The reasons why howler monkeys survive better in local region than the other two species

- Howlers live better in La Pacifica since they can feed themselves with leaves when 36 _____ is not easily found.
- Howlers have better ability to alleviate the 37 _____ which old and young trees used to protect themselves.
- When compared to that of spider monkeys and capuchin monkeys, the 38 _____ rate of howlers is relatively faster (round for just every 2 years).
- The monkeys can survive away from open streams and water holes as the leaves that howlers eat hold high content of 39 _____, which helps them to resist the continuous 40 _____ in Guanacaste.

READING PASSAGE 1

You should spend about 20 minutes on Questions 1-13, which are based on Reading Passage 1 below.

T-rex: Hunter or Scavenger?

Jack Horner is an unlikely academic: his dyslexia is so bad that he has trouble reading a book. But he can read the imprint of life in sandstone or muddy shale across a distance of 100 years, and it is this gift that has made him curator of palaeontology at Montana State University's Museum of the Rockies, the leader of a multi-million dollar scientific project to expose a complete slice of life 68 million years ago, and a consultant to Steven Spielberg and other Hollywood figures.

His father had a sand and gravel quarry in Montana, and the young Horner was a collector of stones and bones, complete with notes about when and where he found them. "My father had owned a ranch when he was younger, in Montana," he says. "He was enough of a geologist, being a sand and gravel man, to have a pretty good notion that they were dinosaur bones. So when I was eight years old he took me back to the area that had been his ranch, to where he had seen these big old bones. I picked up one. I am pretty sure it was the upper arm bone of a duckbilled dinosaur: it probably wasn't a duckbilled dinosaur but closely related to that. I catalogued it, and took good care of it, and then later when I was in high school, excavated my first dinosaur skeleton. It obviously started earlier than eight and I literally have been driven ever since. I feel like I was born this way."

Horner spent seven years at university, but never graduated. "I have a learning disability, I would call it a learning difference — dyslexia, they call it — and I just had a terrible time with English and foreign languages and things like that. For a degree in geology or biology they required two years of a foreign language. There was no way in the world I could do that. In fact, I didn't really pass English. So I couldn't get a degree, I just wasn't capable of it. But I took all of the courses required and I wrote a thesis and I did all sorts of things. So I have the education, I just don't have the piece of paper." he says.

"We definitely know we are working on a very broad coastal plain with the streams and rivers bordered by conifers and hardwood plants, and the areas in between these rivers were probably fern-covered. There were no grasses at all: just ferns and bushes — an unusual landscape, kind of taking the south-eastern United States — Georgia, Florida — and mixing

it with the moors of England and flattening it out," he says. "Triceratops is very common: they are the cows of the Cretaceous, they are everywhere. Duckbilled dinosaurs are relatively common but not as common as triceratops and T-rex, for a meat-eating dinosaur, is very common. What we would consider the predator-prey ratio seems really off the scale. What is interesting is the little dromaeosaurs, the ones we know for sure were good predators, are haven't been found."

That is why he sees T-rex not as the lion of the Cretaceous savannah but its vulture. "Look at the wildebeest that migrate in the Serengeti of Africa, a million individuals lose about 200,000 individuals in that annual migration. There is a tremendous carrion base there. And so you have hyenas, you have tremendous numbers of vultures that are scavenging, you don't have all that many animals that are good predators. If T-rex was a top predator, especially considering how big it is, you'd expect it to be extremely rare, much rarer than the little dromaeosaurs, and yet they are everywhere, they are a dime a dozen," he says. A 12-tonne T-rex is a lot of vulture, but he doesn't see the monster as clumsy. He insisted his theory and finding, dedicated to further research upon it, of course, he would like to reevaluate if there is any case that additional evidence found or explanation raised by others in the future.

He examined the leg bones of the T-rex, and compared the length of the thigh bone (upper leg) to the shin bone (lower leg). He found that the thigh bone was equal in length or slightly longer than the shin bone, and much thicker and heavier, which proves that the animal was built to be a slow walker rather than fast running. On the other hand, the fossils of fast hunting dinosaurs always showed that the shin bone was longer than the thigh bone. This same truth can be observed in many animals of today which are designed to run fast: the ostrich, cheetah, etc.

He also studied the fossil teeth of the T-rex, and compared them with the teeth of the Velociraptor, and put the nail in the coffin of the "hunter T-rex theory". The Velociraptor's teeth which like stake knives: sharp, razor-edged, and capable of tearing through flesh with ease. The T-rex's teeth were huge, sharp at their tip, but blunt, propelled by enormous jaw muscles, which enabled them to only crush bones.

With the evidence presented in his documentary, Horner was able to prove that the idea of the T-rex as being a hunting and ruthless killing machine is probably just a myth. In light of the scientific clues he was able to unearth, the T-rex was a slow, sluggish animal which had poor vision, an extraordinary sense of smell, that often reached its "prey" after the real hunters were done feeding, and sometimes it had to scare the hunters away from a corpse. In order to do that, the T-rex had to have been ugly, nasty-looking, and stinky. This is actually true of nearly all scavenger animals. They are usually vile and nasty looking.

Do the following statements agree with the information given in Reading Passage 1?

In boxes 1-7 on your answer sheet, write

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information in this passage

- 1 Jack Horner knew exactly that the bone picked up in his father's ranch belonged to a certain dinosaur when he was at the age of 8.
- 2 Jack Horner achieved a distinctive degree in university when he graduated.
- 3 Jack Horner believes that the number of prey should be more than that of predators.
- 4 T-rex's number is equivalent to the number of vulture in the Serengeti.
- 5 The hypothesis that T-rex is the top predator conflicts with the fact of predator-prey ratio which Jack found.
- 6 Jack Horner refused to accept any other viewpoints about T-rex's theory.
- 7 Jack Horner is the first man that discovered T-rex's bones in the world.

Questions 8-13

Complete the sentences below.

Choose **NO MORE THAN TWO WORDS** from the passage for each answer.

Write your answers in boxes 8-13 on your answer sheet.

Jack Horner found that T-rex's 8 _____ is shorter than the thigh bone, which demonstrates that it was actually a 9 _____, unlike other swift animals such as ostrich or 10 _____ that was built to 11 _____. Another explanation supports his idea is that T-rex's teeth were rather 12 _____, which only allowed T-rex to 13 _____ hard bones instead of tearing flesh like Velociraptor.

READING PASSAGE 2

You should spend about 20 minutes on Questions 14-26, which are based on Reading Passage 2 below.

LEAF-CUTTING ANTS AND FUNGUS

- A** The ants and their agriculture have been extensively studied over the years, but the recent research has uncovered intriguing new findings about the fungus they cultivate, how they domesticated it and how they cultivate it and preserve it from pathogens. For example, the fungus farms, which the ants were thought to keep free of pathogens, turn out to be vulnerable to a devastating mold, found nowhere else but in ants' nests. To keep the mold in check, the ants long ago made a discovery that would do credit to any pharmaceutical laboratory.
- B** Leaf-cutting ants and their fungus farms are a marvel of nature and perhaps the best known example of symbiosis, the mutual dependence of two species. The ants' achievement is remarkable — the biologist Edward O. Wilson has called it "one of the major breakthroughs in animal evolution" — because it allows them to eat, courtesy of their mushroom's digestive powers, the otherwise poisoned harvest of tropical forests whose leaves are laden with terpenoids, alkaloids and other chemicals designed to sicken browsers.
- C** Fungus growing seems to have originated only once in evolution, because all gardening ants belong to a single tribe, the descendants of the first fungus farmer. There are more than 200 known species of the attine ant tribe, divided into 12 groups, or genera. The leaf-cutters use fresh vegetation; the other groups, known as the lower attines because their nests are smaller and their techniques more primitive, feed their gardens with detritus like dead leaves, insects and feces. In 1994 a team of four biologists, Ulrich G. Mueller and Ted R. Schultz from Cornell University and Ignacio H. Chapela and Stephen A. Rehner from the United States Department of Agriculture, analyzed the DNA of ant funguses. The common assumption that the funguses are all derived from a single strain, they found, was only half true.
- D** The leaf-cutters' fungus was indeed descended from a single strain, propagated clonally, or just by budding, for at least 23 million years. But the lower attine ants used different varieties of the fungus, and in one case a quite separate species, the four biologists discovered. Cameron R. Currie, a Ph.D. student in the University of Toronto, it seemed to Mr. Currie, resembled the monocultures of various human crops, that are very productive for a while and which lack the genetic diversity to respond to changing environmental threats, are sitting ducks for parasites. Mr. Currie felt there had to be a parasite in the ant-fungus system. But ants scrupulously weed their gardens of all foreign organisms. "People kept telling me, 'You know the ants keep their gardens free of parasites, don't you?'" Mr. Currie said of his efforts

- E** But after three years of sifting through attine ant gardens, Mr. Currie discovered they are far from free of infections. In last month's issue of the Proceedings of the National Academy of Sciences, he and two colleagues, Dr. Mueller and David Mairoch, isolated several alien organisms, particularly a family of parasitic molds called Escovopsis. Escovopsis turns out to be a highly virulent pathogen that can devastate a fungus garden in a couple of days. It blooms like a white cloud, with the garden dimly visible underneath. In a day or two the whole garden is enveloped. "Other ants won't go near it and the ants associated with the garden just starve to death," Dr. Rehner said. "They just seem to give up, except for those that have rescued their larvae."
- F** Evidently the ants usually manage to keep Escovopsis and other parasites under control. But with any lapse in control, or if the ants are removed, Escovopsis will quickly burst forth. Although new leaf-cutter gardens start off free of Escovopsis, within two years some 60 percent become infected. The discovery of Escovopsis's role brings a new level of understanding to the evolution of the attine ants. "In the last decade, evolutionary biologists have been increasingly aware of the role of parasites as driving forces in evolution," Dr. Schultz said. There is now a possible reason to explain why the lower attine species keep changing the variety of fungus in their mushroom gardens, and occasionally domesticating new ones — to stay one step ahead of the relentless Escovopsis.
- G** Interestingly, Mr. Currie found that the leaf-cutters had in general fewer alien molds in their gardens than the lower attines, yet they had more Escovopsis infections. It seems that the price they pay for cultivating a pure variety of fungus is a higher risk from Escovopsis. But the leaf-cutters may have little alternative: they cultivate a special variety of fungus which, unlike those grown by the lower attines, produces nutritious swollen tips for the ants to eat.
- H** Discovery of a third partner in the ant-fungus symbiosis raises the question of how the attine ants, especially the leaf-cutters, keep this dangerous interloper under control. Amazingly enough, Mr. Currie has again provided the answer. "People have known for a hundred years that ants have a whitish growth on the cuticle," said Dr. Mueller, referring to the insects' body surface. "People would say this is like a cuticular wax. But Cameron was the first one in a hundred years to put these things under a microscope. He saw it was not inert wax. It is alive." Mr. Currie discovered a specialised patch on the ants' cuticle that harbours a particular kind of bacterium, one well known to the pharmaceutical industry, because it is the source of half the antibiotics used in medicine. From each of 22 species of attine ant studied, Mr. Cameron and colleagues isolated a species of Streptomyces bacterium, they reported in *Nature* in April. The Streptomyces does not have much effect on ordinary laboratory funguses. But it is a potent poisoner of Escovopsis, inhibiting its growth and suppressing spore formation. Because both the leaf-cutters and the lower attines use Streptomyces, the bacterium may have been part of their symbiosis for almost as long as the Escovopsis mold. If so, some Alexander Fleming of an ant discovered antibiotics millions of years before people did. Even now, the ants are accomplishing two feats beyond the powers of human technology. The leaf-cutters are growing a monocultural crop year after year without disaster, and they are using an antibiotic apparently so wisely and prudently that, unlike people, they are not provoking antibiotic resistance in the target pathogen.

Questions 14-19

Use the information in the passage to match the options (listed A-C) with the activities or features of ants below.

Write the appropriate letters, A-C, in boxes 14-19 on your answer sheet.

NB You may use any letter more than once.

- A Leaf-cutting ants
- B Lower attine ants
- C Both leaf-cutting ants and lower attine ants

- 14 can use toxic leaves to feed fungus
- 15 build small nests and live with different foreign fungus
- 16 use dead vegetation to feed fungus
- 17 raise a single fungus which do not live with other variety of foreigners
- 18 normally keep a highly dangerous parasite under control
- 19 use special strategies to fight against Escovopsis

Reading Passage 2 has eight paragraphs, A-H.

Which paragraph contains the following information?

Write the correct letter, A-H, in boxes 20-24 on your answer sheet.

- 20 Dangerous outcome of Escovopsis
- 21 Risk of growing single fungus
- 22 Comparison of the features of two different nests for feeding gardens
- 23 Discovery of significant achievements made by ants earlier than human
- 24 Advantages of growing a new breed of fungus in the ant farm

Questions 25-26

Choose the correct letter; **A, B, C or D.**

Write your answers in boxes 25-26 on your answer sheet.

- 25** What does the author think of Currie's opinion on the saying "ants keep their gardens free of parasites"?
- A** His viewpoint was verified later.
 - B** His earlier study has sufficient evidence immediately.
 - C** There is no detail mentioned in the article.
 - D** His opinion was proved to be wrong later on.
- 26** What did scientists find on the skin of ants under microscope?
- A** some white cloud mold embed in their skin
 - B** that wax is all over their skin
 - C** a substance which is useful to humans
 - D** a substance which suppresses growth of all fungus

You should spend about 20 minutes on Questions 27-40, which are based on Reading Passage 3 below.

Honey Bees in Trouble

Can native pollinators fill the gap?

Recently, ominous headlines have described a mysterious ailment, colony collapse disorder (CCD), which is wiping out the honeybees that pollinate many crops. Without honeybees, the story goes, fields will be sterile, economies will collapse, and food will be scarce.

But what few accounts acknowledge is that what's at risk is not itself a natural state of affairs. For one thing, in the United States, where CCD was first reported and has had its greatest impacts, honeybees are not a native species. Pollination in modern agriculture isn't alchemy, it's industry. The total number of hives involved in the U.S. pollination industry has been somewhere between 2.5 million and 3 million in recent years. Meanwhile, American farmers began using large quantities of organophosphate insecticides, planted large-scale crop monocultures, and adopted "clean farming" practices that scrubbed native vegetation from field margins and roadsides. These practices killed many native bees outright — they're as vulnerable to insecticides as any agricultural pest — and made the agricultural landscape inhospitable to those that remained. Concern about these practices and their effects on pollinators isn't new, in her 1962 ecological alarm cry *Silent Spring*, Rachel Carson warned of a 'Fruitless Fall' that could result from the disappearance of insect pollinators.

If that 'Fruitless Fall' has not — yet — occurred, it may be largely thanks to the honeybee, which farmers turned to as the ability of wild pollinators to service crops declined. The honeybee has been semi-domesticated since the time of the ancient Egyptians, but it wasn't just familiarity that determined this choice: the bees' biology is in many ways suited to the kind of agricultural system that was emerging. For example, honeybee hives can be closed up and moved out of the way when pesticides are applied to a field. The bees are generalist pollinators, so they can be used to pollinate many different crops. And although they are not the most efficient pollinator of every crop, honeybees have strength in numbers, with 20,000 to 100,000 bees living in a single hive. "Without a doubt, if there was one bee you wanted for agriculture, it would be the honeybee," says Jim Cane, of the U.S. Department of Agriculture. The honeybee, in other words, has become a crucial cog in the modern system of industrial agriculture. That system delivers more food, and more kinds of it, to more places, more cheaply than ever before. But that system is also vulnerable, because making a farm field into the photosynthetic equivalent of a factory floor, and pollination into a series of continent-long assembly lines, also leaches out some of the resilience characteristic of natural ecosystems.

Breno Freitas, an agronomist in Brazil, pointed out that in nature such a high degree of specialisation usually is a very dangerous game: it works well while all the rest is in equilibrium, but runs

quickly to extinction at the least disbalance. In effect, by developing an agricultural system that is heavily reliant on a single pollinator species, we humans have become riskily overspecialised. And when the human-honeybee relationship is disrupted, as it has been by colony collapse disorder, the vulnerability of that agricultural system begins to become clear.

In fact, a few wild bees are already being successfully managed for crop pollination. "The problem is trying to provide native bees in adequate numbers on a reliable basis in a fairly short number of years in order to service the crop," Jim Cane says. "You're talking millions of flowers per acre in a two-to three-week time frame, or less, for a lot of crops." On the other hand, native bees can be much more efficient pollinators of certain crops than honeybees, so you don't need as many to do the job. For example, about 750 blue orchard bees (*Osmia lignaria*) can pollinate a hectare of apples or almonds, a task that would require roughly 50,000 to 150,000 honeybees. There are bee tinkerers engaged in similar work in many corners of the world. In Brazil, Breno Freitas has found that *Centris tarsata*, the native pollinator of wild cashew, can survive in commercial cashew orchards if growers provide a source of floral oils, such as by interplanting their cashew trees with Caribbean cherry.

In certain places, native bees may already be doing more than they're getting credit for. Ecolgist Rachael Winfree recently led a team that looked at pollination of four summer crops (tomato, watermelon, peppers, and muskmelon) at 29 farms in the region of New Jersey and Pennsylvania. Winfree's team identified 54 species of wild bees that visited these crops, and found that wild bees were the most important pollinators in the system: even though managed honeybees were present on many of the farms, wild bees were responsible for 62 percent of flower visits in the study. In another study focusing specifically on watermelon, Winfree and her colleagues calculated that native bees alone could provide sufficient pollination at 90 percent of the 23 farms studied. By contrast, honeybees alone could provide sufficient pollination at only 78 percent of farms.

"The region I work in is not typical of the way most food is produced," Winfree admits. In the Delaware Valley, most farms and farm fields are relatively small, each farmer typically grows a variety of crops, and farms are interspersed with suburbs and other types of land use which means there are opportunities for homeowners to get involved in bee conservation, too. The landscape is a bee-friendly patchwork that provides a variety of nesting habitat and floral resources distributed among different kinds of crops, weedy field margins, fallow fields, suburban neighborhoods, and semi natural habitat like old woodlots, all at a relatively small scale. In other words, "pollinator-friendly" farming practices would not only aid pollination of agricultural crops, but also serve as a key element in the over all conservation strategy for wild pollinators, and often aid other wild species as well.

Of course, not all farmers will be able to implement all of these practices. And researchers are suggesting a shift to a kind of polyglot agricultural system. For some small-scale farms, native bees filling the generalist role and other, native bees pollinating specific crops — with honeybees by free pollination services from resurgent wild pollinators. In other words, they're saying, we still have an opportunity to replace a risky monoculture with something diverse, resilient, and robust.

Questions 27-30

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Do the following statements agree with the claims of the writer in Reading Passage 3?

In boxes 27-30 on your answer sheet, write

- YES** if the statement agrees with the claims of the writer
NO if the statement contradicts the claims of the writer
NOT GIVEN if it is impossible to say what the writer thinks about this

- 27 In the United States, farmers use honeybees in a large scale over the past few years.
- 28 Clean farming practices would be harmful to farmers' health.
- 29 The blue orchard bee is the most efficient pollinator for every crop.
- 30 It is beneficial to other local creatures to protect native bees.

Choose the correct letter, **A**, **B**, **C** or **D**.

Write your answers in boxes 31-35 on your answer sheet.

- 31** The example of the ‘Fruitless Fall’ underlines the writer’s point about
- A** needs for using pesticides.
 - B** impacts of losing insect pollinators.
 - C** vulnerabilities of native bees.
 - D** benefits in building more pollination industries.
- 32** Why can honeybees adapt to the modern agricultural system?
- A** The honeybees can pollinate more crops efficiently.
 - B** The bees are semi-domesticated since ancient times.
 - C** Honeybee hives can be protected from pesticides.
 - D** The ability of wild pollinators using to serve crops declines.
- 33** The writer mentions factories and assembly lines to illustrate
- A** one drawback of the industrialised agricultural system.
 - B** a low cost in modern agriculture.
 - C** the role of honeybees in pollination.
 - D** what a high yield of industrial agriculture.
- 34** In the 6th paragraph, Winfree’s experiment proves that
- A** honeybees can pollinate various crops.
 - B** there are many types of wild bees as the pollinators.
 - C** wild bees can increase the yield to a higher percentage.
 - D** wild bees work more efficiently as a pollinator than honeybees in certain cases.

35 What does the writer want to suggest in the last paragraph?

- A the importance of honeybees in pollination
- B the adoption of different bees in various sizes of agricultural system
- C the comparison between the intensive and the rarefied agricultural system
- D the reason why farmers can rely on native pollinators

Questions 36-40

Complete each sentence with the correct ending, A-F, below.

Write the correct letter, A-F, in boxes 36-40 on your answer sheet.

- 36 Headlines of colony collapse disorder state that
- 37 Viewpoints of Freitas manifest that
- 38 Examples of blue orchard bees have shown that
- 39 Centris tarsata is mentioned to exemplify that
- 40 One finding of the research in Delaware Valley is that

- A native pollinators can survive when a specific plant is supplied.
- B it would cause severe consequences to both commerce and agriculture.
- C honeybees can not be bred.
- D some agricultural landscapes are favourable in supporting wild bees.
- E a large scale of honeybees are needed to pollinate.
- F an agricultural system is fragile when relying on a single pollinator.

READING PASSAGE 1

You should spend about 20 minutes on Questions 1-13, which are based on Reading Passage 1 below.

Ants Could Teach Ants

The ants are tiny and usually nest between rocks in the south coast of England. Transformed into research subjects at the University of Bristol, they raced along a tabletop foraging for food — and then, remarkably, returned to guide others. Time and again, followers trailed behind leaders, darting this way and that along the route, presumably to memorise landmarks. Once a follower got its bearings, it tapped the leader with its antennae, prompting the lesson to literally proceed to the next step. The ants were only looking for food, but the researchers said the careful way the leaders led followers — thereby turning them into leaders in their own right — marked the *Temnothorax albipennis* ant as the very first example of a non-human animal exhibiting teaching behaviour.

“Tandem running is an example of teaching, to our knowledge the first in a non-human animal, that involves bidirectional feedback between teacher and pupil,” remarks Nigel Franks, professor of animal behaviour and ecology, whose paper on the ant educators was published last week in the journal *Nature*.

No sooner was the paper published, of course, than another educator questioned it. Marc Hauser, a psychologist and biologist and one of the scientists who came up with the definition of teaching, said it was unclear whether the ants had learned a new skill or merely acquired new information.

Later, Franks took a further study and found that there were even races between leaders. With the guidance of leaders, ants could find food faster. But the help comes at a cost for the leader, who normally would have reached the food about four times faster if not hampered by a follower. This means the hypothesis that the leaders deliberately slowed down in order to pass the skills on to the followers seems potentially valid. His ideas were advocated by the students who carried out the video project with him.

Opposing views still arose, however. Hauser noted that mere communication of information is commonplace in the animal world. Consider a species, for example, that uses alarm calls to warn fellow members about the presence of a predator. Sounding the alarm can be costly,

because the animal may draw the attention of the predator to itself. But it allows others to flee to safety. "Would you call this teaching?" wrote Hauser. "The caller incurs a cost. The naive animals gain a benefit and new knowledge that better enables them to learn about the predator's location than if the caller had not called. This happens throughout the animal kingdom, but we don't call it teaching, even though it is clearly transfer of information."

Tim Caro, a zoologist, presented two cases of animal communication. He found that cheetah mothers that take their cubs along on hunts gradually allow their cubs to do more of the hunting — going, for example, from killing a gazelle and allowing young cubs to eat to merely tripping the gazelle and letting the cubs finish it off. At one level, such behaviour might be called teaching — except the mother was not really teaching the cubs to hunt but merely facilitating various stages of learning. In another instance, birds watching other birds using a stick to locate food such as insects and so on, are observed to do the same thing themselves while finding food later.

Psychologists study animal behaviour in part to understand the evolutionary roots of human behaviour, Hauser said. The challenge in understanding whether other animals truly teach one another, he added, is that human teaching involves a "theory of mind" — teachers are aware that students don't know something. He questioned whether Franks's leader ants really knew that the follower ants were ignorant. Could they simply have been following an instinctive rule to proceed when the followers tapped them on the legs or abdomen? And did leaders that led the way to food — only to find that it had been removed by the experimenter — incur the wrath of followers? That, Hauser said, would suggest that the follower ant actually knew the leader was more knowledgeable and not merely following an instinctive routine itself.

The controversy went on, and for a good reason. The occurrence of teaching in ants, if proven to be true, indicates that teaching can evolve in animals with tiny brains. It is probably the value of information in social animals that determines when teaching will evolve, rather than the constraints of brain size.

Bennett Galef Jr., a psychologist who studies animal behaviour and social learning at McMaster University in Canada, maintained that ants were unlikely to have a "theory of mind" — meaning that leaders and followers may well have been following instinctive routines that were not based on an understanding of what was happening in another ant's brain. He warned that scientists may be barking up the wrong tree when they look not only for examples of humanlike behaviour among other animals but humanlike thinking that underlies such behaviour. Animals may behave in ways similar to humans without a similar cognitive system, he said, so the behaviour is not necessarily a good guide into how humans came to think the way they do.

Questions 1-5

Look at the following statements (Questions 1-5) and the list of people in the box below.

Match each statement with the correct person, A, B, C or D.

Write the correct letter, A, B, C or D, in boxes 1-5 on your answer sheet.

NB You may use any letter more than once.

- 1 Animals could use objects to locate food.
- 2 Ants show two-way, interactive teaching behaviours.
- 3 It is risky to say ants can teach other ants like human beings do.
- 4 Ant leadership makes finding food faster.
- 5 Communication between ants is not entirely teaching.

List of People

- A Nigel Franks
- B Marc Hauser
- C Tim Caro
- D Bennett Galef Jr.

Questions 6-9

Choose **FOUR** letters, **A-H**.

Write your answers in boxes 6-9 on your answer sheet.

Which **FOUR** of the following behaviours of animals are mentioned in the passage?

- A** touch each other with antenna
- B** alert others when there is danger
- C** escape from predators
- D** protect the young
- E** hunt food for the young
- F** fight with each other
- G** use tools like twigs
- H** feed on a variety of foods

Questions 10-13

Do the following statements agree with the claims of the writer in Reading Passage 1?

In boxes 10-13 on your answer sheet, write

YES

if the statement agrees with the claims of the writer

NO

if the statement contradicts the claims of the writer

NOT GIVEN

if it is impossible to say what the writer thinks about this

- 10 Ants' tandem running involves only one-way communication.
- 11 Franks's theory got many supporters immediately after publicity.
- 12 Ants' teaching behaviour is the same as that of human.
- 13 Cheetah share hunting gains to younger ones.

READING PASSAGE 2

You should spend about 20 minutes on Questions 14-26, which are based on i-
Reading Passage 2 below.

The Development of Plastics

When rubber was first commercially produced in Europe during the nineteenth century, it rapidly became a very important commodity, particularly in the fields of transportation and electricity. However, during the twentieth century a number of new synthetic materials, called plastics, superseded natural rubber in all but a few applications.

Rubber is a polymer — a compound containing large molecules that are formed by the bonding of many smaller, simpler units, repeated over and over again. The same bonding principle — *polymerisation* — underlies the creation of a huge range of plastics by the chemical industry.

The first plastic was developed as a result of a competition in the USA. In the 1860s, \$10,000 was offered to anybody who could replace ivory — supplies of which were declining — with something equally good as a material for making billiard balls. The prize was won by John Wesley Hyatt with a material called celluloid. *Celluloid* was made by dissolving cellulose, a carbohydrate derived from plants, in a solution of camphor dissolved in ethanol. This new material rapidly found uses in the manufacture of products such as knife handles, detachable collars and cuffs, spectacle frames and photographic film. Without celluloid, the film industry could never have got off the ground at the end of the 19th century.

Celluloid can be repeatedly softened and reshaped by heat, and is known as a thermoplastic. In 1907 Leo Baekeland, a Belgian chemist working in the USA, invented a different kind of plastic by causing phenol and formaldehyde to react together. Baekeland called the material Bakelite, and it was the first of the thermosets — plastics that can be cast and moulded while hot, but cannot be softened by heat and reshaped once they have set. Bakelite was a good insulator, and was resistant to water, acids and moderate heat. With these properties it was soon being used in the manufacture of switches, household items, such as knife handles, and electrical components for cars.

Soon chemists began looking for other small molecules that could be strung

together to make polymers. In the 1930s, British chemists discovered that the gas ethylene would polymerise under heat and pressure to form a thermoplastic they called *Polythene*. *Polypropylene* followed in the 1950s. Both were used to make bottles, pipes and plastic bags. A small change in the starting material — replacing a hydrogen atom in ethylene with a chlorine atom — produced PVC (polyvinyl chloride), a hard, fireproof plastic suitable for drains and gutters. And by adding certain chemicals, a soft form of PVC could be produced, suitable as a substitute for rubber in items such as waterproof clothing. A closely related plastic was *Teflon*, or PTFE (polytetrafluoroethylene). This had a very low coefficient of friction, making it ideal for bearings, rollers, and non-stick frying pans. *Polystyrene*, developed during the 1930s in Germany, was a clear, glass-like material, used in food containers, domestic appliances and toys. Expanded polystyrene — a white, rigid foam — was widely used in packaging and insulation. *Polyurethanes*, also developed in Germany, found uses as adhesives, coatings, and — in the form of rigid foams — as insulation materials. They are all produced from chemicals derived from crude oil, which contains exactly the same elements — carbon and hydrogen — as many plastics.

The first of the man-made fibres, nylon, was also created in the 1930s. Its inventor was a chemist called Wallace Carothers, who worked for the Du Pont company in the USA. He found that under the right conditions, two chemicals — hexamethylenediamine and adipic acid — would form a polymer that could be pumped out through holes and then stretched to form long glossy threads that could be woven like silk. Its first use was to make parachutes for the US armed forces in World War II. In the post-war years nylon completely replaced silk in the manufacture of stockings. Subsequently many other synthetic fibres joined nylon, including Orlon, Acrilan and Terylene. Today most garments are made of a blend of natural fibres, such as cotton and wool, and man-made fibres that make fabrics easier to look after.

The great strength of plastic is its indestructibility. However, this quality is also something of a drawback: beaches all over the world, even on the remotest islands, are littered with plastic bottles that nothing can destroy. Nor is it very easy to recycle plastics, as different types of plastic are often used in the same items and call for different treatments. Plastics can be made biodegradable by incorporating into their structure a material such as starch, which is attacked by bacteria and causes the plastic to fall apart. Other materials can be incorporated that gradually decay in sunlight — although bottles made of such materials have to be stored in the dark, to ensure that they do not disintegrate before they have been used.

Questions 14-20

Complete the table below.

Choose **NO MORE THAN THREE WORDS** from the passage for each answer.

Write your answers in boxes 14-20 on your answer sheet.

Name of plastic	Date of invention	Original region	Property	Common use
Celluloid	1860s	US		14 _____
15 _____	1907	US	can be cast and moulded but cannot be softened by heat	16 _____, household items and car parts
Polythene	1930s	17 _____		bottles
Rigid PVC			18 _____	
Polystyrene	1930s	Germany	19 _____	food container
Polyurethanes		Germany	20 _____ foams	adhesives, coatings and insulation

Questions 21-26

Do the following statements agree with the information given in Reading Passage 2?

In boxes 21-26 on your answer sheet, write

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

- 21 The chemical structure of plastic is very different from that of rubber.
- 22 John Wesley was a famous chemist.
- 23 Celluloid and Bakelite react to heat in the same way.
- 24 The mix of different varieties of plastic can make the recycling more difficult.
- 25 Adding starch into plastic can make plastic more durable.
- 26 Some plastic containers have to be preserved in special conditions.

READING PASSAGE 3

ENTER TO LEARN, LEAVE TO ACHIEVE
You should spend about 20 minutes on Questions 27-40, which are based on
Reading Passage 3 below.

Global Warming in New Zealand

For many environmentalists, the world seems to be getting warmer. As the nearest country of South Polar Region, New Zealand has maintained an upward trend in its average temperature in the past few years. However, the temperature in New Zealand will go up 4°C in the next century while the polar region will go up more than 6°C. The different pictures of temperature stem from its surrounding ocean which acts like the air conditioner. Thus New Zealand is comparatively fortunate.

Scientifically speaking, this temperature phenomenon in New Zealand originated from what researchers call "SAM" (Southern Annular Mode), which refers to the wind belt that circles the Southern Oceans including New Zealand and Antarctica. Yet recent work has revealed that changes in SAM in New Zealand have resulted in a weakening of moisture during the summer, and more rainfall in other seasons. A bigger problem may turn out to be heavier droughts for agricultural activities because of more water loss from soil, resulting in poorer harvest before winter when the rainfall arrive too late to rescue.

Among all the calamities posed by drought, moisture deficit ranks the first. Moisture deficit is the gap between the water plants need during the growing season and the water the earth can offer. Measures of moisture deficit were at their highest since the 1970s in New Zealand. Meanwhile, ecological analyses clearly show moisture deficit is imposed at different growth stage of crops. If moisture deficit occurs around a crucial growth stage, it will cause about 22% reduction in grain yield as opposed to moisture deficit at vegetative phase.

Global warming is not only affecting agriculture production. When scientists say the country's snow pack and glaciers are melting at an alarming rate due to global warming, the climate is putting another strain on the local places. For example, line, the local skiing industry comes into a crisis. The snow line may move up as the temperature goes up, and then the snow at the bottom will melt earlier. Fortunately, it is going to be favourable for the local skiing industry to tide over tough periods since the quantities of snowfall in some areas are more likely to increase.

What is the reaction of glacier region? The climate change can be reflected in the glacier region in southern New Zealand or land covered by ice and snow. The

reaction of a glacier to a climatic change involves a complex chain of processes. www.i-educator.vn Over time periods of years to several decades, cumulative changes in mass balance cause volume and thickness changes, which will affect the flow of ice via altered internal deformation and basal sliding. This dynamic reaction finally leads to glacier length changes, the advance or retreat of glacier tongues. Undoubtedly, glacier mass balance is a more direct signal of annual atmospheric conditions.

The latest research result of National Institute of Water and Atmospheric (NIWA) Research shows that glaciers line keeps moving up because of the impacts of global warming. Further losses of ice can be reflected in Mt. Cook Region. By 1996, a 14 km long sector of the glacier had melted down forming a melt lake (Hooker Lake) with a volume. Melting of the glacier front at a rate of 40 m/yr will cause the glacier to retreat at a rather uniform rate. Therefore, the lake will continue to grow until it reaches the glacier bed.

A direct result of the melting glaciers is the change of high tides that serves the main factor for sea level rise. The trend of sea level rise will bring a threat to the groundwater system for its hyper-saline groundwater and then pose a possibility to decrease the agricultural production. Many experts believe that the best way to counter this trend is to give a longer-term view of sea level change in New Zealand. Indeed, the coastal boundaries need to be upgraded and redefined.

There is no doubt that global warming has affected New Zealand in many aspects. The emphasis on the global warming should be based on the joints efforts of local people and experts who conquer the tough period. For instance, farmers are taking a long term, multi-generational approach to adjust the breeds and species according to the temperature. Agriculturists also find ways to tackle the problems that may bring to the soil. In broad terms, going forward, the systemic resilience that's been going on a long time in the ecosystem will continue.

How about animals' reaction? Experts have surprisingly realised that animals have unconventional adaptation to global warming. A study has looked at sea turtles on a few northern beaches in New Zealand and it is very interesting to find that sea turtles can become male or female according to the temperature. Further researches will try to find out how rising temperatures would affect the ratio of sex reversal in their growth. Clearly, the temperature of the nest plays a vital role in the sexes of the baby turtles.

Tackling the problems of global warming is never easy in New Zealand, because records show the slow process of global warming may have a different impact on various regions. For New Zealand, the emission of carbon dioxide only accounts for 0.5% of the world's total, which has met the governmental standard. However, New Zealand's effort counts only a tip of the iceberg. So far, global warming has been a world issue that still hangs in an ambiguous future.

Questions 27-32

Choose the correct letter, A, B, C or D.

Write the correct letter in boxes 27-32 on your answer sheet.

27 What is the main idea of the first paragraph?

- A The temperature in the polar region will increase less than that in New Zealand in the next century.
- B The weather and climate of New Zealand is very important to its people because of its close location to the polar region.
- C The air condition in New Zealand will maintain a high quality because of the ocean.
- D The temperature of New Zealand will increase less than that of other regions in the next 100 years because it is surrounded by sea.

28 What is one effect of the wind belt that circles the Southern Oceans?

- A New Zealand will have more moisture in winds in summer.
- B New Zealand needs to face droughts more often in hotter months in a year.
- C Soil water will increase as a result of weakening moisture in the winds.
- D Agricultural production will be reduced as a result of more rainfall in other seasons.

29 What does "moisture deficit" mean to the grain and crops?

- A The growing condition will be very tough for crops.
- B The growing season of some plants can hardly be determined.
- C There will be a huge gap between the water plants needed and the water the earth can offer.
- D The soil of grain and crops in New Zealand reached its lowest production since 1970s.

- 30 What changes will happen to skiing industry due to the global warming phenomenon?
- A The skiing station may lower the altitude of skiing.
 - B Part of the skiing station needs to move to the north.
 - C The snowfall may increase in part of the skiing station.
 - D The local skiing station may likely to make a profit because of the snowfall increase.
- 31 Cumulative changes over a long period of time in mass balance will lead to
- A alterations in the volume and thickness of glaciers.
 - B faster changes in internal deformation and basal sliding.
 - C larger length of glaciers.
 - D retreat of glacier tongues as a result of change in annual atmospheric conditions.
- 32 Why does the writer mention NIWA in the sixth paragraph?
- A To use a particular example to explain the effects brought by glacier melting.
 - B To emphasize the severance of the further loss of ice in Mt. Cook Region.
 - C To alarm the reader of melting speed of glaciers at a uniform rate.
 - D To note the lake in the region will disappear when it reach the glacier bed.

Questions 33-35

Complete the summary below.

Choose **NO MORE THAN TWO WORDS** from the passage for each answer.

Write your answers in boxes 33-35 on your answer sheet.

Research data shows that sea level has a closely relation with the change of climate. The major reason for the increase in sea level is connected with 33 _____. The increase in sea level is also said to have a threat to the underground water system, the destruction of which caused by rise of sea level will lead to a high probability of reduction in 34 _____. In the long run, New Zealanders may have to improve the 35 _____ if they want to diminish the effect change in sea levels.

Questions 36-40

Do the following statements agree with the claims of the writer in Reading Passage 3?

In boxes 36-40 on your answer sheet, write

YES

if the statement agrees with the claims of the writer

NO

if the statement contradicts the claims of the writer

NOT GIVEN

if it is impossible to say what the writer thinks about this

- 36 Farmers are less responsive to climate change than agriculturists.
- 37 Agricultural sector is too conservative and resistant to deal with climate change.
- 38 Turtle is vulnerable to climate change.
- 39 The global warming is going slowly, and it may have different effects on different areas in New Zealand.
- 40 New Zealand must cut carbon dioxide emission if they want to solve the problem of global warming.

READING PASSAGE 1

You should spend about 20 minutes on *Questions 1-13*, which are based on *Reading Passage 1* below.

Computer Games for Preschoolers: *Nintendo's Research and Design Process*

Designing computer games for young children is a daunting task for game producers, who, for a long time, have concentrated on more "hard core" game fans. This article chronicles the design process and research involved in creating *Nintendo DS* for preschool gamers.

After speaking with our producers who have a keen interest in designing for the DS, we finally agreed on three key goals for our project. First, to understand the range of physical and cognitive abilities of preschoolers in the context of handheld system game play; second, to understand how preschool gamers interact with the DS, specifically how they control the different forms of play and game mechanics offered by the games presently on the market for this platform; third, to understand the expectations of preschoolers' parents concerning the handheld systems as well as the purchase and play contexts within which game play occurs. The team of the research decided that in-home ethnographies with preschoolers and their families would yield comprehensive database with which to give our producers more information and insights, so we start by conducting 26 in-home ethnographies in three markets across the United States: an East coast urban/suburban area, a West coast urban/suburban area, and a Midwest suburban/rural area.

The subjects in this study included 15 girls and 11 boys ranging from 3 years and 3 months old to 5 years and 11 months old. Also, because previous research had shown the effects of older siblings on game play (demonstrated, for example, by more advanced motor coordination when using a computer mouse), households were employed to have a combination of preschoolers with and without elder peers. In order to understand both "experienced" and "new" preschool users of the platform, we divided the sample so that 13 families owned at least one *Nintendo DS* and the others did not. For those households that did not own a DS, one was brought to the interview for the kid to play. This allowed us to see both the instinctive and intuitive movements of the new players (and of the more experienced players when playing new games), as well as the learned movements of the more experienced players. Each of those interviews took about 60 to 120 minutes and included the preschooler, at least one parent, and often siblings and another caregiver.

Three kinds of information were collected after each interview. From any older siblings and the

parents that were available, we gathered data about the buying decisions surrounding game systems in the household, the family's typical game play patterns, levels of parental moderation with regard to computer gaming, and the most favorite games played by family members. We could also understand the ideology of gaming in these homes because of these in-home interviews: what types of spaces were used for game play, how the systems were installed, where the handheld play occurred in the house (as well as on-the-go play), and the number and type of games and game systems owned. The most important is, we gathered the game-playing information for every single kid.

Before carrying out the interviews, the research team had closely discussed with the in-house game producers to create a list of game mechanics and problems tied to preschoolers' motor and cognitive capabilities that were critical for them to understand prior to writing the games. These ranged from general dexterity issues related to game controllers to the effectiveness of in-game instructions to specific mechanics in current games that the producers were interested in implementing for future preschool titles. During the interviews, the moderator gave specific guidance to the preschooler through a series of games, so that he or she could observe the interaction and probe both the preschooler and his or her parents on feelings, attitudes, and frustrations that arose in the different circumstances.

If the subject in the experiment had previous exposure to the DS system, he or she was first asked to play his or her favorite game on that machine. This gave the researchers information about current level of gaming skill related to the complexity of the chosen one, allowing them to see the child playing a game with mechanics he or she was already familiar with. Across the 26 preschoolers, the *Nintendo DS* selections scope were very broad, including *New Super Mario Bros*, *Sonic Rush*, *Nintendogs*, and *Tony Hawk's Proving Ground*. The interviewer observed the child play, noting preferences for game mechanics and motor interactions with the device as well as the complexity level each game mechanic was for the tested subject. The researchers asked all of the preschoolers to play with a specific game in consultation with our producers, *The Little Mermaid: Ariel's Undersea Adventure*. The game was chosen for two major reasons. First, it was one of the few games on the market with characters that appeal to this young age group. Second, it incorporated a large variety of mechanics that highlighted the uniqueness of the DS platform, including using the microphone for blowing or singing.

The findings from this initial experiment were extensive. After reviewing the outcomes and discussing the implications for the game design with our internal game production team, we then outlined the designing needs and presented the findings to a firm specialising in game design. We worked closely with those experts to set the game design for the two preschool-targeted DS games under development on what we had gathered.

As the two DS games went into the development process, a formative research course of action was set up. Whenever we developed new game mechanics, we brought preschoolers into our in-house utility lab to test the mechanics and to evaluate both their simplicity, and whether they were engaging. We tested either alpha or beta versions of different elements of the game, in addition to looking at overarching game structure. Once a full version of the DS game was ready, we went back into the field test with a dozen preschoolers and their parents to make sure that each of the game elements worked for the children, and that the overall objective of the game was understandable and the process was enjoyable for players. We also collected parents' feedback on whether they thought the game is appropriate, engaging, and worth the purchase.

Questions 1-5

Complete the sentences below.

Choose ONE WORD ONLY from the passage for each answer.

Write your answers in boxes 1-5 on your answer sheet.

Exploratory Research Project

Main Objectives:

Determine the relevant 1 _____ in the context

Observe how preschoolers manage playing

Investigate attitudes of 2 _____ towards games

Subjects:

26 children from different US 3 _____

Age range: 3 years and 3 months to 5 years and 11 months

Some children have older 4 _____

Equal number of new and 5 _____ players

Some households have *Nintendo DS* and some don't

Length of Interview:

1-2 hours

Questions 6-9

Do the following statements agree with the information given in Reading Passage 1?

In boxes 6-9 on your answer sheet, write

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

- 6 One area of research is how far mothers and fathers controlled children's playing after school.
- 7 The researchers are allowed a free access to the subjects' houses.
- 8 The researchers regarded *The Little Mermaid: Ariel's Undersea Adventure* as likely appeal to preschoolers.
- 9 *The Little Mermaid: Ariel's Undersea Adventure* is operated entirely by hand controls.

Questions 10-13

Complete the flow-chart below.

Choose NO MORE THAN TWO WORDS from the passage for each answer.

Write your answers in boxes 10-13 on your answer sheet.

Using the Results of the Study

Presentation of design requirements to a specialist 10 _____



Testing the mechanics of two new games in the *Nintendo* lab
(assess 11 _____ and interest)



A 12 _____ of the games trialed by twelve children



Collection of 13 _____ from parents

You should spend about 20 minutes on Questions 14-26, which are based on *Reading Passage 2 below.*

The History of Pencil

The beginning of the story of pencils started with a lightning. Graphite, the main material for producing pencil, was discovered in 1564 in Borrowdale in England when a lightning struck a local tree during a thunder. Local people found out that the black substance spotted at the root of the unlucky tree was different from burning ash of wood. It was soft, thus left marks everywhere. Chemistry was barely out of its infancy at the time, so people mistook it for lead, equally black but much heavier. It was soon put to use by locals in marking their sheep for ownership and calculation.

Britain turns out to be the major country where mines of graphite can be detected and developed. Even so, the first pencil was invented elsewhere. As graphite is soft, it requires some form of encasement. In Italy, graphite sticks were initially wrapped in string or sheepskin for stability, becoming perhaps the very first pencil in the world. Then around 1560, an Italian couple made what are likely the first blueprints for the modern, wood-encased carpentry pencil. Their version was a flat, oval, more compact type of pencil. Their concept involved the hollowing out of a stick of juniper wood. Shortly thereafter in 1662, a superior technique was discovered by German people: two wooden halves were carved, a graphite stick inserted, and the halves then glued together – essentially the same method in use to this day. The news of the usefulness of these early pencils spread far and wide, attracting the attention of artists all over the known world.

Although graphite core in pencils is still referred to as lead, modern pencils do not contain lead as the “lead” of the pencil is actually a mix of finely ground graphite and clay powders. This mixture is important because the amount of clay content added to the graphite depends on the intended pencil hardness, and the amount of time spent on grinding the mixture determines the quality of the lead. The more clay you put in, the higher hardness the core has. Many pencils across the world, and almost all in Europe, are graded on the European system. This system of naming used B for black and H for hard; a pencil’s grade was described by a

sequence or successive Hs or Bs such as BB and BBB for successively softer leads, and HHH and HHHH for successively harder ones. Then the standard writing pencil is graded HB. **i-educator**

In England, pencils continue to be made from whole sawn graphite. But with the mass production of pencils, they are getting drastically more popular in many countries with each passing decade. As demands rise, appetite for graphite soars. According to the United States Geological Survey (USGS), world production of natural graphite in 2012 was 1,100,000 tonnes, of which the following major exporters are: China, India, Brazil, North Korea and Canada. However, much in contrast with its intellectual application in producing pencils, graphite was also widely used in the military. During the reign of Elizabeth I, Borrowdale graphite was used as a refractory material to line moulds for cannonballs, resulting in rounder, smoother balls that could be fired farther, contributing to the strength of the English navy. This particular deposit of graphite was extremely pure and soft, and could easily be broken into sticks. Because of its military importance, this unique mine and its production were strictly controlled by the Crown.

That the United States did not use pencils in the outer space till they spent \$1000 to make a pencil to use in zero gravity conditions is in fact a fiction. It is widely known that astronauts in Russia used grease pencils, which don't have breakage problems. But it is also a fact that their counterparts in the United States used pencils in the outer space before real zero gravity pencil was invented. They preferred mechanical pencils, which produced fine lines, much clearer than the smudgy lines left by the grease pencils that Russians favoured. But the lead tips of these mechanical pencils broke often. That bit of graphite floating around the space capsule could get into someone's eye, or even find its way into machinery or electronics, causing an electrical short or other problems. But despite the fact that the Americans did invent zero gravity pencils later, they stuck to mechanical pencils for many years.

Against the backdrop of a digitalized world, the prospect of pencils seems bleak. In reality, it does not. The application of pencils has by now become so widespread that they can be seen everywhere, such as classrooms, meeting rooms and art rooms, etc. A spectrum of users are likely to continue to use it into the future: students to do math works, artists to draw on sketch pads, waiters or waitresses to mark on order boards, make-up professionals to apply to faces, and architects to produce blue prints. The possibilities seem limitless.

Questions 14-20

Complete the sentences below.

Choose **ONE WORD ONLY** from the passage for each answer.

Write your answers in boxes 14-20 on your answer sheet.

Graphite was found under a 14 _____ in Borrowdale, it was dirty to use because it was 15 _____.

Ancient people used graphite to sign 16 _____.

People found graphite 17 _____ in Britain.

The first pencil was graphite wrapped in 18 _____ or animal skin.

Since graphite was too smooth, 19 _____ was added to make it harder.

Russian astronauts preferred 20 _____ pencils to write in the outer space.

Questions 21-26

Do the following statements agree with the information given in Reading Passage 2?

In boxes 21-26 on your answer sheet, write

TRUE	<i>if the statement agrees with the information</i>
FALSE	<i>if the statement contradicts the information</i>
NOT GIVEN	<i>if there is no information on this</i>

- 21 Italy is probably the first country of the whole world to make pencils.
- 22 Germany used various kinds of wood to make pencils.
- 23 Graphite makes a pencil harder and sharper.
- 24 In Britain, pencils are not produced any more.
- 25 American astronauts did not use pencil in outer space.
- 26 Pencils are unlikely to be used in the future.

You should spend about 20 minutes on Questions 27-40, which are based on Reading Passage 3 below.

Motivating Drives

Scientists have been researching the way to get employees motivated for many years. This research is a relational study which builds the fundamental and comprehensive model for study. This is especially true when the business goal is to turn unmotivated teams into productive ones. But their researches have limitations. It is like studying the movements of car without taking out the engine.

Motivation is what drives people to succeed and plays a vital role in enhancing an organisational development. It is important to study the motivation of employees because it is related to the emotion and behaviour of employees. Recent studies show there are four drives for motivation. They are the drive to acquire, the drive to bond, the drive to comprehend and the drive to defend.

The Drive to Acquire

The drive to acquire must be met to optimise the acquire aspect as well as the achievement element. Thus the way that outstanding performance is recognised, the type of perks that is provided to polish the career path. But sometimes a written letter of appreciation generates more motivation than a thousand dollar check, which can serve as the invisible power to boost business engagement. Successful organisations and leaders not only need to focus on the optimisation of physical reward but also on moving other levers within the organisation that can drive motivation.

The Drive to Bond

The drive to bond is also key to driving motivation. There are many kinds of bonds between people, like friendship, family. In company, employees also want to be an essential part of company. They want to belong to the company. Employees will be motivated if they find personal belonging to the company. In the meantime, the most commitment will be achieved by the employee on condition that the force of motivation within the employee affects the direction, intensity and persistence of decision and behaviour in company.

The Drive to Comprehend

The drive to comprehend motivates many employees to higher performance. For years, it has been known that setting stretch goals can greatly impact performance. Organisations need to ensure that the various job roles provide employees with simulation that challenges them or allow them to grow. Employees don't want to do meaningless things or monotonous job. If the job didn't provide them with personal meaning and fulfillment, they will leave the company.

The Drive to Defend

The drive to defend is often the hardest lever to pull. This drive manifests itself as a quest to create and promote justice, fairness, and the ability to express ourselves freely. The organisational lever for this basic human motivator is resource allocation. This drive is also met through an employee feeling connection to a company. If their companies are merged with another, they will show worries.

Two studies have been done to find the relations between the four drives and motivation. The article based on two studies was finally published in Harvard Business Review. Most authors' arguments have laid emphasis on four-drive theory and actual investigations. Using the results of the surveys which executed with employees from Fortune 500 companies and other two global businesses (P company and H company), the article mentions about how independent drives influence employees' behaviour and how organisational levers boost employee motivation.

The studies show that the drive to bond is most related to fulfilling commitment, while the drive to comprehend is most related to how much effort employees spend on works. The drive to acquire can be satisfied by a rewarding system which ties rewards to performance, and gives the best people opportunities for advancement. For drive to defend, a study on the merging of P company and H company shows that employees in former company show an unusual cooperating attitude.

The key to successfully motivate employees is to meet all drives. Each of these drives is important if we are to understand employee motivation. These four drives, while not necessarily the only human drives, are the ones that are central to the unified understanding of modern human life.

Choose the correct letter, A, B, C or D.

Write the correct letter in boxes 27-31 on your answer sheet.

27 According to the passage, what are we told about the study of motivation?

- A The theory of motivating employees is starting to catch attention in organisations in recent years.
- B It is very important for managers to know how to motivate their subordinates because it is related to the salary of employees.
- C Researchers have tended to be too theoretical to their study.
- D The goal of employee motivation is to increase the profit of organisations.

28 What can be inferred from the passage about the study of people's drives?

- A Satisfying employees' drives can positively lead to the change of behaviour.
- B Satisfying employees' drives will negatively affect their emotions.
- C Satisfying employees' drives can increase companies' productions.
- D Satisfying employees' drives will result in employees' outstanding performance.

29 According to paragraph three, in order to optimise employees' performance,
_____ are needed.

- A drive to acquire and achievement element
- B outstanding performance and recognition
- C career fulfillment and a thousand dollar check
- D financial incentive and recognition

- 30 According to paragraph five, how does “the drive to comprehend” help employees perform better?
- A It can help employees better understand the development of their organisations.
 - B It can help employees feel their task is meaningful to their companies.
 - C It can help employees set higher goals.
 - D It can provide employees with repetitive tasks.
- 31 According to paragraph six, which of the following is true about “drive to defend”?
- A Organisational resource is the most difficult to allocate.
 - B It is more difficult to implement than the drive to comprehend.
 - C Employees think it is very important to voice their own opinions.
 - D Employees think it is very important to connect with a merged corporation.

Choose **THREE** letters, **A-F**.

Write the correct letters in boxes 32-34 on your answer sheet.

Which **THREE** of the following statements are true of the study of drives?

- A** Employees will be motivated if they feel belonged to the company.
- B** If employees get an opportunity of training and development program, their motivation will be enhanced.
- C** If employees' working goals are complied with organisational objectives, their motivation will be reinforced.
- D** If employees' motivation is very low, companies should find a way to increase their salary as their first priority.
- E** If employees find their work lacking challenging, they will leave the company.
- F** Employees will worry if their company is sold.

Questions 35-40

Do the following statements agree with the claims of the writer in Reading Passage 3?

In boxes 35-40 on your answer sheet, write

- YES** if the statement agrees with the claims of the writer
NO if the statement contradicts the claims of the writer
NOT GIVEN if it is impossible to say what the writer thinks about this

- 35 Increasing pay can lead to the high work motivation.
- 36 Local companies benefit more from global companies through the study.
- 37 Employees achieve the most commitment if their drive to comprehend is met.
- 38 The employees in former company presented unusual attitude toward the merging of two companies.
- 39 The two studies are done to analyse the relationship between the natural drives and the attitude of employees.
- 40 Rewarding system cause the company to lose profit.

Answer Keys

Test 1

Each question correctly answered scores 1 mark. CORRECT SPELLING IS NEEDED IN ALL ANSWERS.

Reading Passage 1, Questions 1-13

- 1 FALSE
- 2 FALSE
- 3 NOT GIVEN
- 4 TRUE
- 5 TRUE
- 6 flower
- 7 prejudice
- 8 reverse
- 9 meat
- 10 crops
- 11 soil
- 12 cultivation
- 13 investment

- 21 dish/flat cone
- 22 struts
- 23 bronze
- 24 neck
- 25 sand
- 26 tomb complex

Reading Passage 3, Questions 27-40

- 27 E
- 28 D
- 29 C
- 30 B
- 31 G
- 32 F
- 33 F

- 34 E
- 35 D
- 36 A
- 37 chickens
- 38 adenovirus 36/AD-36
- 39 gene
- 40 vaccine

Reading Passage 2, Questions 14-26

- 14 TRUE
- 15 FALSE
- 16 TRUE
- 17 NOT GIVEN
- 18 elm
- 19 lubricating oil
- 20 18 to 32

If you score...

0-12	13-26	27-40
<p>you are highly unlikely to get an acceptable score under examination conditions and we recommend that you spend a lot of time improving your English before you take IELTS.</p>	<p>you may get an acceptable score under examination conditions but we recommend that you think about having more practice or lessons before you take IELTS.</p>	<p>you are likely to get an acceptable score under examination conditions but remember that different institutions will find different scores acceptable.</p>



Test 2

Each question correctly answered scores 1 mark. CORRECT SPELLING IS NEEDED IN ALL ANSWERS.

Reading Passage 1, Questions 1-13

- 1 NOT GIVEN
- 2 TRUE
- 3 FALSE
- 4 NOT GIVEN
- 5 FALSE
- 6 TRUE
- 7 TRUE
- 8 stonemason
- 9 Gian Giorgio Trissino
- 10 Inigo Jones
- 11 temple (architecture)
- 12 Quattro Libri dell'Architettura
- 13 benevolent calm

- 21 equal opportunity
- 22 internal costs
- 23 C
- 24 C
- 25 A
- 26 B

Reading Passage 3, Questions 27-40

- 27 C
- 28 A
- 29 B
- 30 D
- 31 I
- 32 D
- 33 J
- 34 F
- 35 C
- 36 YES
- 37 NOT GIVEN
- 38 NO
- 39 NOT GIVEN
- 40 YES

Reading Passage 2, Questions 14-26

- 14 v
- 15 viii
- 16 vi
- 17 vii
- 18 iii
- 19 i
- 20 ii

If you score...

0-12	13-26	27-40
<p>you are highly unlikely to get an acceptable score under examination conditions and we recommend that you spend a lot of time improving your English before you take IELTS.</p>	<p>you may get an acceptable score under examination conditions but we recommend that you think about having more practice or lessons before you take IELTS.</p>	<p>you are likely to get an acceptable score under examination conditions but remember that different institutions will find different scores acceptable.</p>

Each question correctly answered scores 1 mark. CORRECT SPELLING IS NEEDED IN ALL ANSWERS.

Reading Passage 1, Questions 1-13

- 1 YES
- 2 NOT GIVEN
- 3 NO
- 4 NOT GIVEN
- 5 YES
- 6 NO
- 7 NOT GIVEN
- 8 rock
- 9 teeth
- 10 descendants
- 11 canoes
- 12 (prevailing) trade winds
- 13 seabirds and turtles

- 21 C
- 22 D
- 23 scalp electrodes
- 24 inspiration and elaboration
- 25 alpha wave activity
- 26 difference

Reading Passage 3, Questions 27-40

- 27 G
- 28 A
- 29 C
- 30 B
- 31 H
- 32 D
- 33 C
- 34 A
- 35 B
- 36 fruit
- 37 plant toxins
- 38 birth
- 39 water
- 40 drought

Reading Passage 2, Questions 14-26

- 14 FALSE
- 15 NOT GIVEN
- 16 TRUE
- 17 TRUE
- 18 A
- 19 E
- 20 F

If you score...

0-12	13-26	27-40
<p>you are highly unlikely to get an acceptable score under examination conditions and we recommend that you spend a lot of time improving your English before you take IELTS.</p>	<p>you may get an acceptable score under examination conditions but we recommend that you think about having more practice or lessons before you take IELTS.</p>	<p>you are likely to get an acceptable score under examination conditions but remember that different institutions will find different scores acceptable.</p>

Test 4

Each question correctly answered scores 1 mark. CORRECT SPELLING IS NEEDED IN ALL ANSWERS.

Reading Passage 1, Questions 1-13

- 1 TRUE
- 2 FALSE
- 3 TRUE
- 4 NOT GIVEN
- 5 TRUE
- 6 FALSE
- 7 NOT GIVEN
- 8 shin bone
- 9 slow walker
- 10 cheetah
- 11 run fast
- 12 blunt
- 13 crush

- 21 D
- 22 C
- 23 H
- 24 F
- 25 A
- 26 C

Reading Passage 3, Questions 27-40

- 27 YES
- 28 NOT GIVEN
- 29 NO
- 30 YES
- 31 B
- 32 C
- 33 A
- 34 D
- 35 B
- 36 B
- 37 F
- 38 E
- 39 A
- 40 D

Reading Passage 2, Questions 14-26

- 14 A
- 15 B
- 16 B
- 17 A
- 18 A
- 19 C
- 20 E

If you score...

0-12	13-26	27-40
<p>you are highly unlikely to get an acceptable score under examination conditions and we recommend that you spend a lot of time improving your English before you take IELTS.</p>	<p>you may get an acceptable score under examination conditions but we recommend that you think about having more practice or lessons before you take IELTS.</p>	<p>you are likely to get an acceptable score under examination conditions but remember that different institutions will find different scores acceptable.</p>

Test 5

Each question correctly answered scores 1 mark. CORRECT SPELLING IS NEEDED IN ALL ANSWERS.

Reading Passage 1, Questions 1-13

- 1 C
- 2 A
- 3 D
- 4 A
- 5 B
- 6 A
- 7 B
- 8 E
- 9 G
- 10 NO
- 11 NOT GIVEN
- 12 NOT GIVEN
- 13 YES

Reading Passage 2, Questions 14-26

- 14 photographic film
- 15 Bakelite
- 16 switches
- 17 Britain/UK
- 18 fireproof
- 19 clear and glass-like
- 20 rigid

- 21 FALSE
- 22 NOT GIVEN
- 23 FALSE
- 24 TRUE
- 25 FALSE
- 26 TRUE

Reading Passage 3, Questions 27-40

- 27 D
- 28 B
- 29 A
- 30 C
- 31 A
- 32 A
- 33 high tides
- 34 agricultural production
- 35 coastal boundaries
- 36 NOT GIVEN
- 37 NOT GIVEN
- 38 NO
- 39 YES
- 40 NO

If you score...

0-12	13-26	27-40
<p>you are highly unlikely to get an acceptable score under examination conditions and we recommend that you spend a lot of time improving your English before you take IELTS.</p>	<p>you may get an acceptable score under examination conditions but we recommend that you think about having more practice or lessons before you take IELTS.</p>	<p>you are likely to get an acceptable score under examination conditions but remember that different institutions will find different scores acceptable.</p>

Each question correctly answered scores 1 mark. CORRECT SPELLING IS NEEDED IN ALL ANSWERS.

Reading Passage 1, Questions 1-13

- 1 abilities
- 2 parents
- 3 markets
- 4 siblings
- 5 experienced
- 6 NOT GIVEN
- 7 TRUE
- 8 TRUE
- 9 FALSE
- 10 firm
- 11 simplicity
- 12 full version
- 13 feedback

- 21 TRUE
- 22 NOT GIVEN
- 23 FALSE
- 24 FALSE
- 25 FALSE
- 26 FALSE

Reading Passage 3, Questions 27-40

- 27 C
- 28 A
- 29 D
- 30 B
- 31 C
- 32 A
- 33 E
- 34 F
- 35 NO
- 36 NOT GIVEN
- 37 NO
- 38 YES
- 39 NO
- 40 NOT GIVEN

Reading Passage 2, Questions 14-26

- 14 tree
- 15 soft
- 16 sheep
- 17 mines
- 18 string
- 19 clay
- 20 grease

If you score...

0-12	13-26	27-40
<p>you are highly unlikely to get an acceptable score under examination conditions and we recommend that you spend a lot of time improving your English before you take IELTS.</p>	<p>you may get an acceptable score under examination conditions but we recommend that you think about having more practice or lessons before you take IELTS.</p>	<p>you are likely to get an acceptable score under examination conditions but remember that different institutions will find different scores acceptable.</p>