

Practice Cambridge IELTS 17 Reading Test 01 with Answer

READING PASSAGE 1

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

The development of the London underground railway

In the first half of the 1800s, London's population grew at an astonishing rate, and the central area became increasingly congested. In addition, the expansion of the overground railway network resulted in more and more passengers arriving in the capital. However, in 1846, a Royal Commission decided that the railways should not be allowed to enter the City, the capital's historic and business centre. The result was that the overground railway stations formed a ring around the City. The area within consisted of poorly built, overcrowded slums and the streets were full of horse-drawn traffic. Crossing the City became a nightmare. It could take an hour and a half to travel 8 km by horse-drawn carriage or bus. Numerous schemes were proposed to resolve these problems, but few succeeded.

Amongst the most vocal advocates for a solution to London's traffic problems was Charles Pearson, who worked as a solicitor for the City of London. He saw both social and economic advantages in building an underground railway that would link the overground railway stations together and clear London slums at the same time. His idea was to relocate the poor workers who lived in the inner-city slums to newly constructed suburbs, and to provide cheap rail travel for them to get to work. Pearson's ideas gained support amongst some businessmen and in 1851 he submitted a plan to Parliament. It was rejected, but coincided with a proposal from another group for an underground connecting line, which Parliament passed.

The two groups merged and established the Metropolitan Railway Company in August 1854. The company's plan was to construct an underground railway line from the Great Western Railway's (GWR) station at Paddington to the edge of the City at Farringdon Street – a distance of almost 5 km. The organisation had difficulty in raising the funding for such a radical and expensive scheme, not least because of the critical articles printed by the press. Objectors argued that the tunnels would collapse under the weight of traffic overhead, buildings would be

shaken and passengers would be poisoned by the emissions from the train engines. However, Pearson and his partners persisted.

The GWR, aware that the new line would finally enable them to run trains into the heart of the City, invested almost £250,000 in the scheme. Eventually, over a five-year period, £1m was raised. The chosen route ran beneath existing main roads to minimise the expense of demolishing buildings. Originally scheduled to be completed in 21 months, the construction of the underground line took three years. It was built just below street level using a technique known as 'cut and cover'. A trench about ten metres wide and six metres deep was dug, and the sides temporarily held up with timber beams. Brick walls were then constructed, and finally a brick arch was added to create a tunnel. A two-metre-deep layer of soil was laid on top of the tunnel and the road above rebuilt.

The Metropolitan line, which opened on 10 January 1863, was the world's first underground railway. On its first day, almost 40,000 passengers were carried between Paddington and Farringdon, the journey taking about 18 minutes. By the end of the Metropolitan's first year of operation, 9.5 million journeys had been made.

Even as the Metropolitan began operation, the first extensions to the line were being authorised; these were built over the next five years, reaching Moorgate in the east to London and Hammersmith in the west. The original plan was to pull the trains with steam locomotives, using firebricks in the boilers to provide steam, but these engines were never introduced. Instead, the line used specially designed locomotives that were fitted with water tanks in which steam could be condensed. However, smoke and fumes remained a problem, even though ventilation shafts were added to the tunnels.

Despite the extension of the underground railway, by the 1880s, congestion on London's streets had become worse. The problem was partly that the existing underground lines formed a circuit around the centre of London and extended to the suburbs, but did not cross the capital's centre. The 'cut and cover' method of construction was not an option in this part of the capital. The only alternative was to tunnel deep underground.

Although the technology to create these tunnels existed, steam locomotives could not be used in such a confined space. It wasn't until the development of a reliable electric motor, and a means of transferring power from the generator to a moving train, that the world's first deep-level electric railway, the City & South

London, became possible. The line opened in 1890, and ran from the City to Stockwell, south of the River Thames. The trains were made up of three carriages and driven by electric engines. The carriages were narrow and had tiny windows just below the roof because it was thought that passengers would not want to look out at the tunnel walls. The line was not without its problems, mainly caused by an unreliable power supply. Although the City & South London Railway was a great technical achievement, it did not make a profit. Then, in 1900, the Central London Railway, known as the 'Tuppenny Tube', began operation using new electric locomotives. It was very popular and soon afterwards new railways and extensions were added to the growing tube network. By 1907, the heart of today's Underground system was in place.

Questions 1-6

Complete the notes below.

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

Write your answers in boxes **1-6** on your answer sheet.

The London underground railway

The problem

- The **1** of London increased rapidly between 1800 and 1850
- The streets were full of horse-drawn vehicles

The proposed solution

- Charles Pearson, a solicitor, suggested building an underground railway
- Building the railway would make it possible to move people to better housing in the **2**
- A number of **3** agreed with Pearson's idea
- The company initially had problems getting the **4** needed for the project
- Negative articles about the project appeared in the **5**

The construction

- The chosen route did not require many buildings to be pulled down
- The 'cut and cover' method was used to construct the tunnels
- With the completion of the brick arch, the tunnel was covered with **6**

Questions 7-13

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

In boxes **7-13** 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

7 Other countries had built underground railways before the Metropolitan line opened.

8 More people than predicted travelled on the Metropolitan line on the first day.

9 The use of ventilation shafts failed to prevent pollution in the tunnels.

10 A different approach from the 'cut and cover' technique was required in London's central area.

11 The windows on City & South London trains were at eye level.

12 The City & South London Railway was a financial success.

13 Trains on the 'Tuppenny Tube' nearly always ran on time.

READING PASSAGE 2

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

Stadiums: past, present and future

A

Stadiums are among the oldest forms of urban architecture: vast stadiums where the public could watch sporting events were at the centre of western city life as far back as the ancient Greek and Roman Empires, well before the construction of the great medieval cathedrals and the grand 19th- and 20th-century railway stations which dominated urban skylines in later eras.

Today, however, stadiums are regarded with growing scepticism. Construction costs can soar above £1 billion, and stadiums finished for major events such as the Olympic Games or the FIFA World Cup have notably fallen into disuse and disrepair.

But this need not be the cause. History shows that stadiums can drive urban development and adapt to the culture of every age. Even today, architects and planners are finding new ways to adapt the mono-functional sports arenas which became emblematic of modernisation during the 20th century.

B

The amphitheatre* of Arles in southwest France, with a capacity of 25,000 spectators, is perhaps the best example of just how versatile stadiums can be. Built by the Romans in 90 AD, it became a fortress with four towers after the fifth century, and was then transformed into a village containing more than 200 houses. With the growing interest in conservation during the 19th century, it was converted back into an arena for the staging of bullfights, thereby returning the structure to its original use as a venue for public spectacles.

Another example is the imposing arena of Verona in northern Italy, with space for 30,000 spectators, which was built 60 years before the Arles amphitheatre and 40 years before Rome's famous Colosseum. It has endured the centuries and is currently considered one of the world's prime sites for opera, thanks to its outstanding acoustics.

C

The area in the centre of the Italian town of Lucca, known as the Piazza dell' Anfiteatro, is yet another impressive example of an amphitheatre becoming absorbed into the fabric of the city. The site evolved in a similar way to Arles and was progressively filled with buildings from the Middle Ages until the 19th century, variously used as houses, a salt depot and a prison. But rather than reverting to an arena, it became a market square, designed by Romanticist architect Lorenzo Nottolini. Today, the ruins of the amphitheatre remain embedded in the various shops and residences surrounding the public square.

D

There are many similarities between modern stadiums and the ancient amphitheatres intended for games. But some of the flexibility was lost at the beginning of the 20th century, as stadiums were developed using new products such as steel and reinforced concrete, and made use of bright lights for night-time matches.

Many such stadiums are situated in suburban areas, designed for sporting use only and surrounded by parking lots. These factors mean that they may not be as accessible to the general public, require more energy to run and contribute to urban heat.

E

But many of today's most innovative architects see scope for the stadium to help improve the city. Among the current strategies, two seem to be having particular success: the stadium as an urban hub, and as a power plant.

There's a growing trend for stadiums to be equipped with public spaces and services that serve a function beyond sport, such as hotels, retail outlets, conference centres, restaurants and bars, children's playgrounds and green space. Creating mixed-use developments such as this reinforces compactness and multi-functionality, making more efficient use of land and helping to regenerate urban spaces.

This opens the space up to families and a wider cross-section of society, instead of catering only to sportspeople and supporters. There have been many examples of this in the UK: the mixed-use facilities at Wembley and Old Trafford have become a blueprint for many other stadiums in the world.

F

The phenomenon of stadium as power stations has arisen from the idea that energy problems can be overcome by integrating interconnected buildings by means of a smart grid, which is an electricity supply network that uses digital communications technology to detect and react to local changes in usage, without significant energy losses. Stadiums are ideal for these purposes, because their canopies have a large surface area for fitting photovoltaic panels and rise high enough (more than 40 metres) to make use of micro wind turbines.

Freiburg Mage Solar Stadium in Germany is the first of a new wave of stadiums as power plants, which also includes the Amsterdam Arena and the Kaohsiung Stadium. The latter, inaugurated in 2009, has 8,844 photovoltaic panels producing up to 1.14 GWh of electricity annually. This reduces the annual output of carbon dioxide by 660 tons and supplies up to 80 percent of the surrounding area when the stadium is not in use. This is proof that a stadium can serve its city, and have a decidedly positive impact in terms of reduction of CO2 emissions.

G

Sporting arenas have always been central to the life and culture of cities. In every era, the stadium has acquired new value and uses: from military fortress to residential village, public space to theatre and most recently a field for experimentation in advanced engineering. The stadium of today now brings together multiple functions, thus helping cities to create a sustainable future.

* amphitheatre: (especially in Greek and Roman architecture) an open circular or oval building with a central space surrounded by tiers of seats for spectators, for the presentation of dramatic or sporting events

Questions 14-17

Reading Passage 2 has seven paragraphs, **A-G**.

Which section contains the following information?

*Write the correct letter, **A-G**, in boxes 14-17 on your answer sheet.*

NB You may use any letter more than once.

- 14** a mention of negative attitudes towards stadium building projects
- 15** figures demonstrating the environmental benefits of a certain stadium
- 16** examples of the wide range of facilities available at some new stadiums
- 17** reference to the disadvantages of the stadiums built during a certain era

Questions 18-22

Complete the summary below.

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

Write your answers in boxes 18-22 on your answer sheet.

Roman amphitheatres

The Roman stadium of Europe have proved very versatile. The amphitheatre of Arles, for example, was converted first into a **18**, then into a residential area and finally into an arena where spectators could watch **19** Meanwhile, the arena in Verona, one of the oldest Roman amphitheatres, is famous today as a venue where **20** is performed. The site of Lucca's amphitheatre has also been used for many purposes over the centuries, including the storage of **21** It is now a market square with **22** and homes incorporated into the remains of the Roman amphitheatre.

Questions 23-24

Choose **TWO** letters, **A-E**.

Write the correct letters in boxes 23 and 24 on your answer sheet.

When comparing twentieth-century stadiums to ancient amphitheatres in Section D, which **TWO** negative features does the writer mention?

- A** They are less imaginatively designed.
- B** They are less spacious.
- C** They are in less convenient locations.
- D** They are less versatile.
- E** They are made of less durable materials

Questions 25-26

Choose **TWO** letters, **A-E**.

Write the correct letters in boxes 25 and 26 on your answer sheet.

Which **TWO** advantages of modern stadium design does the writer mention?

- A** offering improved amenities for the enjoyment of sports events
- B** bringing community life back into the city environment
- C** facilitating research into solar and wind energy solutions
- D** enabling local residents to reduce their consumption of electricity
- E** providing a suitable site for the installation of renewable power generators

READING PASSAGE 3

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

To catch a king

Anna Keay reviews Charles Spencer's book about the hunt for King Charles II during the English Civil War of the seventeenth century

Charles Spencer's latest book, *To Catch a King*, tells us the story of the hunt for King Charles II in the six weeks after his resounding defeat at the Battle of Worcester in September 1651. And what a story it is. After his father was executed by the Parliamentarians in 1649, the young Charles II sacrificed one of the very principles his father had died for and did a deal with Scots, thereby accepting Presbyterianism* as the national religion in return for being crowned King of Scots. His arrival in Edinburgh prompted the English Parliamentary army to invade Scotland in a pre-emptive strike. This was followed by a Scottish invasion of England. The two sides finally faced one another at Worcester in the west of England in 1651. After being comprehensively defeated on the meadows outside the city by the Parliamentary army, the 21-year-old king found himself the subject of a national manhunt, with a huge sum offered for his capture, through a series of heart-pounding close escapes, to evade the Parliamentarians before seeking refuge in France. For the next nine years, the penniless and defeated Charles wandered around Europe with only a small group of loyal supporters. Years later, after his restoration as king, the 50-year-old Charles II requested a meeting with the writer and diarist Samuel Pepys. His intention when asking Pepys to commit his story to paper was to ensure that this most extraordinary episode was never forgotten. Over two three-hour sittings, the king related to him

in great detail his personal recollections of the six weeks he had spent as a fugitive. As the king and secretary settled down (a scene that is surely a gift for a future scriptwriter), Charles commenced his story: 'After the battle was so absolutely lost as to be beyond hope of recovery, I began to think of the best way of saving myself.'

One of the joys of Spencer's book, a result not least of its use of Charles II's own narrative as well as those of his supporters, is just how close the reader gets to the action. The day-by-day retelling of the fugitives' doings provides delicious details: the cutting of the king's long hair with agricultural shears, the use of walnut leaves to dye his pale skin, and the day Charles spent lying on a branch of the great oak tree in Boscobel Wood as the Parliamentary soldiers scoured the forest floor below. Spencer draws out both the humour – such as the preposterous refusal of Charles's friend Henry Wilmot to adopt disguise on the grounds that it was beneath his dignity – and the emotional tension when the secret of the king's presence was cautiously revealed to his supporters.

Charles's adventures after losing the Battle of Worcester hide the uncomfortable truth that whilst almost everyone in England had been appalled by the execution of his father, they had not welcomed the arrival of his son with the Scots army, but had instead firmly bolted their doors. This was partly because he rode at the head of what looked like a foreign invasion force and partly because, after almost a decade of civil war, people were desperate to avoid it beginning again. This makes it all the more interesting that Charles II himself loved the story so much ever after. As well as retelling it to anyone who would listen, causing eye-rolling among courtiers, he set in train a series of initiatives to memorialise it. There was to be a new order of chivalry, the Knights of the Royal Oak. A series of enormous oil paintings depicting the episode were produced, including a two-metre-wide canvas of Boscobel Wood and a set of six similarly enormous paintings of the king on the run. In 1660, Charles II commissioned the artist John Michael Wright to paint a flying squadron of cherubs* carrying an oak tree to the heavens on the ceiling of his bedchamber. It is hard to imagine many other kings marking the lowest point in their life so enthusiastically, or indeed pulling off such an escape in the first place.

Charles Spencer is the perfect person to pass the story on to a new generation. His pacey, readable prose steers deftly clear of modern idioms and elegantly brings to life the details of the great tale. He has even-handed sympathy for both

the fugitive king and the fierce republican regime that hunted him, and he succeeds in his desire to explore far more of the background of the story than previous books on the subject have done. Indeed, the opening third of the book is about how Charles II found himself at Worcester in the first place, which for some will be reason alone to read *To Catch a King*.

The tantalizing question left, in the end, is that of what it all meant. Would Charles II have been a different king had these six weeks never happened? The days and nights spent in hiding must have affected him in some way. Did the need to assume disguises, to survive on wit and charm alone, to use trickery and subterfuge to escape from tight corners help form him? This is the one area where the book doesn't quite hit the mark. Instead its depiction of Charles II in his final years as an ineffective, pleasure-loving monarch doesn't do justice to the man (neither is it accurate), or to the complexity of his character. But this one niggle aside, *To Catch a King* is an excellent read, and those who come to it knowing little of the famous tale will find they have a treat in store.

* Presbyterianism: part of the reformed Protestant religion

* cherub: an image of angelic children used in paintings

Questions 27-31

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

Write the correct letter, **A-J**, in boxes 27-31 on your answer sheet.

The story behind the hunt for Charles II

Charles II's father was executed by the Parliamentary forces in 1649. Charles II then formed a **27** with the Scots, and in order to become King of Scots, he abandoned an important **28** that was held by his father and had contributed to his father's death. The opposing sides then met outside Worcester in 1651. The battle led to a **29** for the Parliamentarians and Charles had to flee for his life. A **30** was offered for Charles's capture, but after six weeks spent in hiding, he eventually managed to reach the **31** of continental Europe.

- | | |
|--------------------------------|--------------------------|
| A military innovation | B large reward |
| C widespread conspiracy | D relative safety |

- | | |
|---------------------------|-------------------------------|
| E new government | F decisive victory |
| G political debate | H strategic alliance |
| I popular solution | J religious conviction |

Questions 32-35

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

In boxes **32-35** 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

- 32** Charles chose Pepys for the task because he considered him to be trustworthy.
33 Charles's personal recollection of the escape lacked sufficient detail.
34 Charles indicated to Pepys that he had planned his escape before the battle.
35 The inclusion of Charles's account is a positive aspect of the book.

Questions 36-40

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

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

- 36** What is the reviewer's main purpose in the first paragraph?
A to describe what happened during the Battle of Worcester
B to give an account of the circumstances leading to Charles II's escape
C to provide details of the Parliamentarians' political views
D to compare Charles II's beliefs with those of his father
- 37** Why does the reviewer include examples of the fugitives' behaviour in the third paragraph?
A to explain how close Charles II came to losing his life
B to suggest that Charles II's supporters were badly prepared
C to illustrate how the events of the six weeks are brought to life
D to argue that certain aspects are not as well known as they should be
- 38** What point does the reviewer make about Charles II in the fourth paragraph?
A He chose to celebrate what was essentially a defeat.
B He misunderstood the motives of his opponents.
C He aimed to restore people's faith in the monarchy.
D He was driven by a desire to be popular.

- 39** What does the reviewer say about Charles Spencer in the fifth paragraph?
- A** His decision to write the book comes as a surprise.
 - B** He takes an unbiased approach to the subject matter.
 - C** His descriptions of events would be better if they included more detail.
 - D** He chooses language that is suitable for a twenty-first-century audience.
- 40** When the reviewer says the book 'doesn't quite hit the mark', she is making the point that
- A** it overlooks the impact of events on ordinary people.
 - B** it lacks an analysis of prevalent views on monarchy.
 - C** it omits any references to the deceit practised by Charles II during his time in hiding.
 - D** it fails to address whether Charles II's experiences had a lasting influence on him.

Practice Cambridge IELTS 17 Reading Test 02 with Answer

READING PASSAGE 1

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

The Dead Sea Scrolls

In late 1946 or early 1947, three Bedouin teenagers were tending their goats and sheep near the ancient settlement of Qumran, located on the northwest shore of the Dead Sea in what is now known as the West Bank. One of these young shepherds tossed a rock into an opening on the side of a cliff and was surprised to hear a shattering sound. He and his companions later entered the cave and stumbled across a collection of large clay jars, seven of which contained scrolls with writing on them. The teenagers took the seven scrolls to a nearby town where they were sold for a small sum to a local antiquities dealer. Word of the find spread, and Bedouins and archaeologists eventually unearthed tens of thousands of additional scroll fragments from 10 nearby caves; together they make up between 800 and 900 manuscripts. It soon became clear that this was one of the greatest archaeological discoveries ever made.

The origin of the Dead Sea Scrolls, which were written around 2,000 years ago between 150 BCE and 70 CE, is still the subject of scholarly debate even today. According to the prevailing theory, they are the work of a population that inhabited the area until Roman troops destroyed the settlement around 70 CE. The area was known as Judea at that time, and the people are thought to have belonged to a group called the Essenes, a devout Jewish sect.

The majority of the texts on the Dead Sea Scrolls are in Hebrew, with some fragments written in an ancient version of its alphabet thought to have fallen out of use in the fifth century BCE. But there are other languages as well. Some scrolls are in Aramaic, the language spoken by many inhabitants of the region from the sixth century BCE to the siege of Jerusalem in 70 CE. In addition, several texts feature translations of the Hebrew Bible into Greek.

The Dead Sea Scrolls include fragments from every book of the Old Testament of the Bible except for the Book of Esther. The only entire book of the Hebrew Bible preserved among the manuscripts from Qumran is Isaiah; this copy, dated to the

first century BCE, is considered the earliest biblical manuscript still in existence. Along with biblical texts, the scrolls include documents about sectarian regulations and religious writings that do not appear in the Old Testament.

The writing on the Dead Sea Scrolls is mostly in black or occasionally red ink, and the scrolls themselves are nearly all made of neither parchment (animal skin) or an early form of paper called 'papyrus'. The only exception is the scroll numbered 3Q15, which was created out of a combination of copper and tin. Known as the Copper Scroll, this curious document features letters chiselled onto metal – perhaps, as some have theorized, to better withstand the passage of time. One of the most intriguing manuscripts from Qumran, this is a sort of ancient treasure map that lists dozens of gold and silver caches. Using an unconventional vocabulary and odd spelling, it describes 64 underground hiding places that supposedly contain riches buried for safekeeping. None of these hoards have been recovered, possibly because the Romans pillaged Judea during the first century CE. According to various hypotheses, the treasure belonged to local people, or was rescued from the Second Temple before its destruction or never existed to begin with.

Some of the Dead Sea Scrolls have been on interesting journeys. In 1948, a Syrian Orthodox archbishop known as Mar Samuel acquired four of the original seven scrolls from a Jerusalem shoemaker and part-time antiquity dealer, paying less than \$100 for them. He then travelled to the United States and unsuccessfully offered them to a number of universities, including Yale. Finally, in 1954, he placed an advertisement in the business newspaper *The Wall Street Journal* – under the category 'Miscellaneous Items for Sale' – that read: 'Biblical Manuscripts dating back to at least 200 B.C. are for sale. This would be an ideal gift to an educational or religious institution by an individual or group.' Fortunately, Israeli archaeologist and statesman Yigael Yadin negotiated their purchase and brought the scrolls back to Jerusalem, where they remain to this day.

In 2017, researchers from the University of Haifa restored and deciphered one of the last untranslated scrolls. The university's Eshbal Ratson and Jonathan Ben-Dov spent one year reassembling the 60 fragments that make up the scroll. Deciphered from a band of coded text on parchment, the find provides insight into the community of people who wrote it and the 364-day calendar they would have used. The scroll names celebrations that indicate shifts in seasons and

details two yearly religious events known from another Dead Sea Scroll. Only one more known scroll remains untranslated.

Questions 1-5

Complete the notes below.

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

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

The Dead Sea Scrolls

Discovery

Qumran, 1946/7

- three Bedouin shepherds in their teens were near an opening on side of cliff
- heard a noise of breaking when one teenager threw a **1**
- teenagers went into the **2** and found a number of containers made of **3**

The scrolls

- date from between 150 BCE and 70 CE
- thought to have been written by group of people known as the **4**
- written mainly in the **5** language
- most are on religious topics, written using ink on parchment or papyrus

Questions 6-13

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

*In boxes **6-13** 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*

- The Bedouin teenagers who found the scrolls were disappointed by how little money they received for them.
- There is agreement among academics about the origin of the Dead Sea Scrolls.
- Most of the books of the Bible written on the scrolls are incomplete.
- The information on the Copper Scroll is written in an unusual way.
- Mar Samuel was given some of the scrolls as a gift.
- In the early 1950s, a number of educational establishments in the US were keen to buy scrolls from Mar Samuel.

12 The scroll that was pieced together in 2017 contains information about annual occasions in the Qumran area 2,000 years ago.

13 Academics at the University of Haifa are currently researching how to decipher the final scroll.

READING PASSAGE 2

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

A second attempt at domesticating the tomato

A

It took at least 3,000 years for humans to learn how to domesticate the wild tomato and cultivate it for food. Now two separate teams in Brazil and China have done it all over again in less than three years. And they have done it better in some ways, as the re-domesticated tomatoes are more nutritious than the ones we eat at present.

This approach relies on the revolutionary CRISPR genome editing technique, in which changes are deliberately made to the DNA of a living cell, allowing genetic material to be added, removed or altered. The technique could not only improve existing crops, but could also be used to turn thousands of wild plants into useful and appealing foods. In fact, a third team in the US has already begun to do this with a relative of the tomato called the groundcherry.

This fast-track domestication could help make the world's food supply healthier and far more resistant to diseases, such as the rust fungus devastating wheat crops.

'This could transform what we eat,' says Jorg Kudla at the University of Munster in Germany, a member of the Brazilian team. 'There are 50,000 edible plants in the world, but 90 percent of our energy comes from just 15 crops.'

'We can now mimic the known domestication course of major crops like rice, maize, sorghum or others,' says Caixia Gao of the Chinese Academy of Sciences in Beijing. 'Then we might try to domesticate plants that have never been domesticated.'

B

Wild tomatoes, which are native to the Andes region in South America, produce pea-sized fruits. Over many generations, peoples such as the Aztecs and Incas

transformed the plant by selecting and breeding plants with mutations* in their genetic structure, which resulted in desirable traits such as larger fruit.

But every time a single plant with a mutation is taken from a larger population for breeding, much genetic diversity is lost. And sometimes the desirable mutations come with less desirable traits. For instance, the tomato strains grown for supermarkets have lost much of their flavour.

By comparing the genomes of modern plants to those of their wild relatives, biologists have been working out what genetic changes occurred as plants were domesticated. The teams in Brazil and China have now used this knowledge to reintroduce these changes from scratch while maintaining or even enhancing the desirable traits of wild strains.

C

Kudla's team made six changes altogether. For instance, they tripled the size of fruit by editing a gene called FRUIT WEIGHT, and increased the number of tomatoes per truss by editing another called MULTIFLORA.

While the historical domestication of tomatoes reduced levels of the red pigment lycopene – thought to have potential health benefits – the team in Brazil managed to boost it instead. The wild tomato has twice as much lycopene as cultivated ones; the newly domesticated one has five times as much.

'They are quite tasty,' says Kudla. 'A little bit strong. And very aromatic.'

The team in China re-domesticated several strains of wild tomatoes with desirable traits lost in domesticated tomatoes. In this way they managed to create a strain resistant to a common disease called bacterial spot race, which can devastate yields. They also created another strain that is more salt tolerant – and has higher levels of vitamin C.

D

Meanwhile, Joyce Van Eck at the Boyce Thompson Institute in New York state decided to use the same approach to domesticate the groundcherry or goldenberry (*Physalis pruinosa*) for the first time. This fruit looks similar to the closely related Cape gooseberry (*Physalis peruviana*).

Groundcherries are already sold to a limited extent in the US but they are hard to produce because the plant has a sprawling growth habit and the small fruits fall off the branches when ripe. Van Eck's team has edited the plants to increase fruit size, make their growth more compact and to stop fruits dropping. 'There's potential for this to be a commercial crop,' says Van Eck. But she adds that taking

the work further would be expensive because of the need to pay for a licence for the CRISPR technology and get regulatory approval.

E

This approach could boost the use of many obscure plants, says Jonathan Jones of the Sainsbury Lab in the UK. But it will be hard for new foods to grow so popular with farmers and consumers that they become new staple crops, he thinks.

The three teams already have their eye on other plants that could be 'catapulted into the mainstream', including foxtail, oat-grass and cowpea. By choosing wild plants that are drought or heat tolerant, says Gao, we could create crops that will thrive even as the planet warms.

But Kudla didn't want to reveal which species were in his team's sights, because CRISPR has made the process so easy. 'Any one with the right skills could go to their lab and do this.'

* mutations: changes in an organism's genetic structure that can be passed down to later generations

Questions 14-18

Reading Passage 2 has five paragraphs, **A-E**.

Which section contains the following information?

Write the correct letter, **A-E**, in boxes 14-18 on your answer sheet.

NB You may use any letter more than once.

14 a reference to a type of tomato that can resist a dangerous infection.

15 an explanation of how problems can arise from focusing only on a certain type of tomato plant.

16 a number of examples of plants that are not cultivated at present but could be useful as food sources.

17 a comparison between the early domestication of the tomato and more recent research

18 a personal reaction to the flavour of a tomato that has been genetically edited

Questions 19-23

Look at the following statements (Questions 19-23) and the list of researchers below.

Match each statement with the correct researcher, **A-D**.

Write the correct letter, **A-D**, in boxes 19-23 on your answer sheet.

NB You may use any letter more than once.

- 19** Domestication of certain plants could allow them to adapt to future environmental challenges.
- 20** The idea of growing and eating unusual plants may not be accepted on a large scale.
- 21** It is not advisable for the future direction of certain research to be made public.
- 22** Present efforts to domesticate one wild fruit are limited by the costs involved.
- 23** Humans only make use of a small proportion of the plant food available on Earth.

List of Researchers

- A** Jorg Kudla
- B** Caixia Gao
- C** Joyce Van Eck
- D** Jonathan Jones

Questions 24-26

Complete the sentences below.

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

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

- 24** An undesirable trait such as loss of may be caused by a mutation in a tomato gene.
- 25** By modifying one gene in a tomato plant, researchers made the tomato three times its original
- 26** A type of tomato which was not badly affected by, and was rich in vitamin C, was produced by a team of researchers in China.

READING PASSAGE 3

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

Insight or evolution?

Two scientists consider the origins of discoveries and other innovative behavior

Scientific discovery is popularly believed to result from the sheer genius of such intellectual stars as naturalist Charles Darwin and theoretical physicist Albert

Einstein. Our view of such unique contributions to science often disregards the person's prior experience and the efforts of their lesser-known predecessors. Conventional wisdom also places great weight on insight in promoting breakthrough scientific achievements, as if ideas spontaneously pop into someone's head – fully formed and functional.

There may be some limited truth to this view. However, we believe that it largely misrepresents the real nature of scientific discovery, as well as that of creativity and innovation in many other realms of human endeavor.

Setting aside such greats as Darwin and Einstein – whose monumental contributions are duly celebrated – we suggest that innovation is more a process of trial and error, where two steps forward may sometimes come with one step back, as well as one or more stops to the right or left. This evolutionary view of human innovation undermines the notion of creative genius and recognizes the cumulative nature of scientific progress.

Consider one unheralded scientist: John Nicholson, a mathematical physicist working in the 1910s who postulated the existence of 'proto-elements' in outer space. By combining different numbers of weights of these proto-elements' atoms, Nicholson could recover the weights of all the elements in the then-known periodic table. These successes are all the more noteworthy given the fact that Nicholson was wrong about the presence of proto-elements: they do not actually exist. Yet, amid his often fanciful theories and wild speculations, Nicholson also proposed a novel theory about the structure of atoms. Niels Bohr, the Nobel prize-winning father of modern atomic theory, jumped off from this interesting idea to conceive his now-famous model of the atom.

What are we to make of this story? One might simply conclude that science is a collective and cumulative enterprise. That may be true, but there may be a deeper insight to be gleaned. We propose that science is constantly evolving, much as species of animals do. In biological systems, organisms may display new characteristics that result from random genetic mutations. In the same way, random, arbitrary or accidental mutations of ideas may help pave the way for advances in science. If mutations prove beneficial, then the animal or the scientific theory will continue to thrive and perhaps reproduce.

Support for this evolutionary view of behavioral innovation comes from many domains. Consider one example of an influential innovation in US horseracing. The so-called 'acey-deucey' stirrup placement, in which the rider's foot in his left

stirrup is placed as much as 25 centimeters lower than the right, is believed to confer important speed advantages when turning on oval tracks. It was developed by a relatively unknown jockey named Jackie Westrope. Had Westrope conducted methodical investigations or examined extensive film records in a shrewd plan to outrun his rivals? Had he foreseen the speed advantage that would be conferred by riding acey-deucey? No. He suffered a leg injury, which left him unable to fully bend his left knee. His modification just happened to coincide with enhanced left-hand turning performance. This led to the rapid and widespread adoption of riding acey-deucey by many riders, a racing style which continues in today's thoroughbred racing.

Plenty of other stories show that fresh advances can arise from error, misadventure, and also pure serendipity – a happy accident. For example, in the early 1970s, two employees of the company 3M each had a problem: Spencer Silver had a product – a glue which was only slightly sticky – and no use for it, while his colleague Art Fry was trying to figure out how to affix temporary bookmarks in his hymn book without damaging its pages. The solution to both these problems was invention of the brilliantly simple yet phenomenally successful Post-It note. Such examples give lie to the claim that ingenious, designing minds are responsible for human creativity and invention. Far more banal and mechanical forces may be at work; forces that are fundamentally connected to the laws of science.

The notions of insight, creativity and genius are often invoked, but they remain vague and of doubtful scientific utility, especially when one considers the diverse and enduring contributions of individuals such as Plato, Leonardo da Vinci, Shakespeare, Beethoven, Galileo, Newton, Kepler, Curie, Pasteur and Edison. These notions merely label rather than explain the evolution of human innovations. We need another approach, and there is a promising candidate.

The Law of Effect was advanced by psychologist Edward Thorndike in 1898, some 40 years after Charles Darwin published his groundbreaking work on biological evolution, *On the Origin of Species*. This simple law holds that organisms tend to repeat successful behaviors and to refrain from performing unsuccessful ones. Just like Darwin's Law of Natural Selection, the Law of Effect involves an entirely mechanical process of variation and selection, without any end objective in sight. Of course, the origin of human innovation demands much further study. In particular, the provenance of the raw material on which the Law of Effect

operates is not as clearly known as that of the genetic mutations on which the Law of Natural Selection operates. The generation of novel ideas and behaviors may not be entirely random, but constrained by prior successes and failures – of the current individual (such as Bohr) or of predecessors (such as Nicholson). The time seems right for abandoning the naïve notion of intelligent design and genius, and for scientifically exploring the true origins of creative behavior.

Questions 27-31

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

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

27 The purpose of the first paragraph is to

- A** defend particular ideas.
- B** compare certain beliefs.
- C** disprove a widely held view.
- D** outline a common assumption.

28 What are the writers doing in the second paragraph?

- A** criticising an opinion
- B** justifying a standpoint
- C** explaining an approach
- D** supporting an argument

29 In the third paragraph, what do the writers suggest about Darwin and Einstein?

- A** They represent an exception to a general rule.
- B** Their way of working has been misunderstood.
- C** They are an ideal which others should aspire to.
- D** Their achievements deserve greater recognition.

30 John Nicholson is an example of a person whose idea

- A** established his reputation as an influential scientist.
- B** was only fully understood at a later point in history.
- C** laid the foundations for someone else's breakthrough.
- D** initially met with scepticism from the scientific community.

31 What is the key point of interest about the 'acey-deucy' stirrup placement?

- A** the simple reason why it was invented
- B** the enthusiasm with which it was adopted
- C** the research that went into its development
- D** the cleverness of the person who first used it

Questions 32-36

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

In boxes **32-36** 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

32 Acknowledging people such as Plato or da Vinci as geniuses will help us understand the process by which great minds create new ideas.

33 The Law of Effect was discovered at a time when psychologists were seeking a scientific reason why creativity occurs.

34 The Law of Effect states that no planning is involved in the behaviour of organisms.

35 The Law of Effect sets out clear explanations about the sources of new ideas and behaviours.

36 Many scientists are now turning away from the notion of intelligent design and genius.

Questions 37-40

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

Write the correct letter, **A-G**, in boxes 37-40 on your answer sheet.

The origins of creative behaviour

The traditional view of scientific discovery is that breakthroughs happen when a single great mind has sudden **37** Although this can occur, it is not often the case. Advances are more likely to be the result of a longer process. In some cases, this process involves **38**, such as Nicholson's theory about proto-elements. In others, simple necessity may provoke innovation, as with Westrope's decision to modify the position of his riding stirrups. There is also often an element of **39**, for example, the coincidence of ideas that led to the invention of the Post-It note. With both the Law of Natural Selection and the Law of Effect, there may be no clear **40** involved, but merely a process of variation and selection.

A invention **B** goals **C** compromise

D mistakes **E** luck **F** inspiration

G experiments



Practice Cambridge IELTS 17 Reading Test 03 with Answer

READING PASSAGE 1

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

The thylacine

The extinct thylacine, also known as the Tasmanian tiger, was a marsupial* that bore a superficial resemblance to a dog. Its most distinguishing feature was the 13-19 dark brown stripes over its back, beginning at the rear of the body and extending onto the tail. The thylacine's average nose-to-tail length for adult males was 162.6 cm, compared to 153.7 cm for females.

The thylacine appeared to occupy most types of terrain except dense rainforest, with open eucalyptus forest thought to be its prime habitat. In terms of feeding, it was exclusively carnivorous, and its stomach was muscular with an ability to distend so that it could eat large amounts of food at one time, probably an adaptation to compensate for long periods when hunting was unsuccessful and food scarce. The thylacine was not a fast runner and probably caught its prey by exhausting it during a long pursuit. During long-distance chases, thylacines were likely to have relied more on scent than any other sense. They emerged to hunt during the evening, night and early morning and tended to retreat to the hills and forest for shelter during the day. Despite the common name 'tiger', the thylacine had a shy, nervous temperament. Although mainly nocturnal, it was sighted moving during the day and some individuals were even recorded basking in the sun.

The thylacine had an extended breeding season from winter to spring, with indications that some breeding took place throughout the year. The thylacine, like all marsupials, was tiny and hairless when born. Newborns crawled into the pouch on the belly of their mother, and attached themselves to one of the four teats, remaining there for up to three months. When old enough to leave the pouch, the young stayed in a lair such as a deep rocky cave, well-hidden nest or hollow log, whilst the mother hunted.

Approximately 4,000 years ago, the thylacine was widespread throughout New Guinea and most of mainland Australia, as well as the island of Tasmania. The most recent, well-dated occurrence of a thylacine on the mainland is a carbon-

dated fossil from Murray Cave in Western Australia, which is around 3,100 years old. Its extinction coincided closely with the arrival of wild dogs called dingoes in Australia and a similar predator in New Guinea. Dingoes never reached Tasmania, and most scientists see this as the main reason for the thylacine's survival there. The dramatic decline of the thylacine in Tasmania, which began in the 1830s and continued for a century, is generally attributed to the relentless efforts of sheep farmers and bounty hunters** with shotguns. While this determined campaign undoubtedly played a large part, it is likely that various other factors also contributed to the decline and eventual extinction of the species. These include competition with wild dogs introduced by European settlers, loss of habitat along with the disappearance of prey species, and a distemper-like disease which may also have affected the thylacine.

There was only one successful attempt to breed a thylacine in captivity, at Melbourne Zoo in 1899. This was despite the large numbers that went through some zoos, particularly London Zoo and Tasmania's Hobart Zoo. The famous naturalist John Gould foresaw the thylacine's demise when he published his *Mammals of Australia* between 1848 and 1863, writing, 'The numbers of this singular animal will speedily diminish, extermination will have its full sway, and it will then, like the wolf of England and Scotland, be recorded as an animal of the past.'

However, there seems to have been little public pressure to preserve the thylacine, nor was much concern expressed by scientists at the decline of this species in the decades that followed. A notable exception was T.T. Flynn, Professor of Biology at the University of Tasmania. In 1914, he was sufficiently concerned about the scarcity of the thylacine to suggest that some should be captured and placed on a small island. But it was not until 1929, with the species on the very edge of extinction, that Tasmania's Animals and Birds Protection Board passed a motion protecting thylacines only for the month of December, which was thought to be their prime breeding season. The last known wild thylacine to be killed was shot by a farmer in the north-east of Tasmania in 1930, leaving just captive specimens. Official protection of the species by the Tasmanian government was introduced in July 1936, 59 days before the last known individual died in Hobart Zoo on 7th September, 1936.

There have been numerous expeditions and searches for the thylacine over the years, none of which has produced definitive evidence that thylacines still exist. The species was declared extinct by the Tasmanian government in 1986.

-
- * marsupial: a mammal, such as a kangaroo, whose young are born incompletely developed and are typically carried and suckled in a pouch on the mother's belly
- **bounty hunters: people who are paid a reward for killing a wild animal

Questions 1-5

Complete the notes below.

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

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

The thylacine

Appearance and behaviour

- looked rather like a dog
- had a series of stripes along its body and tail
- ate an entirely **1** diet
- probably depended mainly on **2** when hunting
- young spent first months of life inside its mother's **3**

Decline and extinction

- last evidence in mainland Australia is a 3,100-year-old **4**
- probably went extinct in mainland Australia due to animals known as dingoes
- reduction in **5** and available sources of food were partly responsible for decline in Tasmania

Questions 6-13

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

6 Significant numbers of thylacines were killed by humans from the 1830s onwards.

7 Several thylacines were born in zoos during the late 1800s.

8 John Gould's prediction about the thylacine surprised some biologists.

- 9 In the early 1900s, many scientists became worried about the possible extinction of the thylacine.
- 10 T.T. Flynn's proposal to rehome captive thylacines on an island proved to be impractical.
- 11 There were still reasonable numbers of thylacines in existence when a piece of legislation protecting the species during their breeding season was passed.
- 12 From 1930 to 1936, the only known living thylacines were all in captivity.
- 13 Attempts to find living thylacines are now rarely made.

READING PASSAGE 2

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

Palm oil

A

Palm oil is an edible oil derived from the fruit of the African oil palm tree, and is currently the most consumed vegetable oil in the world. It's almost certainly in the soap we wash with in the morning, the sandwich we have for lunch, and the biscuits we snack on during the day. Why is palm oil so attractive for manufacturers? Primarily because its unique properties – such as remaining solid at room temperature – make it an ideal ingredient for long-term preservation, allowing many packaged foods on supermarket shelves to have 'best before' dates of months, even years, into the future.

B

Many farmers have seized the opportunity to maximise the planting of oil palm trees. Between 1990 and 2012, the global land area devoted to growing oil palm trees grew from 6 to 17 million hectares, now accounting for around ten percent of total cropland in the entire world. From a mere two million tonnes of palm oil being produced annually globally 50 years ago, there are now around 60 million tonnes produced every single year, a figure looking likely to double or even triple by the middle of the century.

C

However, there are multiple reasons why conservationists cite the rapid spread of oil palm plantations as a major concern. There are countless news stories of

deforestation, habitat destruction and dwindling species populations, all as a direct result of land clearing to establish oil palm tree monoculture on an industrial scale, particularly in Malaysia and Indonesia. Endangered species – most famously the Sumatran orangutan, but also rhinos, elephants, tigers, and numerous other fauna – have suffered from the unstoppable spread of oil palm plantations.

D

‘Palm oil is surely one of the greatest threats to global biodiversity,’ declares Dr Farnon Ellwood of the University of the West of England, Bristol. ‘Palm oil is replacing rainforest, and rainforest is where all the species are. That’s a problem.’ This has led to some radical questions among environmentalists, such as whether consumers should try to boycott palm oil entirely.

Meanwhile Bhavani Shankar, Professor at London’s School of Oriental and African Studies, argues, ‘It’s easy to say that palm oil is the enemy and we should be against it. It makes for a more dramatic story, and it’s very intuitive. But given the complexity of the argument, I think a much more nuanced story is closer to the truth.’

E

One response to the boycott movement has been the argument for the vital role palm oil plays in lifting many millions of people in the developing world out of poverty. Is it desirable to have palm oil boycotted, replaced, eliminated from the global supply chain, given how many low-income people in developing countries depend on it for their livelihoods? How best to strike a utilitarian balance between these competing factors has become a serious bone of contention.

F

Even the deforestation argument isn’t as straightforward as it seems. Oil palm plantations produce at least four and potentially up to ten times more oil per hectare than soybean, rapeseed, sunflower or other competing oils. That immensely high yield – which is predominantly what makes it so profitable – is potentially also an ecological benefit. If ten times more palm oil can be produced from a patch of land than any competing oil, then ten times more land would need to be cleared in order to produce the same volume of oil from that competitor.

As for the question of carbon emissions, the issue really depends on what oil palm trees are replacing. Crops vary in the degree to which they sequester carbon – in

other words, the amount of carbon they capture from the atmosphere and store within the plant. The more carbon a plant sequesters, the more it reduces the effect of climate change. As Shankar explains: '[Palm oil production] actually sequesters more carbon in some ways than other alternatives. [...] Of course, if you're cutting down virgin forest it's terrible – that's what's happening in Indonesia and Malaysia, it's been allowed to get out of hand. But if it's replacing rice, for example, it might actually sequester more carbon.'

G

The industry is now regulated by a group called the Roundtable on Sustainable Palm Oil (RSPO), consisting of palm growers, retailers, product manufacturers, and other interested parties. Over the past decade or so, an agreement has gradually been reached regarding standards that producers of palm oil have to meet in order for their product to be regarded as officially 'sustainable'. The RSPO insists upon no virgin forest clearing, transparency and regular assessment of carbon stocks, among other criteria. Only once these requirements are fully satisfied is the oil allowed to be sold as certified sustainable palm oil (CSPO). Recent figures show that the RSPO now certifies around 12 million tonnes of palm oil annually, equivalent to roughly 21 percent of the world's total palm oil production.

H

There is even hope that oil palm plantations might not need to be such sterile monocultures, or 'green deserts', as Ellwood describes them. New research at Ellwood's lab hint at one plant which might make all the difference. The bird's nest fern (*Asplenium nidus*) grows on trees in an epiphytic fashion (meaning it's dependent on the tree only for support, not for nutrients), and is native to many tropical regions, where as a keystone species it performs a vital ecological role. Ellwood believes that reintroducing the bird's nest fern into oil palm plantations could potentially allow these areas to recover their biodiversity, providing a home for all manner of species, from fungi and bacteria, to invertebrates such as insects, amphibians, reptiles and even mammals.

Questions 14-20

Reading Passage 2 has eight paragraphs, **A-H**.

Which section contains the following information?

*Write the correct letter, **A-H**, in boxes 14-20 on your answer sheet.*

- 14** examples of a range of potential environmental advantages of oil palm tree cultivation
- 15** description of an organisation which controls the environmental impact of palm oil production
- 16** examples of the widespread global use of palm oil
- 17** reference to a particular species which could benefit the ecosystem of oil palm plantations
- 18** figures illustrating the rapid expansion of the palm oil industry
- 19** an economic justification for not opposing the palm oil industry
- 20** examples of creatures badly affected by the establishment of oil palm plantations

Questions 21 and 22

Choose **TWO** letters, **A-E**.

Write the correct letters in boxes 21 and 22 on your answer sheet.

Which **TWO** statements are made about the Roundtable on Sustainable Palm Oil (RSPO)?

- A** Its membership has grown steadily over the course of the last decade.
- B** It demands that certified producers be open and honest about their practices.
- C** It took several years to establish its set of criteria for sustainable palm oil certification.
- D** Its regulations regarding sustainability are stricter than those governing other industries.
- E** It was formed at the request of environmentalists concerned about the loss of virgin forests.

Questions 23-26

Complete the sentences below.

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

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

- 23** One advantage of palm oil for manufacturers is that it stays even when not refrigerated.
- 24** The is the best known of the animals suffering habitat loss as a result of the spread of oil palm plantations.
- 25** As one of its criteria for the certification of sustainable palm oil, the RSPO insists that growers check on a routine basis.

26 Ellwood and his researchers are looking into whether the bird's nest fern could restore in areas where oil palm trees are grown.

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READING PASSAGE 3

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

Building the Skyline: The Birth and Growth of Manhattan's Skyscrapers

Katharine L. Shester reviews a book by Jason Barr about the development of New York City

In *Building the Skyline*, Jason Barr takes the reader through a detailed history of New York City. The book combines geology, history, economics, and a lot of data to explain why business clusters developed where they did and how the early decisions of workers and firms shaped the skyline we see today. *Building the Skyline* is organized into two distinct parts. The first is primarily historical and addresses New York's settlement and growth from 1609 to 1900; the second deals primarily with the 20th century and is a compilation of chapters commenting on different aspects of New York's urban development. The tone and organization of the book changes somewhat between the first and second parts, as the latter chapters incorporate aspects of Barr's related research papers. Barr begins chapter one by taking the reader on a 'helicopter time-machine' ride – giving a fascinating account of how the New York landscape in 1609 might have looked from the sky. He then moves on to a subterranean walking tour of the city, indicating the location of rock and water below the subsoil, before taking the reader back to the surface. His love of the city comes through as he describes various fun facts about the location of the New York residence of early 19th-century vice-president Aaron Burr as well as a number of legends about the city. Chapters two and three take the reader up to the Civil War (1861-1865), with chapter two focusing on the early development of land and the implementation of a grid system in 1811. Chapter three focuses on land use before the Civil War. Both chapters are informative and well researched and set the stage for the economic analysis that comes later in the book. I would have liked Barr to expand upon his claim that existing tenements* prevented skyscrapers in certain neighborhoods because 'likely no skyscraper developer was interested in performing the necessary "slum clearance"'. Later in the book, Barr makes the

claim that the depth of bedrock** was not a limiting factor for developers, as foundation costs were a small fraction of the cost of development. At first glance, it is not obvious why slum clearance would be limiting, while more expensive foundations would not.

Chapter four focuses on immigration and the location of neighborhoods and tenements in the late 19th century. Barr identifies four primary immigrant enclaves and analyses their locations in terms of the amenities available in the area. Most of these enclaves were located on the least valuable land, between the industries located on the waterfront and the wealthy neighborhoods bordering Central Park.

Part two of the book begins with a discussion of the economics of skyscraper height. In chapter five, Barr distinguishes between engineering height, economic height, and developer height – where engineering height is the tallest building that can be safely made at a given time, economic height is the height that is most efficient from society's point of view, and developer height is the actual height chosen by the developer, who is attempting to maximize return on investment. Chapter five also has an interesting discussion of the technological advances that led to the construction of skyscrapers. For example, the introduction of iron and steel skeletal frames made thick, load-bearing walls unnecessary, expanding the usable square footage of buildings and increasing the use of windows and availability of natural light. Chapter six then presents data on building height throughout the 20th century and uses regression analysis to 'predict' building construction. While less technical than the research paper on which the chapter is based, it is probably more technical than would be preferred by a general audience.

Chapter seven tackles the 'bedrock myth', the assumption that the absence of bedrock close to the surface between Downtown and Midtown New York is the reason for skyscrapers not being built between the two urban centers. Rather, Barr argues that while deeper bedrock does increase foundation costs, these costs were neither prohibitively high nor were they large compared to the overall cost of building a skyscraper. What I enjoyed the most about this chapter was Barr's discussion of how foundations are actually built. He describes the use of caissons, which enable workers to dig down for considerable distances, often below the water table, until they reach bedrock. Barr's thorough technological history discusses not only how caissons work, but also the dangers involved.

While this chapter references empirical research papers, it is a relatively easy read.

Chapters eight and nine focus on the birth of Midtown and the building boom of the 1920s. Chapter eight contains lengthy discussions of urban economic theory that may serve as a distraction to readers primarily interested in New York. However, they would be well-suited for undergraduates learning about the economics of cities. In the next chapter, Barr considers two of the primary explanations for the building boom of the 1920s – the first being exuberance, and the second being financing. He uses data to assess the viability of these two explanations and finds that supply and demand factors explain much of the development of the 1920s; though it enabled the boom, cheap credit was not, he argues, the primary cause.

In the final chapter (chapter 10), Barr discusses another of his empirical papers that estimates Manhattan land values from the mid-19th century to the present day. The data work that went into these estimations is particularly impressive. Toward the end of the chapter, Barr assesses 'whether skyscrapers are a cause or an effect of high land values'. He finds that changes in land values predict future building height, but the reverse is not true. The book ends with an epilogue, in which Barr discusses the impact of climate change on the city and makes policy suggestions for New York going forward.

* a tenement: a multi-occupancy building of any sort, but particularly a run-down apartment building or slum building

** bedrock: the solid, hard rock in the ground that lies under a loose layer of soil

Questions 27-31

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

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

27 What point does Shester make about Barr's book in the first paragraph?

- A** It gives a highly original explanation for urban development.
- B** Elements of Barr's research papers are incorporated throughout the book.
- C** Other books that are available on the subject have taken a different approach.
- D** It covers a range of factors that affected the development of New York.

28 How does Shester respond to the information in the book about tenements?

- A** She describes the reasons for Barr's interest.
- B** She indicates a potential problem with Barr's analysis.

- C** She compares Barr's conclusion with that of other writers.
D She provides details about the sources Barr used for his research.
- 29** What does Shester say about chapter six of the book?
A It contains conflicting data.
B It focuses too much on possible trends.
C It is too specialised for most readers.
D It draws on research that is out of date.
- 30** What does Shester suggest about the chapters focusing on the 1920s building boom?
A The information should have been organised differently.
B More facts are needed about the way construction was financed.
C The explanation that is given for the building boom is unlikely.
D Some parts will have limited appeal to certain people.
- 31** What impresses Shester the most about the chapter on land values?
A the broad time period that is covered
B the interesting questions that Barr asks
C the nature of the research into the topic
D the recommendations Barr makes for the future

Questions 32-35

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

In boxes **32-35** 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

- 32** The description in the first chapter of how New York probably looked from the air in the early 1600s lacks interest.
- 33** Chapters two and three prepare the reader well for material yet to come.
- 34** The biggest problem for many nineteenth-century New York immigrant neighbourhoods was a lack of amenities.
- 35** In the nineteenth century, New York's immigrant neighbourhoods tended to concentrate around the harbour.

Questions 36-40

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

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

The bedrock myth

In chapter seven, Barr indicates how the lack of bedrock close to the surface does not explain why skyscrapers are absent from **36** He points out that although the cost of foundations increases when bedrock is deep below the surface, this cannot be regarded as **37**, especially when compared to **38**

A particularly enjoyable part of the chapter was Barr's account of how foundations are built. He describes not only how **39** are made possible by the use of caissons, but he also discusses their **40** The chapter is well researched but relatively easy to understand.

- | | |
|----------------------------|----------------------------------|
| A development plans | B deep excavations |
| C great distance | D excessive expense |
| E impossible tasks | F associated risks |
| G water level | H specific areas |
| I total expenditure | J construction guidelines |

Practice Cambridge IELTS 17 Reading Test 04 with Answer

READING PASSAGE 1

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

Bats to the rescue

How Madagascar's bats are helping to save the rainforest

There are few places in the world where relations between agriculture and conservation are more strained. Madagascar's forests are being converted to agricultural land at a rate of one percent every year. Much of this destruction is fuelled by the cultivation of the country's main staple crop: rice. And a key reason for this destruction is that insect pests are destroying vast quantities of what is grown by local subsistence farmers, leading them to clear forest to create new paddy fields. The result is devastating habitat and biodiversity loss on the island, but not all species are suffering. In fact, some of the island's insectivorous bats are currently thriving and this has important implications for farmers and conservationists alike.

Enter University of Cambridge zoologist Ricardo Rocha. He's passionate about conservation, and bats. More specifically, he's interested in how bats are responding to human activity and deforestation in particular. Rocha's new study shows that several species of bats are giving Madagascar's rice farmers a vital pest control service by feasting on plagues of insects. And this, he believes, can ease the financial pressure on farmers to turn forest into fields.

Bats comprise roughly one-fifth of all mammal species in Madagascar and thirty-six recorded bat species are native to the island, making it one of the most important regions for conservation of this animal group anywhere in the world. Co-leading an international team of scientists, Rocha found that several species of indigenous bats are taking advantage of habitat modification to hunt insects swarming above the country's rice fields. They include the Malagasy mouse-eared bat, Major's long-fingered bat, the Malagasy white-bellied free-tailed bat and Peters' wrinkle-lipped bat.

'These winner species are providing a valuable free service to Madagascar as biological pest suppressors,' says Rocha. 'We found that six species of bat are preying on rice pests, including the paddy swarming caterpillar and grass

webworm. The damage which these insects cause puts the island's farmers under huge financial pressure and that encourages deforestation.'

The study, now published in the journal *Agriculture, Ecosystems and Environment*, set out to investigate the feeding activity of insectivorous bats in the farmland bordering the Ranomafana National Park in the southeast of the country.

Rocha and his team used state-of-the-art ultrasonic recorders to record over a thousand bat 'feeling buzzes' (echolocation sequences used by bats to target their prey) at 54 sites, in order to identify the favourite feeding spots of the bats. The next used DNA barcoding techniques to analyse droppings collected from bats at the different sites.

The recordings revealed that bat activity over rice fields was much higher than it was in continuous forest – seven times higher over rice fields which were on flat ground, and sixteen times higher over fields on the sides of hills – leaving no doubt that the animals are preferentially foraging in these man-made ecosystems. The researchers suggest that the bats favour these fields because lack of water and nutrient run-off make these crops more susceptible to insect pest infestations. DNA analysis showed that all six species of bat had fed on economically important insect pests. While the findings indicated that rice farming benefits most from the bats, the scientists also found indications that the bats were consuming pests of other crops, including the black twig borer (which infests coffee plants), the sugarcane cicada, the macadamia nut-borer, and the sober tabby (a pest of citrus fruits).

'The effectiveness of bats as pest controllers has already been proven in the USA and Catalonia,' said co-author James Kemp, from the University of Lisbon. 'But our study is the first to show this happening in Madagascar, where the stakes for both farmers and conservationists are so high.'

Local people may have a further reason to be grateful to their bats. While the animal is often associated with spreading disease, Rocha and his team found evidence that Malagasy bats feed not just on crop pests but also on mosquitoes – carriers of malaria, Rift Valley fever virus and elephantiasis – as well as blackflies, which spread river blindness.

Rocha points out that the relationship is complicated. When food is scarce, bats become a crucial source of protein for local people. Even the children will hunt them. And as well as roosting in trees, the bats sometimes roost in buildings, but are not welcomed there because they make them unclean. At the same time,

however, they are associated with sacred caves and the ancestors, so they can be viewed as beings between worlds, which makes them very significant in the culture of the people. And one potential problem is that while these bats are benefiting from farming, at the same time deforestation is reducing the places where they can roost, which could have long-term effects on their numbers. Rocha says, 'With the right help, we hope that farmers can promote this mutually beneficial relationship by installing bat houses.'

Rocha and his colleagues believe that maximising bat populations can help to boost crop yields and promote sustainable livelihoods. The team is now calling for further research to quantify this contribution. 'I'm very optimistic,' says Rocha. 'If we give nature a hand, we can speed up the process of regeneration.'

Questions 1-6

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

In boxes **1-6** 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** Many Madagascan forests are being destroyed by attacks from insects.
- 2** Loss of habitat has badly affected insectivorous bats in Madagascar.
- 3** Ricardo Rocha has carried out studies of bats in different parts of the world.
- 4** Habitat modification has resulted in indigenous bats in Madagascar becoming useful to farmers.
- 5** The Malagasy mouse-eared bat is more common than other indigenous bat species in Madagascar.
- 6** Bats may feed on paddy swarming caterpillars and grass webworms.

Questions 7-13

Complete the table below.

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

Write your answers in boxes **7-13** on your answer sheet.

The study carried out by Rocha's team

Aim

- to investigate the feeding habits of bats in farmland near the Ranomafana National Park

Method	- ultrasonic recording to identify favourite feeding spots - DNA analysis of bat 7 - prevent the spread of disease by eating 9 and blackflies ...
Findings	- the bats - were most active in rice fields located on hills - ate pests of rice, 8, sugarcane, nuts and fruit - local attitudes to bats are mixed: - they provide food rich in 10 - the buildings where they roost become 11 - they play an important role in local 12
Recommendation	farmers should provide special 13 to support the bat population

READING PASSAGE 2

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

Does education fuel economic growth?

A

Over the last decade, a huge database about the lives of southwest German villagers between 1600 and 1900 has been compiled by a team led by Professor Sheilagh Ogilvie at Cambridge University's Faculty of Economics. It includes court records, guild ledgers, parish registers, village censuses, tax lists and – the most recent addition – 9,000 handwritten inventories listing over a million personal

possessions belonging to ordinary women and men across three centuries. Ogilvie, who discovered the inventories in the archives of two German communities 30 years ago, believes they may hold the answer to a conundrum that has long puzzled economists: the lack of evidence for a causal link between education and a country's economic growth.

B

As Ogilvie explains, 'Education helps us to work more productively, invent better technology, and earn more ... surely it must be critical for economic growth? But, if you look back through history, there's no evidence that having a high literacy rate made a country industrialise earlier.' Between 1600 and 1900, England had only mediocre literacy rates by European standards, yet its economy grew fast and it was the first country to industrialise. During this period, Germany and Scandinavia had excellent literacy rates, but their economies grew slowly and they industrialised late. 'Modern cross-country analyses have also struggled to find evidence that education causes economic growth, even though there is plenty of evidence that growth increases education,' she adds.

C

In the handwritten inventories that Ogilvie is analysing are the belongings of women and men at marriage, remarriage and death. From badger skins to Bibles, sewing machines to scarlet bodices – the villagers' entire worldly goods are included. Inventories of agricultural equipment and craft tools reveal economic activities; ownership of books and education-related objects like pens and slates suggests how people learned. In addition, the tax lists included in the database record the value of farms, workshops, assets and debts; signatures and people's estimates of their age indicate literacy and numeracy levels; and court records reveal obstacles (such as the activities of the guilds*) that stifled industry.

Previous studies usually had just one way of linking education with economic growth – the presence of schools and printing presses, perhaps, or school enrolment, or the ability to sign names. According to Ogilvie, the database provides multiple indicators for the same individuals, making it possible to analyse links between literacy, numeracy, wealth, and industriousness, for individual women and men over the long term.

D

Ogilvie and her team have been building the vast database of material possessions on top of their full demographic reconstruction of the people who

lived in these two German communities. 'We can follow the same people – and their descendants – across 300 years of educational and economic change,' she says. Individual lives have unfolded before their eyes. Stories like that of the 24-year-olds Ana Regina and Magdalena Riethmüllerin, who were chastised in 1707 for reading books in church instead of listening to the sermon. 'This tells us they were continuing to develop their reading skills at least a decade after leaving school,' explains Ogilvie. The database also reveals the case of Juliana Schweickherdt, a 50-year-old spinster living in the small Black Forest community of Wildberg, who was reprimanded in 1752 by the local weavers' guild for 'weaving cloth and combing wool, counter to the guide ordinance'. When Juliana continued taking jobs reserved for male guild members, she was summoned before the guild court and told to pay a fine equivalent to one third of a servant's annual wage. It was a small act of defiance by today's standards, but it reflects a time when laws in Germany and elsewhere regulated people's access to labour markets. The dominance of guilds not only prevented people from using their skills, but also held back even the simplest industrial innovation.

E

The data-gathering phase of the project has been completed and now, according to Ogilvie, it is time 'to ask the big questions'. One way to look at whether education causes economic growth is to 'hold wealth constant'. This involves following the lives of different people with the same level of wealth over a period of time. If wealth is constant, it is possible to discover whether education was, for example, linked to the cultivation of new crops, or to the adoption of industrial innovations like sewing machines. The team will also ask what aspect of education helped people engage more with productive and innovative activities. Was it, for instance, literacy, numeracy, book ownership, years of schooling? Was there a threshold level – a tipping point – that needed to be reached to affect economic performance?

F

Ogilvie hopes to start finding answers to these questions over the next few years. One thing is already clear, she says: the relationship between education and economic growth is far from straightforward. 'German-speaking central Europe is an excellent laboratory for testing theories of economic growth,' she explains. Between 1600 and 1900, literacy rates and book ownership were high and yet the region remained poor. It was also the case that local guilds and merchant

associations were extremely powerful and legislated against anything that undermined their monopolies. In villages throughout the region, guilds blocked labour migration and resisted changes that might reduce their influence.

'Early findings suggest that the potential benefits of education for the economy can be held back by other barriers, and this has implications for today,' says Ogilvie. 'Huge amounts are spent improving education in developing countries, but this spending can fail to deliver economic growth if restrictions block people – especially women and the poor – from using their education in economically productive ways. If economic institutions are poorly set up, for instance, education can't lead to growth.'

* guild: an association of artisans or merchants which oversees the practice of their craft or trade in a particular area

Questions 14-18

Reading Passage 2 has six paragraphs, **A-F**.

Which section contains the following information?

*Write the correct letter, **A-F**, in boxes 14-18 on your answer sheet.*

- 14** an explanation of the need for research to focus on individuals with a fairly consistent income
- 15** examples of the sources the database has been compiled from
- 16** an account of one individual's refusal to obey an order
- 17** a reference to a region being particularly suited to research into the link between education and economic growth
- 18** examples of the items included in a list of personal possessions

Questions 19-22

Complete the summary below.

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

Write your answers in boxes 19-22 on your answer sheet.

Demographic reconstruction of two German communities

The database that Ogilvie and her team has compiled sheds light on the lives of a range of individuals, as well as those of their **19**, over a 300-year period. For example, Ana Regina and Magdalena Riethmüllerin were reprimanded for reading while they should have been paying attention to a **20**

There was also Juliana Schweickherdt, who came to the notice of the weavers' guild in the year 1752 for breaking guild rules. As a punishment, she was later given a **21** Cases like this illustrate how the guilds could prevent **22** and stop skilled people from working

Questions 23 and 24

Choose **TWO** letters, **A-E**.

Write the correct letters in boxes 23 and 24 on your answer sheet.

Which **TWO** of the following statements does the writer make about literacy rates in Section B?

- A** Very little research has been done into the link between high literacy rates and improved earnings.
- B** Literacy rates in Germany between 1600 and 1900 were very good.
- C** There is strong evidence that high literacy rates in the modern world result in economic growth.
- D** England is a good example of how high literacy rates helped a country industrialise.
- E** Economic growth can help to improve literacy rates.

Questions 25 and 26

Choose **TWO** letters, **A-E**.

Write the correct letters in boxes 25 and 26 on your answer sheet.

Which **TWO** of the following statements does the writer make in Section F about guilds in German-speaking Central Europe between 1600 and 1900?

- A** They helped young people to learn a skill.
- B** They were opposed to people moving to an area for work.
- C** They kept better records than guilds in other parts of the world.
- D** They opposed practices that threatened their control over a trade.
- E** They predominantly consisted of wealthy merchants.

READING PASSAGE 3

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

Timur Gareyev – blindfold chess champion

A

Next month, a chess player named Timur Gareyev will take on nearly 50 opponents at once. But that is not the hard part. While his challengers will play the games as normal, Gareyev himself will be blindfolded. Even by world record standards, it sets a high bar for human performance. The 28-year-old already stands out in the rarefied world of blindfold chess. He has a fondness for bright clothes and unusual hairstyles, and he gets his kicks from the adventure sport of BASE jumping. He has already proved himself a strong chess player, too. In a 10-hour chess marathon in 2013, Gareyev played 33 games in his head simultaneously. He won 29 and lost none. The skill has become his brand: he calls himself the Blindfold King.

B

But Gareyev's prowess has drawn interest from beyond the chess-playing community. In the hope of understanding how he and others like him can perform such mental feats, researchers at the University of California in Los Angeles (UCLA) called him in for tests. They now have their first results. 'The ability to play a game of chess with your eyes closed is not a far reach for most accomplished player,' said Jesse Rissman, who runs a memory lab at UCLA. 'But the thing that's so remarkable about Timur and a few other individuals is the number of games they can keep active at once. To me it is simply astonishing.'

C

Gareyev learned to play chess in his native Uzbekistan when he was six years old. Tutored by his grandfather, he entered his first tournament aged eight and soon became obsessed with competitions. At 16, he was crowned Asia's youngest ever chess grandmaster. He moved to the US soon after, and as a student helped his university win its first national chess championship. In 2013, Gareyev was ranked the third best chess player in the US.

D

To the uninitiated, blindfold chess seems to call for superhuman skill. But displays of the feat go back centuries. The first recorded game in Europe was played in 13th-century Florence. In 1947, the Argentinian grandmaster Miguel Najdorf played 45 simultaneous games in his mind, winning 39 in the 24-hour session.

E

Accomplished players can develop the skill of playing blind even without realising it. The nature of the game is to run through possible moves in the mind to see how they play out. From this, regular players develop a memory for the patterns

the pieces make, the defences and attacks. 'You recreate it in your mind,' said Gareyev. 'A lot of players are capable of doing what I'm doing.' The real mental challenge comes from playing multiple games at once in the head. Not only must the positions of each piece on every board be memorised, they must be recalled faithfully when needed, updated with each player's moves, and then reliably stored again, so the brain can move on to the next board. First moves can be tough to remember because they are fairly uninteresting. But the ends of games are taxing too, as exhaustion sets in. When Gareyev is tired, his recall can get patchy. He sometimes makes moves based on only a fragmented memory of the pieces' positions.

F

The scientists first had Gareyev perform some standard memory tests. These assessed his ability to hold numbers, pictures and words in mind. One classic test measures how many numbers a person can repeat, both forwards and backwards, soon after hearing them. Most people manage about seven. 'He was not exceptional on any of these standard tests,' said Rissman. 'We didn't find anything other than playing chess that he seems to be supremely gifted at.' But next came the brain scans. With Gareyev lying down in the machine, Rissman looked at how well connected the various regions of the chess player's brain were. Though the results are tentative and as yet unpublished, the scans found much greater than average communication between parts of Gareyev's brain that make up what is called the frontoparietal control network. Of 63 people scanned alongside the chess player, only one or two scored more highly on the measure. 'You use this network in almost any complex task. It helps you to allocate attention, keep rules in mind, and work out whether you should be responding or not,' said Rissman.

G

It was not the only hint of something special in Gareyev's brain. The scans also suggest that Gareyev's visual network is more highly connected to other brain parts than usual. Initial results suggest that the areas of his brain that process visual images – such as chess boards – may have stronger links to other brain regions, and so be more powerful than normal. While the analyses are not finalised yet, they may hold the first clues to Gareyev's extraordinary ability.

H

For the world record attempt, Gareyev hopes to play 47 blindfold games at once in about 16 hours. He will need to win 80% to claim the title. 'I don't worry too much about the winning percentage, that's never been an issue for me,' he said. 'The most important part of blindfold chess for me is that I have found the one thing that I can fully dedicate myself to. I miss having an obsession.'

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.*

NB You may use any letter more than once.

- 27** a reference to earlier examples of blindfold chess
- 28** an outline of what blindfold chess involves
- 29** a claim that Gareyev's skill is limited to chess
- 30** why Gareyev's skill is of interest to scientists
- 31** an outline of Gareyev's priorities
- 32** a reason why the last part of a game may be difficult

Questions 33-36

Do the following statements agree with the information given in Reading Passage 3?

*In boxes **33-36** 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

- 33** In the forthcoming games, all the participants will be blindfolded.
- 34** Gareyev has won competitions in BASE jumping.
- 35** UCLA is the first university to carry out research into blindfold chess players.
- 36** Good chess players are likely to be able to play blindfold chess.

Questions 37-40

Complete the summary below

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

Write the correct letter in boxes 37-40 on your answer sheet.

How the research was carried out

The researchers started by testing Gareyev's **37**; for example, he was required to recall a string of **38** in order and also in reverse

order. Although his performance was normal, scans showed an unusual amount of **39** within the areas of Gareyev's brain that are concerned with directing attention. In addition, the scans raised the possibility of unusual strength in the parts of his brain that deal with **40** input.