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READING

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READING

READING PASSAGE 1

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

Stonehenge

For centuries, historians and archaeologists have puzzled over the many mysteries of Stonehenge, a prehistoric monument that took an estimated 1,500 years to erect. Located on Salisbury Plain in southern England, it is comprised of roughly 100 massive upright stones placed in a circular layout.

Archaeologists believe England's most iconic prehistoric ruin was built in several stages, with the earliest constructed 5,000 or more years ago. First, Neolithic* Britons used primitive tools, which may have been fashioned out of deer antlers, to dig a massive circular ditch and bank, or henge. Deep pits dating back to that era and located within the circle may have once held a ring of timber posts, according to some scholars.

Several hundred years later, it is thought, Stonehenge's builders hoisted an estimated 80 bluestones, 43 of which remain today, into standing positions and placed them in either a horseshoe or circular formation. These stones have been traced all the way to the Preseli Hills in Wales, some 300 kilometres from Stonehenge. How, then, did prehistoric builders without sophisticated tools or engineering haul these boulders, which weigh up to four tons, over such a great distance?

According to one long-standing theory among archaeologists, Stonehenge's builders fashioned sledges and rollers out of tree trunks to lug the bluestones from the Preseli Hills. They then transferred the boulders onto rafts and floated them first along the Welsh coast and then up the River Avon toward Salisbury Plain; alternatively, they may have towed each stone with a fleet of vessels. More recent archaeological hypotheses have them transporting the bluestones with supersized wicker baskets on a combination of ball bearings and long grooved planks, hauled by oxen.

As early as the 1970s, geologists have been adding their voices to the debate over how Stonehenge came into being. Challenging the classic image of industrious builders pushing, carting, rolling or hauling giant stones from faraway Wales, some scientists have suggested that it was glaciers, not humans, that carried the bluestones to Salisbury Plain. Most archaeologists have remained sceptical about this theory, however, wondering how the forces of nature could possibly have delivered the exact number of stones needed to complete the circle.

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* Neolithic – The era, also known as the New Stone Age, which began around 12,000 years ago and ended around 3500 BCE

The third phase of construction took place around 2000 BCE. At this point, sandstone slabs – known as 'sarsens' – were arranged into an outer crescent or ring; some were assembled into the iconic three-pieced structures called trilithons that stand tall in the centre of Stonehenge. Some 50 of these stones are now visible on the site, which may once have contained many more. Radiocarbon dating has revealed that work continued at Stonehenge until roughly 1600 BCE, with the bluestones in particular being repositioned multiple times.

But who were the builders of Stonehenge? In the 17th century, archaeologist John Aubrey made the claim that Stonehenge was the work of druids, who had important religious, judicial and political roles in Celtic** society. This theory was widely popularized by the antiquarian William Stukeley, who had unearthed primitive graves at the site. Even today, people who identify as modern druids continue to gather at Stonehenge for the summer solstice. However, in the mid-20th century, radiocarbon dating demonstrated that Stonehenge stood more than 1,000 years before the Celts inhabited the region.

Many modern historians and archaeologists now agree that several distinct tribes of people contributed to Stonehenge, each undertaking a different phase of its construction. Bones, tools and other artefacts found on the site seem to support this hypothesis. The first stage was achieved by Neolithic agrarians who were likely to have been indigenous to the British Isles. Later, it is believed, groups with advanced tools and a more communal way of life left their mark on the site. Some believe that they were immigrants from the European continent, while others maintain that they were probably native Britons, descended from the original builders.

If the facts surrounding the architects and construction of Stonehenge remain shadowy at best, the purpose of the striking monument is even more of a mystery. While there is consensus among the majority of modern scholars that Stonehenge once served the function of burial ground, they have yet to determine what other purposes it had.

In the 1960s, the astronomer Gerald Hawkins suggested that the cluster of megalithic stones operated as a form of calendar, with different points corresponding to astrological phenomena such as solstices, equinoxes and eclipses occurring at different times of the year. While his theory has received a considerable amount of attention over the decades, critics maintain that Stonehenge's builders probably lacked the knowledge necessary to predict such events or that England's dense cloud cover would have obscured their view of the skies.

More recently, signs of illness and injury in the human remains unearthed at Stonehenge led a group of British archaeologists to speculate that it was considered a place of healing, perhaps because bluestones were thought to have curative powers.

** Celtic – The Celts were people who lived in Britain and northwest Europe during the Iron Age from 600 BCE to 43 CE

Questions 1–8

Complete the notes below.

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

Write your answers in boxes 1–8 on your answer sheet.

Stonehenge

Construction

Stage 1:

- the ditch and henge were dug, possibly using tools made from **1** .....
- **2** ..... may have been arranged in deep pits inside the circle

Stage 2:

- bluestones from the Preseli Hills were placed in standing position
- theories about the transportation of the bluestones:
  - archaeological:
    - builders used **3** ..... to make sledges and rollers
    - **4** ..... pulled them on giant baskets
  - geological:
    - they were brought from Wales by **5** .....

Stage 3:

- sandstone slabs were arranged into an outer crescent or ring

Builders

- a theory arose in the 17th century that its builders were Celtic **6** .....

Purpose

- many experts agree it has been used as a **7** ..... site
- in the 1960s, it was suggested that it worked as a kind of **8** .....

Questions 9–13

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

In boxes 9–13 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*

9 During the third phase of construction, sandstone slabs were placed in both the outer areas and the middle of the Stonehenge site.

10 There is scientific proof that the bluestones stood in the same spot until approximately 1600 BCE.

11 John Aubrey's claim about Stonehenge was supported by 20th-century findings.

12 Objects discovered at Stonehenge seem to indicate that it was constructed by a number of different groups of people.

13 Criticism of Gerald Hawkins' theory about Stonehenge has come mainly from other astronomers.

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READING PASSAGE 2

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

Living with artificial intelligence

Powerful artificial intelligence (AI) needs to be reliably aligned with human values, but does this mean AI will eventually have to police those values?

This has been the decade of AI, with one astonishing feat after another. A chess-playing AI that can defeat not only all human chess players, but also all previous human-programmed chess machines, after learning the game in just four hours? That's yesterday's news, what's next? True, these prodigious accomplishments are all in so-called narrow AI, where machines perform highly specialised tasks. But many experts believe this restriction is very temporary. By mid-century, we may have artificial general intelligence (AGI) – machines that can achieve human-level performance on the full range of tasks that we ourselves can tackle.

If so, there's little reason to think it will stop there. Machines will be free of many of the physical constraints on human intelligence. Our brains run at slow biochemical processing speeds on the power of a light bulb, and their size is restricted by the dimensions of the human birth canal. It is remarkable what they accomplish, given these handicaps. But they may be as far from the physical limits of thought as our eyes are from the incredibly powerful Webb Space Telescope.

Once machines are better than us at designing even smarter machines, progress towards these limits could accelerate. What would this mean for us? Could we ensure a safe and worthwhile coexistence with such machines? On the plus side, AI is already useful and profitable for many things, and super AI might be expected to be super useful, and super profitable. But the more powerful AI becomes, the more important it will be to specify its goals with great care. Folklore is full of tales of people who ask for the wrong thing, with disastrous consequences – King Midas, for example, might have wished that everything he touched turned to gold, but didn't really intend this to apply to his breakfast.

So we need to create powerful AI machines that are 'human-friendly' – that have goals reliably aligned with our own values. One thing that makes this task difficult is that we are far from reliably human-friendly ourselves. We do many terrible things to each other and to many other creatures with whom we share the planet. If superintelligent machines don't do a lot better than us, we'll be in deep trouble. We'll have powerful new intelligence amplifying the dark sides of our own fallible natures.

For safety's sake, then, we want the machines to be ethically as well as cognitively superhuman. We want them to aim for the moral high ground, not for the troughs in which many of us spend some of our time. Luckily they'll be smart enough for the job. If there are routes to the moral high ground, they'll be better than us at finding them, and steering us in the right direction.

However, there are two big problems with this utopian vision. One is how we get the machines started on the journey, the other is what it would mean to reach this destination. The 'getting started' problem is that we need to tell the machines what they're looking for with sufficient clarity that we can be confident they will find it – whatever 'it' actually turns out to be. This won't be easy, given that we are tribal creatures and conflicted about the ideals ourselves. We often ignore the suffering of strangers, and even contribute to it, at least indirectly. How then, do we point machines in the direction of something better?

As for the 'destination' problem, we might, by putting ourselves in the hands of these moral guides and gatekeepers, be sacrificing our own autonomy – an important part of what makes us human. Machines who are better than us at sticking to the moral high ground may be expected to discourage some of the lapses we presently take for granted. We might lose our freedom to discriminate in favour of our own communities, for example.

Loss of freedom to behave badly isn't always a bad thing, of course: denying ourselves the freedom to put children to work in factories, or to smoke in restaurants are signs of progress. But are we ready for ethical silicon police limiting our options? They might be so good at doing it that we won't notice them; but few of us are likely to welcome such a future.

These issues might seem far-fetched, but they are to some extent already here. AI already has some input into how resources are used in our National Health Service (NHS) here in the UK, for example. If it was given a greater role, it might do so much more efficiently than humans can manage, and act in the interests of taxpayers and those who use the health system. However, we'd be depriving some humans (e.g. senior doctors) of the control they presently enjoy. Since we'd want to ensure that people are treated equally and that policies are fair, the goals of AI would need to be specified correctly.

We have a new powerful technology to deal with – itself, literally, a new way of thinking. For our own safety, we need to point these new thinkers in the right direction, and get them to act well for us. It is not yet clear whether this is possible, but if it is, it will require a cooperative spirit, and a willingness to set aside self-interest.

Both general intelligence and moral reasoning are often thought to be uniquely human capacities. But safety seems to require that we think of them as a package: if we are to give general intelligence to machines, we'll need to give them moral authority, too. And where exactly would that leave human beings? All the more reason to think about the destination now, and to be careful about what we wish for.

Questions 14–19

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

Write the correct letter in boxes 14–19 on your answer sheet.

14 What point does the writer make about AI in the first paragraph?

- **A** It is difficult to predict how quickly AI will progress.
- **B** Much can be learned about the use of AI in chess machines.
- **C** The future is unlikely to see limitations on the capabilities of AI.
- **D** Experts disagree on which specialised tasks AI will be able to perform.

15 What is the writer doing in the second paragraph?

- **A** explaining why machines will be able to outperform humans
- **B** describing the characteristics that humans and machines share
- **C** giving information about the development of machine intelligence
- **D** indicating which aspects of humans are the most advanced

16 Why does the writer mention the story of King Midas?

- **A** to compare different visions of progress
- **B** to illustrate that poorly defined objectives can go wrong
- **C** to emphasise the need for cooperation
- **D** to point out the financial advantages of a course of action

17 What challenge does the writer refer to in the fourth paragraph?

- **A** encouraging humans to behave in a more principled way
- **B** deciding which values we want AI to share with us
- **C** creating a better world for all creatures on the planet
- **D** ensuring AI is more human-friendly than we are ourselves

18 What does the writer suggest about the future of AI in the fifth paragraph?

- **A** The safety of machines will become a key issue.
- **B** It is hard to know what impact machines will have on the world.
- **C** Machines will be superior to humans in certain respects.
- **D** Many humans will oppose machines having a wider role.

19 Which of the following best summarises the writer's argument in the sixth paragraph?

- **A** More intelligent machines will result in greater abuses of power.
- **B** Machine learning will share very few features with human learning.
- **C** There are a limited number of people with the knowledge to program machines.
- **D** Human shortcomings will make creating the machines we need more difficult.

Questions 20–23

Do the following statements agree with the claims of the writer in Reading Passage 2?

In boxes 20–23 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*

20 Machines with the ability to make moral decisions may prevent us from promoting the interests of our communities.

21 Silicon police would need to exist in large numbers in order to be effective.

22 Many people are comfortable with the prospect of their independence being restricted by machines.

23 If we want to ensure that machines act in our best interests, we all need to work together.

Questions 24–26

*Complete the summary using the list of phrases, **A–F**, below.*

*Write the correct letter, **A–F**, in boxes 24–26 on your answer sheet.*

Using AI in the UK health system

AI currently has a limited role in the way **24** ..... are allocated in the health service. The positive aspect of AI having a bigger role is that it would be more efficient and lead to patient benefits. However, such a change would result, for example, in certain **25** ..... not having their current level of **26** ..... . It is therefore important that AI goals are appropriate so that discriminatory practices could be avoided.

A medical practitioners	**B** specialised tasks	**C** available resources
D reduced illness	**E** professional authority	**F** technology experts

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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.*

An ideal city

Leonardo da Vinci's ideal city was centuries ahead of its time

The word 'genius' is universally associated with the name of Leonardo da Vinci. A true Renaissance man, he embodied scientific spirit, artistic talent and humanist sensibilities. Five hundred years have passed since Leonardo died in his home at Château du Clos Lucé, outside Tours, France. Yet far from fading into insignificance, his thinking has carried down the centuries and still surprises today.

The Renaissance marked the transition from the 15th century to modernity and took place after the spread of the plague in the 14th century, which caused a global crisis resulting in some 200 million deaths across Europe and Asia. Today, the world is on the cusp of a climate crisis, which is predicted to cause widespread displacement, extinctions and death, if left unaddressed. Then, as now, radical solutions were called for to revolutionise the way people lived and safeguard humanity against catastrophe.

Around 1486 – after a pestilence that killed half the population in Milan, Italy – Leonardo turned his thoughts to urban planning problems. Following a typical Renaissance trend, he began to work on an 'ideal city' project, which – due to its excessive costs – would remain unfulfilled. Yet given that unsustainable urban models are a key cause of global climate change today, it's only natural to wonder how Leonardo might have changed the shape of modern cities.

Although the Renaissance is renowned as an era of incredible progress in art and architecture, it is rarely noted that the 15th century also marked the birth of urbanism as a true academic discipline. The rigour and method behind the conscious conception of a city had been largely missing in Western thought until the moment when prominent Renaissance men pushed forward large-scale urban projects in Italy, such as the reconfiguration of the town of Pienza and the expansion of the city of Ferrara. These works surely inspired Leonardo's decision to rethink the design of medieval cities, with their winding and overcrowded streets and with houses piled against one another.

It is not easy to identify a coordinated vision of Leonardo's ideal city because of his disordered way of working with notes and sketches. But from the largest collection of Leonardo's papers ever assembled, a series of innovative thoughts can be reconstructed regarding the foundation of a new city along the Ticino River, which runs from Switzerland into Italy and is 248 kilometres long. He designed the city for the easy transport of goods and clean urban spaces, and he wanted a comfortable and spacious city, with well-ordered streets and architecture. He recommended 'high, strong walls', with 'towers and battlements of all necessary and pleasant beauty'.

His plans for a modern and 'rational' city were consistent with Renaissance ideals. But, in keeping with his personality, Leonardo included several innovations in his urban design. Leonardo wanted the city to be built on several levels, linked with vertical outdoor staircases. This design can be seen in some of today's high-rise buildings but was unconventional at the time. Indeed, this idea of taking full advantage of the interior spaces wasn't implemented until the 1920s and 1930s, with the birth of the Modernist movement.

While in the upper layers of the city, people could walk undisturbed between elegant palaces and streets, the lower layer was the place for services, trade, transport and industry. But the true originality of Leonardo's vision was its fusion of architecture and engineering. Leonardo designed extensive hydraulic plants to create artificial canals throughout the city. The canals, regulated by clocks and basins, were supposed to make it easier for boats to navigate inland. Leonardo also thought that the width of the streets ought to match the average height of the adjacent houses: a rule still followed in many contemporary cities across Italy, to allow access to sun and reduce the risk of damage from earthquakes.

Although some of these features existed in Roman cities, before Leonardo's drawings there had never been a multi-level, compact modern city which was thoroughly technically conceived. Indeed, it wasn't until the 19th century that some of his ideas were applied. For example, the subdivision of the city by function – with services and infrastructures located in the lower levels and wide and well-ventilated boulevards and walkways above for residents – is an idea that can be found in Georges-Eugène Haussmann's renovation of Paris under Emperor Napoleon III between 1853 and 1870.

Today, Leonardo's ideas are not simply valid, they actually suggest a way forward for urban planning. Many scholars think that the compact city, built upwards instead of outwards, integrated with nature (especially water systems), with efficient transport infrastructure, could help modern cities become more efficient and sustainable. This is yet another reason why Leonardo was aligned so closely with modern urban planning and centuries ahead of his time.

Questions 27–33

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

In boxes 27–33 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*

27 People first referred to Leonardo da Vinci as a genius 500 years ago.

28 The current climate crisis is predicted to cause more deaths than the plague.

29 Some of the challenges we face today can be compared to those of earlier times.

30 Leonardo da Vinci's 'ideal city' was constructed in the 15th century.

31 Poor town planning is a major contributor to climate change.

32 In Renaissance times, local people fought against the changes to Pienza and Ferrara.

33 Leonardo da Vinci kept a neat, organised record of his designs.

Questions 34–40

Complete the summary below.

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

Write your answers in boxes 34–40 on your answer sheet.

Leonardo da Vinci's ideal city

A collection of Leonardo da Vinci's paperwork reveals his design of a new city beside the Ticino River. This was to provide better **34** ..... for trade and a less polluted environment. Although Leonardo da Vinci's city shared many of the ideals of his time, some of his innovations were considered unconventional in their design. They included features that can be seen in some tower blocks today, such as **35** ..... on the exterior of a building.

Leonardo da Vinci wasn't only an architect. His expertise in **36** ..... was evident in his plans for artificial canals within his ideal city. He also believed that the height of houses should relate to the width of streets in case earthquakes occurred. The design of many cities in Italy today follows this **37** ..... .

While some cities from **38** ..... times have aspects that can also be found in Leonardo's designs, his ideas weren't put into practice until long after his death. **39** ..... is one example of a city that was redesigned in the 19th century in the way that Leonardo had envisaged. His ideas are also relevant to today's world, where building **40** ..... no longer seems to be the best approach.

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TEST 2

READING

Answer key with extra explanations in Resource Bank

Reading Passage 1, Questions 1–13

1 (deer) antlers
2 (timber) posts
3 tree trunks
4 oxen
5 glaciers
6 druids
7 burial
8 calendar
9 TRUE
10 FALSE
11 FALSE
12 TRUE
13 NOT GIVEN

Reading Passage 2, Questions 14–26

14 C
15 A
16 B
17 D
18 C
19 D
20 YES
21 NOT GIVEN
22 NO
23 YES
24 C
25 A
26 E

Reading Passage 3, Questions 27–40

27 NOT GIVEN
28 NOT GIVEN
29 TRUE
30 FALSE
31 TRUE
32 NOT GIVEN
33 FALSE
34 transport
35 staircases
36 engineering
37 rule
38 Roman
39 Paris
40 outwards

If you score ...

0–17	18–26	27–40
you are unlikely to get an acceptable score under examination conditions and we recommend that you spend a lot of time improving your English before you take IELTS.	you may get an acceptable score under examination conditions but we recommend that you think about having more practice or lessons before you take IELTS.	you are likely to get an acceptable score under examination conditions but remember that different institutions will find different scores acceptable.

READING

READING PASSAGE 1

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

Materials to take us beyond concrete

Concrete is everywhere, but it's bad for the planet, generating large amounts of carbon dioxide – alternatives are being developed

A Concrete is the second most used substance in the global economy, after water – and one of the world's biggest single sources of greenhouse gas emissions. The chemical process by which cement, the key ingredient of concrete, is created results in large quantities of carbon dioxide. The UN estimates that there will be 9.8 billion people living on the planet by mid-century. They will need somewhere to live. If concrete is the only answer to the construction of new cities, then carbon emissions will soar, aggravating global warming. And so scientists have started innovating with other materials, in a scramble for alternatives to a universal commodity that has underpinned our modern life for many years.

B The problem with replacing concrete is that it is so very good at what it does. Chris Cheeseman, an engineering professor at Imperial College London, says the key thing to consider is the extent to which concrete is used around the world, and is likely to continue to be used. 'Concrete is not a high-carbon product. Cement is high carbon, but concrete is not. But it is the scale on which it is used that makes it high carbon. The sheer scale of manufacture is so huge, that is the issue.'

C Not only are the ingredients of concrete relatively cheap and found in abundance in most places around the globe, the stuff itself has marvellous properties: Portland cement, the vital component of concrete, is mouldable and pourable, but quickly sets hard. Cheeseman also notes another advantage: concrete and steel have similar thermal expansion properties, so steel can be used to reinforce concrete, making it far stronger and more flexible as a building material than it could be on its own. According to Cheeseman, all these factors together make concrete hard to beat. 'Concrete is amazing stuff. Making anything with similar properties is going to be very difficult.'

D A possible alternative to concrete is wood. Making buildings from wood may seem like a rather medieval idea, but climate change is driving architects to turn to treated timber as a possible resource. Recent years have seen the emergence of tall buildings constructed almost entirely from timber. Vancouver, Vienna and Brumunddal in Norway are all home to constructed tall, wooden buildings.

E Using wood to construct buildings, however, is not straightforward. Wood expands as it absorbs moisture from the air and is susceptible to pests, not to mention fire. But treating wood and combining it with other materials can improve its properties. Cross-laminated timber is engineered wood. An adhesive is used to stick layers of solid-sawn timber together, crosswise, to form building blocks. This material is light but has the strength of concrete and steel. Construction experts say that wooden buildings can be constructed at a greater speed than ones of concrete and steel and the process, it seems, is quieter.

F Stora Enso is Europe's biggest supplier of cross-laminated timber, and its vice-president Markus Mannström reports that the company is seeing increasing demand globally for building in wood, with climate change concerns the key driver. Finland, with its large forests, where Stora Enso is based, has been leading the way, but the company is seeing a rise in demand for its timber products across the world, including in Asia. Of course, using timber in a building also locks away the carbon that it absorbed as it grew. But even treated wood has its limitations and only when a wider range of construction projects has been proven in practice will it be possible to see wood as a real alternative to concrete in constructing tall buildings.

G Fly ash and slag from iron ore are possible alternatives to cement in a concrete mix. Fly ash, a byproduct of coal-burning power plants, can be incorporated into concrete mixes to make up as much as 15 to 30% of the cement, without harming the strength or durability of the resulting mix. Iron-ore slag, a byproduct of the iron-ore smelting process, can be used in a similar way. Their incorporation into concrete mixes has the potential to reduce greenhouse gas emissions.

But Anna Surgenor, of the UK's Green Building Council, notes that although these waste products can save carbon in the concrete mix, their use is not always straightforward. 'It's possible to replace the cement content in concrete with waste products to lower the overall carbon impact. But there are several calculations that need to be considered across the entire life cycle of the building – these include factoring in where these materials are being shipped from. If they are transported over long distances, using fossil fuels, the use of alternative materials might not make sense from an overall carbon reduction perspective.'

H While these technologies are all promising ideas, they are either unproven or based on materials that are not abundant. In their overview of innovation in the concrete industry, Felix Preston and Johanna Lehne of the UK's Royal Institute of International Affairs reached the conclusion that, 'Some novel cements have been discussed for more than a decade within the research community, without breaking through. At present, these alternatives are rarely as cost-effective as conventional cement, and they face raw-material shortages and resistance from customers.'

Questions 1–4

Reading Passage 1 has eight sections, **A–H**.

Which section contains the following information?

*Write the correct letter, **A–H**, in boxes 1–4 on your answer sheet.*

1 an explanation of the industrial processes that create potential raw materials for concrete

2 a reference to the various locations where high-rise wooden buildings can be found

3 an indication of how widely available the raw materials of concrete are

4 the belief that more high-rise wooden buildings are needed before wood can be regarded as a viable construction material

Questions 5–8

Complete the summary below.

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

Write your answers in boxes 5–8 on your answer sheet.

Making buildings with wood

Wood is a traditional building material, but current environmental concerns are encouraging **5** ..... to use wood in modern construction projects. Using wood, however, has its challenges. For example, as **6** ..... in the atmosphere enters wood, it increases in size. In addition, wood is prone to pests and the risk of fire is greater. However, wood can be turned into a better construction material if it is treated and combined with other materials. In one process, **7** ..... of solid wood are glued together to create building blocks. These blocks are lighter than concrete and steel but equal them in strength. Experts say that wooden buildings are an improvement on those made of concrete and steel in terms of the **8** ..... with which they can be constructed and how much noise is generated by the process.

Questions 9–13

Look at the following statements (Questions 9–13) and the list of people below.

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

*Write the correct letter, **A**, **B**, **C** or **D**, in boxes 9–13 on your answer sheet.*

NB *You may use any letter more than once.*

9 The environmental advantage of cement alternatives may not be as great as initially assumed.

10 It would be hard to create a construction alternative to concrete that offers so many comparable benefits.

11 Worries about the environment have led to increased interest in wood as a construction material.

12 Expense has been a factor in the negative response to the development of new cements.

13 The environmental damage caused by concrete is due to it being produced in large quantities.

List of People

A Chris Cheeseman

B Markus Mannström

C Anna Surgenor

D Felix Preston and Johanna Lehne

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READING PASSAGE 2

*You should spend about 20 minutes on **Questions 14–26**, which are based on Reading Passage 2 on pages 66 and 67.*

Questions 14–20

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

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

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

List of Headings

- **i** A period in cold conditions before the technology is assessed
- **ii** Marketing issues lead to failure
- **iii** Good and bad aspects of steam technology are passed on
- **iv** A possible solution to the issues of today
- **v** Further improvements lead to commercial orders
- **vi** Positive publicity at last for this quiet, clean, fast vehicle
- **vii** A disappointing outcome for customers
- **viii** A better option than the steam car arises

14 Paragraph **A**

15 Paragraph **B**

16 Paragraph **C**

17 Paragraph **D**

18 Paragraph **E**

19 Paragraph **F**

20 Paragraph **G**

The steam car

The successes and failures of the Doble brothers and their steam cars

A When primitive automobiles first began to appear in the 1800s, their engines were based on steam power. Steam had already enjoyed a long and successful career in the railways, so it was only natural that the technology evolved into a miniaturized version which was separate from the trains. But these early cars inherited steam's weaknesses along with its strengths. The boilers had to be lit by hand, and they required about twenty minutes to build up pressure before they could be driven. Furthermore, their water reservoirs only lasted for about thirty miles before needing replenishment. Despite such shortcomings, these newly designed self-propelled carriages offered quick transportation, and by the early 1900s it was not uncommon to see such machines shuttling wealthy citizens around town.

B But the glory days of steam cars were few. A new technology called the Internal Combustion Engine soon appeared, which offered the ability to drive down the road just moments after starting up. At first, these noisy gasoline cars were unpopular because they were more complicated to operate and they had difficult hand-crank starters, which were known to break arms when the engines backfired. But in 1912 General Motors introduced the electric starter, and over the following few years steam power was gradually phased out.

C Even as the market was declining, four brothers made one last effort to rekindle the technology. Between 1906 and 1909, while still attending high school, Abner Doble and his three brothers built their first steam car in their parents' basement. It comprised parts taken from a wrecked early steam car but reconfigured to drive an engine of their own design. Though it did not run well, the Doble brothers went on to build a second and third prototype in the following years. Though the Doble boys' third prototype, nicknamed the Model B, still lacked the convenience of an internal combustion engine, it drew the attention of automobile trade magazines due to its numerous improvements over previous steam cars. The Model B proved to be superior to gasoline automobiles in many ways. Its high-pressure steam drove the engine pistons in virtual silence, in contrast to clattering gas engines which emitted the aroma of burned hydrocarbons. Perhaps most impressively, the Model B was amazingly swift. It could accelerate from zero to sixty miles per hour in just fifteen seconds, a feat described as 'remarkable acceleration' by *Automobile* magazine in 1914.

D The following year Abner Doble drove the Model B from Massachusetts to Detroit in order to seek investment in his automobile design, which he used to open the General Engineering Company. He and his brothers immediately began working on the Model C, which was intended to expand upon the innovations of the Model B. The brothers added features such as a key-based ignition in the cabin, eliminating the need for the operator to manually ignite the boiler. With these enhancements, the Dobles' new car company promised a steam vehicle which would provide all of the convenience of a gasoline car, but with much greater speed, much simpler driving controls, and a virtually silent powerplant. By the following April, the General Engineering Company had received 5,390 deposits for Doble Detroits, which were scheduled for delivery in early 1918.

E Later that year Abner Doble delivered unhappy news to those eagerly awaiting the delivery of their modern new cars. Those buyers who received the handful of completed cars complained that the vehicles were sluggish and erratic, sometimes going in reverse when they should go forward. The new engine design, though innovative, was still plagued with serious glitches.

F The brothers made one final attempt to produce a viable steam automobile. In early 1924, the Doble brothers shipped a Model E to New York City to be road-tested by the Automobile Club of America. After sitting overnight in freezing temperatures, the car was pushed out into the road and left to sit for over an hour in the frosty morning air. At the turn of the key, the boiler lit and reached its operating pressure inside of forty seconds. As they drove the test vehicle further, they found that its evenly distributed weight lent it surprisingly good handling, even though it was so heavy. As the new Doble steamer was further developed and tested, its maximum speed was pushed to over a hundred miles per hour, and it achieved about fifteen miles per gallon of kerosene with negligible emissions.

G Sadly, the Dobles' brilliant steam car never was a financial success. Priced at around $18,000 in 1924, it was popular only among the very wealthy. Plus, it is said that no two Model Es were quite the same, because Abner Doble tinkered endlessly with the design. By the time the company folded in 1931, fewer than fifty of the amazing Model E steam cars had been produced. For his whole career, until his death in 1961, Abner Doble remained adamant that steam-powered automobiles were at least equal to gasoline cars, if not superior. Given the evidence, he may have been right. Many of the Model E Dobles which have survived are still in good working condition, some having been driven over half a million miles with only normal maintenance. Astonishingly, an unmodified Doble Model E runs clean enough to pass the emissions laws in California today, and they are pretty strict. It is true that the technology poses some difficult problems, but you cannot help but wonder how efficient a steam car might be with the benefit of modern materials and computers. Under the current pressure to improve automotive performance and reduce emissions, it is not unthinkable that the steam car may rise again.

Questions 21–23

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

Write the correct letter in boxes 21–23 on your answer sheet.

21 What point does the writer make about the steam car in Paragraph B?

- **A** Its success was short-lived.
- **B** Not enough cars were made.
- **C** Car companies found them hard to sell.
- **D** People found them hard to drive.

22 When building their first steam car, the Doble brothers

- **A** constructed all the parts themselves.
- **B** made written notes at each stage of the construction.
- **C** needed several attempts to achieve a competitive model.
- **D** sought the advice of experienced people in the car industry.

23 In order to produce the Model C, the Doble brothers

- **A** moved production to a different city.
- **B** raised financial capital.
- **C** employed an additional worker.
- **D** abandoned their earlier designs.

Questions 24–26

Complete the summary below.

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

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

The Model E

The Model E was road-tested in 1924 by the Automobile Club of America. They found it easy to drive, despite its weight, and it impressed the spectators. A later version of the Model E raised its **24** ....., while keeping its emissions extremely low.

The steam car was too expensive for many people and its design was constantly being altered. Under **25** ..... cars were produced before the company went out of business. However, even today, there are Model Es on the road in the US. They are straightforward to maintain, and they satisfy California's **26** ..... emissions laws. Perhaps today's technology and materials would help us revive the steam car.

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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.*

The case for mixed-ability classes

Picture this scene. It's an English literature lesson in a UK school, and the teacher has just read an extract from Shakespeare's *Romeo and Juliet* with a class of 15-year-olds. He's given some of the students copies of *No Fear Shakespeare,* a kid-friendly translation of the original. For three students, even these literacy demands are beyond them. Another girl simply can't focus and he gives her pens and paper to draw with. The teacher can ask the *No Fear* group to identify the key characters and maybe provide a tentative plot summary. He can ask most of the class about character development, and five of them might be able to support their statements with textual evidence. Now two curious students are wondering whether Shakespeare advocates living a life of moderation or one of passionate engagement.

As a teacher myself, I'd think my lesson would be going rather well if the discussion went as described above. But wouldn't this kind of class work better if there weren't such a huge gap between the top and the bottom? If we put all the kids who needed literacy support into one class, and all the students who want to discuss the virtue of moderation into another?

The practice of 'streaming', or 'tracking', involves separating students into classes depending on their diagnosed levels of attainment. At a macro level, it requires the establishment of academically selective schools for the brightest students, and comprehensive schools for the rest. Within schools, it means selecting students into a 'stream' of general ability, or 'sets' of subject-specific ability. The practice is intuitively appealing to almost every stakeholder.

I have heard the mixed-ability model attacked by way of analogy: a group hike. The fittest in the group take the lead and set a brisk pace, only to have to stop and wait every 20 minutes. This is frustrating, and their enthusiasm wanes. Meanwhile, the slowest ones are not only embarrassed but physically struggling to keep up. What's worse, they never get a long enough break. They honestly just want to quit. Hiking, they feel, is not for them.

Mixed-ability classes bore students, frustrate parents and burn out teachers. The brightest ones will never summit Mount Qomolangma, and the stragglers won't enjoy the lovely stroll in the park they are perhaps more suited to. Individuals suffer at the demands of the collective, mediocrity prevails. So: is learning like hiking?

The current pedagogical paradigm is arguably that of constructivism, which emerged out of the work of psychologist Lev Vygotsky. In the 1930s, Vygotsky emphasised the importance of targeting a student's specific 'zone of proximal development' (ZPD). This is the gap between what they can achieve only with support – teachers, textbooks, worked examples, parents and so on – and what they can achieve independently. The purpose of teaching is to provide and then gradually remove this 'scaffolding' until they are autonomous. If we accept this model, it follows that streaming students with similar ZPDs would be an efficient and effective solution. And that forcing everyone on the same hike – regardless of aptitude – would be madness.

Despite all this, there is limited empirical evidence to suggest that streaming results in

better outcomes for students. Professor John Hattie, director of the Melbourne Education Research Institute, notes that 'tracking has minimal effects on learning outcomes'. What is more, streaming appears to significantly – and negatively – affect those students assigned to the lowest sets. These students tend to have much higher representation of low socioeconomic class. Less significant is the small benefit for those lucky clever students in the higher sets. The overall result is that the smart stay smart and the dumb get dumber, further entrenching the social divide.

In the latest update of Hattie's influential meta-analysis of factors influencing student achievement, one of the most significant factors is the teachers' estimate of achievement. Streaming students by diagnosed achievement automatically limits what the teacher feels the student is capable of. Meanwhile, in a mixed environment, teachers' estimates need to be more diverse and flexible.

While streaming might seem to help teachers effectively target a student's ZPD, it can underestimate the importance of peer-to-peer learning. A crucial aspect of constructivist theory is the role of the MKO – 'more-knowledgeable other' – in knowledge construction. While teachers are traditionally the MKOs in classrooms, the value of knowledgeable student peers must not go unrecognised either.

I find it amazing to watch students get over an idea to their peers in ways that I would never think of. They operate with different language tools and different social tools from teachers and, having just learnt it themselves, they possess similar cognitive structures to their struggling classmates. There is also something exciting about passing on skills and knowledge that you yourself have just mastered – a certain pride and zeal, a certain freshness to the interaction between 'teacher' and 'learner' that is often lost by the expert for whom the steps are obvious and the joy of discovery forgotten.

Having a variety of different abilities in a collaborative learning environment provides valuable resources for helping students meet their learning needs, not to mention improving their communication and social skills. And today, more than ever, we need the many to flourish – not suffer at the expense of a few bright stars. Once a year, I go on a hike with my class, a mixed bunch of students. It *is* challenging. The fittest students realise they need to encourage the reluctant. There are lookouts who report back, and extra items to carry for others. We make it – together.

Questions 27–30

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

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

27 The writer describes the *Romeo and Juliet* lesson in order to demonstrate

- **A** how few students are interested in literature.
- **B** how a teacher handles a range of learning needs.
- **C** how unsuitable Shakespeare is for most teenagers.
- **D** how weaker students can disrupt their classmates' learning.

28 What does the writer say about streaming in the third paragraph?

- **A** It has a very broad appeal.
- **B** It favours cleverer students.
- **C** It is relatively simple to implement.
- **D** It works better in some schools than others.

29 What idea is suggested by the reference to Mount Qomolangma in the fifth paragraph?

- **A** students following unsuitable paths
- **B** students attempting interesting tasks
- **C** students not achieving their full potential
- **D** students not being aware of their limitations

30 What does the word 'scaffolding' in the sixth paragraph refer to?

- **A** the factors which prevent a student from learning effectively
- **B** the environment where most of a student's learning takes place
- **C** the assistance given to a student in their initial stages of learning
- **D** the setting of appropriate learning targets for a student's aptitude

Questions 31–35

*Complete the summary using the list of phrases, **A–I**, below.*

*Write the correct letter, **A–I**, in boxes 31–35 on your answer sheet.*

Is streaming effective?

According to Professor John Hattie of the Melbourne Education Research Institute, there is very little indication that streaming leads to **31** ..... . He points out that, in schools which use streaming, the most significant impact is on those students placed in the **32** ..... , especially where a large proportion of them have **33** ..... . Meanwhile, for the **34** ..... , there appears to be only minimal advantage. A further issue is that teachers tend to have **35** ..... of students in streamed groups.

A	wrong classes	**B**	lower expectations	**C**	average learners
D	bottom sets	**E**	brightest pupils	**F**	disadvantaged backgrounds
G	weaker students	**H**	higher achievements	**I**	positive impressions

Questions 36–40

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

In boxes 36–40 on your answer sheet, write

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

36 The Vygotsky model of education supports the concept of a mixed-ability class.

37 Some teachers are uncertain about allowing students to take on MKO roles in the classroom.

38 It can be rewarding to teach knowledge which you have only recently acquired.

39 The priority should be to ensure that the highest-achieving students attain their goals.

40 Taking part in collaborative outdoor activities with teachers and classmates can improve student outcomes in the classroom.

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TEST 3

READING

Answer key with extra explanations in Resource Bank

Reading Passage 1, Questions 1–13

1 G
2 D
3 C
4 F
5 architects
6 moisture
7 layers
8 speed
9 C
10 A
11 B
12 D
13 A

Reading Passage 2, Questions 14–26

14 iii
15 viii
16 vi
17 v
18 vii
19 i
20 iv
21 A
22 C
23 B
24 speed
25 fifty / 50
26 strict

Reading Passage 3, Questions 27–40

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

If you score ...

0–17	18–26	27–40
you are unlikely to get an acceptable score under examination conditions and we recommend that you spend a lot of time improving your English before you take IELTS.	you may get an acceptable score under examination conditions but we recommend that you think about having more practice or lessons before you take IELTS.	you are likely to get an acceptable score under examination conditions but remember that different institutions will find different scores acceptable.

READING

READING PASSAGE 1

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

THE IMPORTANCE OF CHILDREN'S PLAY

Brick by brick, six-year-old Alice is building a magical kingdom. Imagining fairy-tale turrets and fire-breathing dragons, wicked witches and gallant heroes, she's creating an enchanting world. Although she isn't aware of it, this fantasy is helping her take her first steps towards her capacity for creativity and so it will have important repercussions in her adult life.

Minutes later, Alice has abandoned the kingdom in favour of playing schools with her younger brother. When she bosses him around as his 'teacher', she's practising how to regulate her emotions through pretence. Later on, when they tire of this and settle down with a board game, she's learning about the need to follow rules and take turns with a partner.

'Play in all its rich variety is one of the highest achievements of the human species,' says Dr David Whitebread from the Faculty of Education at the University of Cambridge, UK. 'It underpins how we develop as intellectual, problem-solving adults and is crucial to our success as a highly adaptable species.'

Recognising the importance of play is not new: over two millennia ago, the Greek philosopher Plato extolled its virtues as a means of developing skills for adult life, and ideas about play-based learning have been developing since the 19th century.

But we live in changing times, and Whitebread is mindful of a worldwide decline in play, pointing out that over half the people in the world now live in cities. 'The opportunities for free play, which I experienced almost every day of my childhood, are becoming increasingly scarce,' he says. Outdoor play is curtailed by perceptions of risk to do with traffic, as well as parents' increased wish to protect their children from being the victims of crime, and by the emphasis on 'earlier is better' which is leading to greater competition in academic learning and schools.

International bodies like the United Nations and the European Union have begun to develop policies concerned with children's right to play, and to consider implications for leisure facilities and educational programmes. But what they often lack is the evidence to base policies on.

'The type of play we are interested in is child-initiated, spontaneous and unpredictable – but, as soon as you ask a five-year-old "to play", then you as the researcher have intervened,' explains Dr Sara Baker. 'And we want to know what the long-term impact of play is. It's a real challenge.'

Dr Jenny Gibson agrees, pointing out that although some of the steps in the puzzle of how and why play is important have been looked at, there is very little data on the impact it has on the child's later life.

Now, thanks to the university's new Centre for Research on Play in Education, Development and Learning (PEDAL), Whitebread, Baker, Gibson and a team of researchers hope to provide evidence on the role played by play in how a child develops.

'A strong possibility is that play supports the early development of children's self-control,' explains Baker. 'This is our ability to develop awareness of our own thinking processes – it influences how effectively we go about undertaking challenging activities.'

In a study carried out by Baker with toddlers and young pre-schoolers, she found that children with greater self-control solved problems more quickly when exploring an unfamiliar set-up requiring scientific reasoning. 'This sort of evidence makes us think that giving children the chance to play will make them more successful problem-solvers in the long run.'

If playful experiences do facilitate this aspect of development, say the researchers, it could be extremely significant for educational practices, because the ability to self-regulate has been shown to be a key predictor of academic performance.

Gibson adds: 'Playful behaviour is also an important indicator of healthy social and emotional development. In my previous research, I investigated how observing children at play can give us important clues about their well-being and can even be useful in the diagnosis of neurodevelopmental disorders like autism.'

Whitebread's recent research has involved developing a play-based approach to supporting children's writing. 'Many primary school children find writing difficult, but we showed in a previous study that a playful stimulus was far more effective than an instructional one.' Children wrote longer and better-structured stories when they first played with dolls representing characters in the story. In the latest study, children first created their story with Lego*, with similar results. 'Many teachers commented that they had always previously had children saying they didn't know what to write about. With the Lego building, however, not a single child said this through the whole year of the project.'

Whitebread, who directs PEDAL, trained as a primary school teacher in the early 1970s, when, as he describes, 'the teaching of young children was largely a quiet backwater, untroubled by any serious intellectual debate or controversy.' Now, the landscape is very different, with hotly debated topics such as school starting age.

'Somehow the importance of play has been lost in recent decades. It's regarded as something trivial, or even as something negative that contrasts with "work". Let's not lose sight of its benefits, and the fundamental contributions it makes to human achievements in the arts, sciences and technology. Let's make sure children have a rich diet of play experiences.'

* Lego: coloured plastic building blocks and other pieces that can be joined together

Questions 1–8

Complete the notes below.

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

Write your answers in boxes 1–8 on your answer sheet.

Children's play

Uses of children's play

- building a 'magical kingdom' may help develop **1** .....
- board games involve **2** ..... and turn-taking

Recent changes affecting children's play

- populations of **3** ..... have grown
- opportunities for free play are limited due to
  - fear of **4** .....
  - fear of **5** .....
  - increased **6** ..... in schools

International policies on children's play

- it is difficult to find **7** ..... to support new policies
- research needs to study the impact of play on the rest of the child's **8** .....

Questions 9–13

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

In boxes 9–13 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*

9 Children with good self-control are known to be likely to do well at school later on.

10 The way a child plays may provide information about possible medical problems.

11 Playing with dolls was found to benefit girls' writing more than boys' writing.

12 Children had problems thinking up ideas when they first created the story with Lego.

13 People nowadays regard children's play as less significant than they did in the past.

READING PASSAGE 2

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

The growth of bike-sharing schemes around the world

How Dutch engineer Luud Schimmelpennink helped to devise urban bike-sharing schemes

A The original idea for an urban bike-sharing scheme dates back to a summer's day in Amsterdam in 1965. Provo, the organisation that came up with the idea, was a group of Dutch activists who wanted to change society. They believed the scheme, which was known as the Witte Fietsenplan, was an answer to the perceived threats of air pollution and consumerism. In the centre of Amsterdam, they painted a small number of used bikes white. They also distributed leaflets describing the dangers of cars and inviting people to use the white bikes. The bikes were then left unlocked at various locations around the city, to be used by anyone in need of transport.

B Luud Schimmelpennink, a Dutch industrial engineer who still lives and cycles in Amsterdam, was heavily involved in the original scheme. He recalls how the scheme succeeded in attracting a great deal of attention – particularly when it came to publicising Provo's aims – but struggled to get off the ground. The police were opposed to Provo's initiatives and almost as soon as the white bikes were distributed around the city, they removed them. However, for Schimmelpennink and for bike-sharing schemes in general, this was just the beginning. 'The first Witte Fietsenplan was just a symbolic thing,' he says. 'We painted a few bikes white, that was all. Things got more serious when I became a member of the Amsterdam city council two years later.'

C Schimmelpennink seized this opportunity to present a more elaborate Witte Fietsenplan to the city council. 'My idea was that the municipality of Amsterdam would distribute 10,000 white bikes over the city, for everyone to use,' he explains. 'I made serious calculations. It turned out that a white bicycle – per person, per kilometre – would cost the municipality only 10% of what it contributed to public transport per person per kilometre.' Nevertheless, the council unanimously rejected the plan. 'They said that the bicycle belongs to the past. They saw a glorious future for the car,' says Schimmelpennink. But he was not in the least discouraged.

D Schimmelpennink never stopped believing in bike-sharing, and in the mid-90s, two Danes asked for his help to set up a system in Copenhagen. The result was the world's first large-scale bike-share programme. It worked on a deposit: 'You dropped a coin in the bike and when you returned it, you got your money back.' After setting up the Danish system, Schimmelpennink decided to try his luck again

in the Netherlands – and this time he succeeded in arousing the interest of the Dutch Ministry of Transport. 'Times had changed,' he recalls. 'People had become more environmentally conscious, and the Danish experiment had proved that bike-sharing was a real possibility.' A new Witte Fietsenplan was launched in 1999 in Amsterdam. However, riding a white bike was no longer free; it cost one guilder per trip and payment was made with a chip card developed by the Dutch bank Postbank. Schimmelpennink designed conspicuous, sturdy white bikes locked in special racks which could be opened with the chip card – the plan started with 250 bikes, distributed over five stations.

E Theo Molenaar, who was a system designer for the project, worked alongside Schimmelpennink. 'I remember when we were testing the bike racks, he announced that he had already designed better ones. But of course, we had to go through with the ones we had.' The system, however, was prone to vandalism and theft. 'After every weekend there would always be a couple of bikes missing,' Molenaar says. 'I really have no idea what people did with them, because they could instantly be recognised as white bikes.' But the biggest blow came when Postbank decided to abolish the chip card, because it wasn't profitable. 'That chip card was pivotal to the system,' Molenaar says. 'To continue the project we would have needed to set up another system, but the business partner had lost interest.'

F Schimmelpennink was disappointed, but – characteristically – not for long. In 2002 he got a call from the French advertising corporation JC Decaux, who wanted to set up his bike-sharing scheme in Vienna. 'That went really well. After Vienna, they set up a system in Lyon. Then in 2007, Paris followed. That was a decisive moment in the history of bike-sharing.' The huge and unexpected success of the Parisian bike-sharing programme, which now boasts more than 20,000 bicycles, inspired cities all over the world to set up their own schemes, all modelled on Schimmelpennink's. 'It's wonderful that this happened,' he says. 'But financially I didn't really benefit from it, because I never filed for a patent.'

G In Amsterdam today, 38% of all trips are made by bike and, along with Copenhagen, it is regarded as one of the two most cycle-friendly capitals in the world – but the city never got another Witte Fietsenplan. Molenaar believes this may be because everybody in Amsterdam already has a bike. Schimmelpennink, however, cannot see that this changes Amsterdam's need for a bike-sharing scheme. 'People who travel on the underground don't carry their bikes around. But often they need additional transport to reach their final destination.' Although he thinks it is strange that a city like Amsterdam does not have a successful bike-sharing scheme, he is optimistic about the future. 'In the '60s we didn't stand a chance because people were prepared to give their lives to keep cars in the city. But that mentality has totally changed. Today everybody longs for cities that are not dominated by cars.'

Questions 14–18

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

Which paragraph contains the following information?

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

NB *You may use any letter more than once.*

14 a description of how people misused a bike-sharing scheme

15 an explanation of why a proposed bike-sharing scheme was turned down

16 a reference to a person being unable to profit from their work

17 an explanation of the potential savings a bike-sharing scheme would bring

18 a reference to the problems a bike-sharing scheme was intended to solve

Questions 19 and 20

*Choose **TWO** letters, **A–E**.*

Write the correct letters in boxes 19 and 20 on your answer sheet.

Which **TWO** of the following statements are made in the text about the Amsterdam bike-sharing scheme of 1999?

A It was initially opposed by a government department.
B It failed when a partner in the scheme withdrew support.
C It aimed to be more successful than the Copenhagen scheme.
D It was made possible by a change in people's attitudes.
E It attracted interest from a range of bike designers.

Questions 21 and 22

*Choose **TWO** letters, **A–E**.*

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

Which **TWO** of the following statements are made in the text about Amsterdam today?

A The majority of residents would like to prevent all cars from entering the city.
B There is little likelihood of the city having another bike-sharing scheme.
C More trips in the city are made by bike than by any other form of transport.
D A bike-sharing scheme would benefit residents who use public transport.
E The city has a reputation as a place that welcomes cyclists.

Questions 23–26

Complete the summary below.

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

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

The first urban bike-sharing scheme

The first bike-sharing scheme was the idea of the Dutch group Provo. The people who belonged to this group were **23** ..... . They were concerned about damage to the environment and about **24** ..... , and believed that the bike-sharing scheme would draw attention to these issues. As well as painting some bikes white, they handed out **25** ..... that condemned the use of cars.

However, the scheme was not a great success: almost as quickly as Provo left the bikes around the city, the **26** ..... took them away. According to Schimmelpennink, the scheme was intended to be symbolic. The idea was to get people thinking about the issues.

READING PASSAGE 3

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

Motivational factors and the hospitality industry

A critical ingredient in the success of hotels is developing and maintaining superior performance from their employees. How is that accomplished? What Human Resource Management (HRM) practices should organizations invest in to acquire and retain great employees?

Some hotels aim to provide superior working conditions for their employees. The idea originated from workplaces – usually in the non-service sector – that emphasized fun and enjoyment as part of work–life balance. By contrast, the service sector, and more specifically hotels, has traditionally not extended these practices to address basic employee needs, such as good working conditions.

Pfeffer (1994) emphasizes that in order to succeed in a global business environment, organizations must make investment in Human Resource Management (HRM) to allow them to acquire employees who possess better skills and capabilities than their competitors. This investment will be to their competitive advantage. Despite this recognition of the importance of employee development, the hospitality industry has historically been dominated by underdeveloped HR practices (Lucas, 2002).

Lucas also points out that 'the substance of HRM practices does not appear to be designed to foster constructive relations with employees or to represent a managerial approach that enables developing and drawing out the full potential of people, even though employees may be broadly satisfied with many aspects of their work' (Lucas, 2002). In addition, or maybe as a result, high employee turnover has been a recurring problem throughout the hospitality industry. Among the many cited reasons are low compensation, inadequate benefits, poor working conditions and compromised employee morale and attitudes (Maroudas et al., 2008).

Ng and Sorensen (2008) demonstrated that when managers provide recognition to employees, motivate employees to work together, and remove obstacles preventing effective performance, employees feel more obligated to stay with the company. This was succinctly summarized by Michel et al. (2013): '[P]roviding support to employees gives them the confidence to perform their jobs better and the motivation to stay with the organization.' Hospitality organizations can therefore enhance employee motivation and retention through the development and improvement of their working conditions. These conditions are inherently linked to the working environment.

While it seems likely that employees' reactions to their job characteristics could be affected by a predisposition to view their work environment negatively, no evidence exists to support this hypothesis (Spector et al., 2000). However, given the opportunity, many people will find

something to complain about in relation to their workplace (Poulston, 2009). There is a strong link between the perceptions of employees and particular factors of their work environment that are separate from the work itself, including company policies, salary and vacations.

Such conditions are particularly troubling for the luxury hotel market, where high-quality service, requiring a sophisticated approach to HRM, is recognized as a critical source of competitive advantage (Maroudas et al., 2008). In a real sense, the services of hotel employees represent their industry (Schneider and Bowen, 1993). This representation has commonly been limited to guest experiences. This suggests that there has been a dichotomy between the guest environment provided in luxury hotels and the working conditions of their employees.

It is therefore essential for hotel management to develop HRM practices that enable them to inspire and retain competent employees. This requires an understanding of what motivates employees at different levels of management and different stages of their careers (Enz and Siguaw, 2000). This implies that it is beneficial for hotel managers to understand what practices are most favorable to increase employee satisfaction and retention.

Herzberg (1966) proposes that people have two major types of needs, the first being extrinsic motivation factors relating to the context in which work is performed, rather than the work itself. These include working conditions and job security. When these factors are unfavorable, job dissatisfaction may result. Significantly, though, just fulfilling these needs does not result in satisfaction, but only in the reduction of dissatisfaction (Maroudas et al., 2008).

Employees also have intrinsic motivation needs or motivators, which include such factors as achievement and recognition. Unlike extrinsic factors, motivator factors may ideally result in job satisfaction (Maroudas et al., 2008). Herzberg's (1966) theory discusses the need for a 'balance' of these two types of needs.

The impact of fun as a motivating factor at work has also been explored. For example, Tews, Michel and Stafford (2013) conducted a study focusing on staff from a chain of themed restaurants in the United States. It was found that fun activities had a favorable impact on performance and manager support for fun had a favorable impact in reducing turnover. Their findings support the view that fun may indeed have a beneficial effect, but the framing of that fun must be carefully aligned with both organizational goals and employee characteristics. 'Managers must learn how to achieve the delicate balance of allowing employees the freedom to enjoy themselves at work while simultaneously maintaining high levels of performance' (Tews et al., 2013).

Deery (2008) has recommended several actions that can be adopted at the organizational level to retain good staff as well as assist in balancing work and family life. Those particularly appropriate to the hospitality industry include allowing adequate breaks during the working day, staff functions that involve families, and providing health and well-being opportunities.

Questions 27–31

Look at the following statements (Questions 27–31) and the list of researchers below.

Match each statement with the correct researcher, ***A–F****.*

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

NB *You may use any letter more than once.*

27 Hotel managers need to know what would encourage good staff to remain.

28 The actions of managers may make staff feel they shouldn't move to a different employer.

29 Little is done in the hospitality industry to help workers improve their skills.

30 Staff are less likely to change jobs if cooperation is encouraged.

31 Dissatisfaction with pay is not the only reason why hospitality workers change jobs.

List of Researchers	
A	Pfeffer
B	Lucas
C	Maroudas et al.
D	Ng and Sorensen
E	Enz and Siguaw
F	Deery

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 One reason for high staff turnover in the hospitality industry is poor morale.

33 Research has shown that staff have a tendency to dislike their workplace.

34 An improvement in working conditions and job security makes staff satisfied with their jobs.

35 Staff should be allowed to choose when they take breaks during the working day.

Questions 36–40

Complete the summary below.

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

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

Fun at work

Tews, Michel and Stafford carried out research on staff in an American chain of **36** ..... . They discovered that activities designed for staff to have fun improved their **37** ..... , and that management involvement led to lower staff **38** ..... . They also found that the activities needed to fit with both the company's **39** ..... and the **40** ..... of the staff. A balance was required between a degree of freedom and maintaining work standards.

TEST 11

READING

Reading Passage 1, Questions 1–13

1 creativity
2 rules
3 cities
4&5 *IN EITHER ORDER*
traffic
crime
6 competition
7 evidence
8 life
9 TRUE
10 TRUE
11 NOT GIVEN
12 FALSE
13 TRUE

Reading Passage 2, Questions 14–26

14 E
15 C
16 F
17 C
18 A
19&20 *IN EITHER ORDER*
B
D
21&22 *IN EITHER ORDER*
D
E
23 activists
24 consumerism
25 leaflets
26 police

Reading Passage 3, Questions 27–40

27 E
28 D
29 B
30 D
31 C
32 YES
33 NO
34 NO
35 NOT GIVEN
36 restaurants
37 performance
38 turnover
39 goals
40 characteristics

If you score ...

0–17	18–26	27–40
you are unlikely to get an acceptable score under examination conditions and we recommend that you spend a lot of time improving your English before you take IELTS.	you may get an acceptable score under examination conditions but we recommend that you think about having more practice or lessons before you take IELTS.	you are likely to get an acceptable score under examination conditions but remember that different institutions will find different scores acceptable.

READING

READING PASSAGE 1

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

Cutty Sark: the fastest sailing ship of all time

The nineteenth century was a period of great technological development in Britain, and for shipping the major changes were from wind to steam power, and from wood to iron and steel.

The fastest commercial sailing vessels of all time were clippers, three-masted ships built to transport goods around the world, although some also took passengers. From the 1840s until 1869, when the Suez Canal opened and steam propulsion was replacing sail, clippers dominated world trade. Although many were built, only one has survived more or less intact: *Cutty Sark*, now on display in Greenwich, southeast London.

Cutty Sark's unusual name comes from the poem *Tam O'Shanter* by the Scottish poet Robert Burns. Tam, a farmer, is chased by a witch called Nannie, who is wearing a '*cutty sark*' – an old Scottish name for a short nightdress. The witch is depicted in *Cutty Sark*'s figurehead – the carving of a woman typically at the front of old sailing ships. In legend, and in Burns's poem, witches cannot cross water, so this was a rather strange choice of name for a ship.

Cutty Sark was built in Dumbarton, Scotland, in 1869, for a shipping company owned by John Willis. To carry out construction, Willis chose a new shipbuilding firm, Scott & Linton, and ensured that the contract with them put him in a very strong position. In the end, the firm was forced out of business, and the ship was finished by a competitor.

Willis's company was active in the tea trade between China and Britain, where speed could bring shipowners both profits and prestige, so *Cutty Sark* was designed to make the journey more quickly than any other ship. On her maiden voyage, in 1870, she set sail from London, carrying large amounts of goods to China. She returned laden with tea, making the journey back to London in four months. However, *Cutty Sark* never lived up to the high expectations of her owner, as a result of bad winds and various misfortunes. On one occasion, in 1872, the ship and a rival clipper, *Thermopylae*, left port in China on the same day. Crossing the Indian Ocean, *Cutty Sark* gained a lead of over 400 miles, but then her rudder was severely damaged in stormy seas, making her impossible to steer. The ship's crew had the daunting task of repairing the rudder at sea, and only succeeded at the second attempt. *Cutty Sark* reached London a week after *Thermopylae*.

Steam ships posed a growing threat to clippers, as their speed and cargo capacity increased. In addition, the opening of the Suez Canal in 1869, the same year that *Cutty Sark* was launched, had a serious impact. While steam ships could make use of the quick, direct route between the Mediterranean and the Red Sea, the canal was of no use to sailing ships, which needed the much stronger winds of the oceans, and so had to sail a far greater distance. Steam ships reduced the journey time between Britain and China by approximately two months.

By 1878, tea traders weren't interested in *Cutty Sark*, and instead, she took on the much less prestigious work of carrying any cargo between any two ports in the world. In 1880, violence aboard the ship led ultimately to the replacement of the captain with an incompetent drunkard who stole the crew's wages. He was suspended from service, and a new captain appointed. This marked a turnaround and the beginning of the most successful period in *Cutty Sark*'s working life, transporting wool from Australia to Britain. One such journey took just under 12 weeks, beating every other ship sailing that year by around a month.

The ship's next captain, Richard Woodget, was an excellent navigator, who got the best out of both his ship and his crew. As a sailing ship, *Cutty Sark* depended on the strong trade winds of the southern hemisphere, and Woodget took her further south than any previous captain, bringing her dangerously close to icebergs off the southern tip of South America. His gamble paid off, though, and the ship was the fastest vessel in the wool trade for ten years.

As competition from steam ships increased in the 1890s, and *Cutty Sark* approached the end of her life expectancy, she became less profitable. She was sold to a Portuguese firm, which renamed her *Ferreira*. For the next 25 years, she again carried miscellaneous cargoes around the world.

Badly damaged in a gale in 1922, she was put into Falmouth harbour in southwest England, for repairs. Wilfred Dowman, a retired sea captain who owned a training vessel, recognised her and tried to buy her, but without success. She returned to Portugal and was sold to another Portuguese company. Dowman was determined, however, and offered a high price: this was accepted, and the ship returned to Falmouth the following year and had her original name restored.

Dowman used *Cutty Sark* as a training ship, and she continued in this role after his death. When she was no longer required, in 1954, she was transferred to dry dock at Greenwich to go on public display. The ship suffered from fire in 2007, and again, less seriously, in 2014, but now *Cutty Sark* attracts a quarter of a million visitors a year.

Questions 1–8

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

In boxes 1–8 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 Clippers were originally intended to be used as passenger ships.

2 *Cutty Sark* was given the name of a character in a poem.

3 The contract between John Willis and Scott & Linton favoured Willis.

4 John Willis wanted *Cutty Sark* to be the fastest tea clipper travelling between the UK and China.

5 Despite storm damage, *Cutty Sark* beat *Thermopylae* back to London.

6 The opening of the Suez Canal meant that steam ships could travel between Britain and China faster than clippers.

7 Steam ships sometimes used the ocean route to travel between London and China.

8 Captain Woodget put *Cutty Sark* at risk of hitting an iceberg.

Questions 9–13

Complete the sentences below.

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

Write your answers in boxes 9–13 on your answer sheet.

9 After 1880, *Cutty Sark* carried ..... as its main cargo during its most successful time.

10 As a captain and ..... , Woodget was very skilled.

11 *Ferreira* went to Falmouth to repair damage that a ..... had caused.

12 Between 1923 and 1954, *Cutty Sark* was used for .....

13 *Cutty Sark* has twice been damaged by ..... in the 21st century.

READING PASSAGE 2

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

SAVING THE SOIL

More than a third of the Earth's top layer is at risk. Is there hope for our planet's most precious resource?

A More than a third of the world's soil is endangered, according to a recent UN report. If we don't slow the decline, all farmable soil could be gone in 60 years. Since soil grows 95% of our food, and sustains human life in other more surprising ways, that is a huge problem.

B Peter Groffman, from the Cary Institute of Ecosystem Studies in New York, points out that soil scientists have been warning about the degradation of the world's soil for decades. At the same time, our understanding of its importance to humans has grown. A single gram of healthy soil might contain 100 million bacteria, as well as other microorganisms such as viruses and fungi, living amid decomposing plants and various minerals.

That means soils do not just grow our food, but are the source of nearly all our existing antibiotics, and could be our best hope in the fight against antibiotic-resistant bacteria. Soil is also an ally against climate change: as microorganisms within soil digest dead animals and plants, they lock in their carbon content, holding three times the amount of carbon as does the entire atmosphere. Soils also store water, preventing flood damage: in the UK, damage to buildings, roads and bridges from floods caused by soil degradation costs £233 million every year.

C If the soil loses its ability to perform these functions, the human race could be in big trouble. The danger is not that the soil will disappear completely, but that the microorganisms that give it its special properties will be lost. And once this has happened, it may take the soil thousands of years to recover.

Agriculture is by far the biggest problem. In the wild, when plants grow they remove nutrients from the soil, but then when the plants die and decay these nutrients are returned directly to the soil. Humans tend not to return unused parts of harvested crops directly to the soil to enrich it, meaning that the soil gradually becomes less fertile. In the past we developed strategies to get around the problem, such as regularly varying the types of crops grown, or leaving fields uncultivated for a season.

D But these practices became inconvenient as populations grew and agriculture had to be run on more commercial lines. A solution came in the early 20th century with the Haber-Bosch process for manufacturing ammonium nitrate. Farmers have been putting this synthetic fertiliser on their fields ever since.

But over the past few decades, it has become clear this wasn't such a bright idea. Chemical fertilisers can release polluting nitrous oxide into the atmosphere and excess is often washed away with the rain, releasing nitrogen into rivers. More recently, we have found that indiscriminate use of fertilisers hurts the soil itself, turning it acidic and salty, and degrading the soil they are supposed to nourish.

E One of the people looking for a solution to this problem is Pius Floris, who started out running a tree-care business in the Netherlands, and now advises some of the world's top soil scientists. He came to realise that the best way to ensure his trees flourished was to take care of the soil, and has developed a cocktail of beneficial bacteria, fungi and humus* to do this. Researchers at the University of Valladolid in Spain recently used this cocktail on soils destroyed by years of fertiliser overuse. When they applied Floris's mix to the desert-like test plots, a good crop of plants emerged that were not just healthy at the surface, but had roots strong enough to pierce dirt as hard as rock. The few plants that grew in the control plots, fed with traditional fertilisers, were small and weak.

F However, measures like this are not enough to solve the global soil degradation problem. To assess our options on a global scale we first need an accurate picture of what types of soil are out there, and the problems they face. That's not easy. For one thing, there is no agreed international system for classifying soil. In an attempt to unify the different approaches, the UN has created the Global Soil Map project. Researchers from nine countries are working together to create a map linked to a database that can be fed measurements from field surveys, drone surveys, satellite imagery, lab analyses and so on to provide real-time data on the state of the soil. Within the next four years, they aim to have mapped soils worldwide to a depth of 100 metres, with the results freely accessible to all.

G But this is only a first step. We need ways of presenting the problem that bring it home to governments and the wider public, says Pamela Chasek at the International Institute for Sustainable Development, in Winnipeg, Canada. 'Most scientists don't speak language that policy-makers can understand, and vice versa.' Chasek and her colleagues have proposed a goal of 'zero net land degradation'. Like the idea of carbon neutrality, it is an easily understood target that can help shape expectations and encourage action.

For soils on the brink, that may be too late. Several researchers are agitating for the immediate creation of protected zones for endangered soils. One difficulty here is defining what these areas should conserve: areas where the greatest soil diversity is present? Or areas of unspoilt soils that could act as a future benchmark of quality?

Whatever we do, if we want our soils to survive, we need to take action now.

* Humus: the part of the soil formed from dead plant material

Questions 14–17

Complete the summary below.

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

Write your answers in boxes 14–17 on your answer sheet.

Why soil degradation could be a disaster for humans

Healthy soil contains a large variety of bacteria and other microorganisms, as well as plant remains and **14** ..... . It provides us with food and also with antibiotics, and its function in storing **15** ..... has a significant effect on the climate. In addition, it prevents damage to property and infrastructure because it holds **16** ..... .

If these microorganisms are lost, soil may lose its special properties. The main factor contributing to soil degradation is the **17** ..... carried out by humans.

Questions 18–21

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

*Write the correct letter, **A–F**, in boxes 18–21 on your answer sheet.*

18 Nutrients contained in the unused parts of harvested crops

19 Synthetic fertilisers produced with the Haber-Bosch process

20 Addition of a mixture developed by Pius Floris to the soil

21 The idea of zero net soil degradation

A	may improve the number and quality of plants growing there.
B	may contain data from up to nine countries.
C	may not be put back into the soil.
D	may help governments to be more aware of soil-related issues.
E	may cause damage to different aspects of the environment.
F	may be better for use at a global level.

Questions 22–26

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

Which section contains the following information?

Write the correct letter, ***A–G****, in boxes 22–26 on your answer sheet.*

NB *You may use any letter more than once.*

22 a reference to one person's motivation for a soil-improvement project

23 an explanation of how soil stayed healthy before the development of farming

24 examples of different ways of collecting information on soil degradation

25 a suggestion for a way of keeping some types of soil safe in the near future

26 a reason why it is difficult to provide an overview of soil degradation

READING PASSAGE 3

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

Book Review

The Happiness Industry: How the Government and Big Business Sold Us Well-Being

By William Davies

'Happiness is the ultimate goal because it is self-evidently good. If we are asked why happiness matters we can give no further external reason. It just obviously does matter.' This pronouncement by Richard Layard, an economist and advocate of 'positive psychology', summarises the beliefs of many people today. For Layard and others like him, it is obvious that the purpose of government is to promote a state of collective well-being. The only question is how to achieve it, and here positive psychology – a supposed science that not only identifies what makes people happy but also allows their happiness to be measured – can show the way. Equipped with this science, they say, governments can secure happiness in society in a way they never could in the past.

It is an astonishingly crude and simple-minded way of thinking, and for that very reason increasingly popular. Those who think in this way are oblivious to the vast philosophical literature in which the meaning and value of happiness have been explored and questioned, and write as if nothing of any importance had been thought on the subject until it came to their attention. It was the philosopher Jeremy Bentham (1748–1832) who was more than anyone else responsible for the development of this way of thinking. For Bentham it was obvious that the human good consists of pleasure and the absence of pain. The Greek philosopher Aristotle may have identified happiness with self-realisation in the 4th century BC, and thinkers throughout the ages may have struggled to reconcile the pursuit of happiness with other human values, but for Bentham all this was mere metaphysics or fiction. Without knowing anything much of him or the school of moral theory he established – since they are by education and intellectual conviction illiterate in the history of ideas – our advocates of positive psychology follow in his tracks in rejecting as outmoded and irrelevant pretty much the entirety of ethical reflection on human happiness to date.

But as William Davies notes in his recent book *The Happiness Industry*, the view that happiness is the only self-evident good is actually a way of limiting moral inquiry. One of the virtues of this rich, lucid and arresting book is that it places the current cult of happiness in a well-defined historical framework. Rightly, Davies begins his story with Bentham, noting that he was far more than a philosopher. Davies writes, 'Bentham's activities were those which we might now associate with a public sector management consultant'. In the 1790s, he wrote to the Home Office suggesting that the departments of government be linked together through a set of 'conversation tubes', and to the Bank of England with a design for a printing device that could produce

unforgeable banknotes. He drew up plans for a 'frigidarium' to keep provisions such as meat, fish, fruit and vegetables fresh. His celebrated design for a prison to be known as a 'Panopticon', in which prisoners would be kept in solitary confinement while being visible at all times to the guards, was very nearly adopted. (Surprisingly, Davies does not discuss the fact that Bentham meant his Panopticon not just as a model prison but also as an instrument of control that could be applied to schools and factories.)

Bentham was also a pioneer of the 'science of happiness'. If happiness is to be regarded as a science, it has to be measured, and Bentham suggested two ways in which this might be done. Viewing happiness as a complex of pleasurable sensations, he suggested that it might be quantified by measuring the human pulse rate. Alternatively, money could be used as the standard for quantification: if two different goods have the same price, it can be claimed that they produce the same quantity of pleasure in the consumer. Bentham was more attracted by the latter measure. By associating money so closely to inner experience, Davies writes, Bentham 'set the stage for the entangling of psychological research and capitalism that would shape the business practices of the twentieth century'.

The Happiness Industry describes how the project of a science of happiness has become integral to capitalism. We learn much that is interesting about how economic problems are being redefined and treated as psychological maladies. In addition, Davies shows how the belief that inner states of pleasure and displeasure can be objectively measured has informed management studies and advertising. The tendency of thinkers such as J B Watson, the founder of behaviourism*, was that human beings could be shaped, or manipulated, by policymakers and managers. Watson had no factual basis for his view of human action. When he became president of the American Psychological Association in 1915, he 'had never even studied a single human being': his research had been confined to experiments on white rats. Yet Watson's reductive model is now widely applied, with 'behaviour change' becoming the goal of governments: in Britain, a 'Behaviour Insights Team' has been established by the government to study how people can be encouraged, at minimum cost to the public purse, to live in what are considered to be socially desirable ways.

Modern industrial societies appear to need the possibility of ever-increasing happiness to motivate them in their labours. But whatever its intellectual pedigree, the idea that governments should be responsible for promoting happiness is always a threat to human freedom.

* 'behaviourism': a branch of psychology which is concerned with observable behaviour

Questions 27–29

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

Write the correct letter in boxes 27–29 on your answer sheet.

27 What is the reviewer's attitude to advocates of positive psychology?

- **A** They are wrong to reject the ideas of Bentham.
- **B** They are over-influenced by their study of Bentham's theories.
- **C** They have a fresh new approach to ideas on human happiness.
- **D** They are ignorant about the ideas they should be considering.

28 The reviewer refers to the Greek philosopher Aristotle in order to suggest that happiness

- **A** may not be just pleasure and the absence of pain.
- **B** should not be the main goal of humans.
- **C** is not something that should be fought for.
- **D** is not just an abstract concept.

29 According to Davies, Bentham's suggestion for linking the price of goods to happiness was significant because

- **A** it was the first successful way of assessing happiness.
- **B** it established a connection between work and psychology.
- **C** it was the first successful example of psychological research.
- **D** it involved consideration of the rights of consumers.

Questions 30–34

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

*Write the correct letter, **A–G**, in boxes 30–34 on your answer sheet.*

Jeremy Bentham

Jeremy Bentham was active in other areas besides philosophy. In the 1790s he suggested a type of technology to improve **30** ..... for different Government departments. He developed a new way of printing banknotes to increase **31** ..... and also designed a method for the **32** ..... of food. He also drew up plans for a prison which allowed the **33** ..... of prisoners at all times, and believed the same design could be used for other institutions as well. When researching happiness, he investigated possibilities for its **34** ..... , and suggested some methods of doing this.

A	measurement	**B**	security	**C**	implementation
D	profits	**E**	observation	**F**	communication
G	preservation				

Questions 35–40

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

In boxes 35–40 on your answer sheet, write

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

35 One strength of *The Happiness Industry* is its discussion of the relationship between psychology and economics.

36 It is more difficult to measure some emotions than others.

37 Watson's ideas on behaviourism were supported by research on humans he carried out before 1915.

38 Watson's ideas have been most influential on governments outside America.

39 The need for happiness is linked to industrialisation.

40 A main aim of government should be to increase the happiness of the population.

TEST 4

READING

Reading Passage 1, Questions 1–13

1 FALSE
2 FALSE
3 TRUE
4 TRUE
5 FALSE
6 TRUE
7 NOT GIVEN
8 TRUE
9 wool
10 navigator
11 gale
12 training
13 fire

Reading Passage 2, Questions 14–26

14 minerals
15 carbon
16 water
17 agriculture
18 C
19 E
20 A
21 D
22 E
23 C
24 F
25 G
26 F

Reading Passage 3, Questions 27–40

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

If you score ...

0–16	17–25	26–40
you are unlikely to get an acceptable score under examination conditions and we recommend that you spend a lot of time improving your English before you take IELTS.	you may get an acceptable score under examination conditions but we recommend that you think about having more practice or lessons before you take IELTS.	you are likely to get an acceptable score under examination conditions but remember that different institutions will find different scores acceptable.

READING

READING PASSAGE 1

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

The coconut palm

For millennia, the coconut has been central to the lives of Polynesian and Asian peoples. In the western world, on the other hand, coconuts have always been exotic and unusual, sometimes rare. The Italian merchant traveller Marco Polo apparently saw coconuts in South Asia in the late 13th century, and among the mid-14th-century travel writings of Sir John Mandeville there is mention of 'great Notes of Ynde' (great Nuts of India). Today, images of palm-fringed tropical beaches are clichés in the west to sell holidays, chocolate bars, fizzy drinks and even romance.

Typically, we envisage coconuts as brown cannonballs that, when opened, provide sweet white flesh. But we see only part of the fruit and none of the plant from which they come. The coconut palm has a smooth, slender, grey trunk, up to 30 metres tall. This is an important source of timber for building houses, and is increasingly being used as a replacement for endangered hardwoods in the furniture construction industry. The trunk is surmounted by a rosette of leaves, each of which may be up to six metres long. The leaves have hard veins in their centres which, in many parts of the world, are used as brushes after the green part of the leaf has been stripped away. Immature coconut flowers are tightly clustered together among the leaves at the top of the trunk. The flower stems may be tapped for their sap to produce a drink, and the sap can also be reduced by boiling to produce a type of sugar used for cooking.

Coconut palms produce as many as seventy fruits per year, weighing more than a kilogram each. The wall of the fruit has three layers: a waterproof outer layer, a fibrous middle layer and a hard, inner layer. The thick fibrous middle layer produces coconut fibre, 'coir', which has numerous uses and is particularly important in manufacturing ropes. The woody innermost layer, the shell, with its three prominent 'eyes', surrounds the seed. An important product obtained from the shell is charcoal, which is widely used in various industries as well as in the home as a cooking fuel. When broken in half, the shells are also used as bowls in many parts of Asia.

Inside the shell are the nutrients (endosperm) needed by the developing seed. Initially, the endosperm is a sweetish liquid, coconut water, which is enjoyed as a drink, but also provides the hormones which encourage other plants to grow more rapidly and produce higher yields. As the fruit matures, the coconut water gradually solidifies to form the brilliant white, fat-rich, edible flesh or meat. Dried coconut flesh, 'copra', is made into coconut oil and coconut milk, which are widely used in cooking in different parts of the world, as well as in cosmetics. A derivative of coconut fat, glycerine, acquired strategic

importance in a quite different sphere, as Alfred Nobel introduced the world to his nitroglycerine-based invention: dynamite.

Their biology would appear to make coconuts the great maritime voyagers and coastal colonizers of the plant world. The large, energy-rich fruits are able to float in water and tolerate salt, but cannot remain viable indefinitely; studies suggest after about 110 days at sea they are no longer able to germinate. Literally cast onto desert island shores, with little more than sand to grow in and exposed to the full glare of the tropical sun, coconut seeds are able to germinate and root. The air pocket in the seed, created as the endosperm solidifies, protects the embryo. In addition, the fibrous fruit wall that helped it to float during the voyage stores moisture that can be taken up by the roots of the coconut seedling as it starts to grow.

There have been centuries of academic debate over the origins of the coconut. There were no coconut palms in West Africa, the Caribbean or the east coast of the Americas before the voyages of the European explorers Vasco da Gama and Columbus in the late 15th and early 16th centuries. 16th century trade and human migration patterns reveal that Arab traders and European sailors are likely to have moved coconuts from South and Southeast Asia to Africa and then across the Atlantic to the east coast of America. But the origin of coconuts discovered along the west coast of America by 16th century sailors has been the subject of centuries of discussion. Two diametrically opposed origins have been proposed: that they came from Asia, or that they were native to America. Both suggestions have problems. In Asia, there is a large degree of coconut diversity and evidence of millennia of human use – but there are no relatives growing in the wild. In America, there are close coconut relatives, but no evidence that coconuts are indigenous. These problems have led to the intriguing suggestion that coconuts originated on coral islands in the Pacific and were dispersed from there.

Test 3

Questions 1–8

Complete the table below.

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

Write your answers in boxes 1–8 on your answer sheet.

THE COCONUT PALM		
Part	**Description**	**Uses**
trunk	up to 30 metres	timber for houses and the making of **1** .....
leaves	up to 6 metres long	to make brushes
flowers	at the top of the trunk	stems provide sap, used as a drink or a source of **2** .....
fruits	outer layer	
	middle layer (coir fibres)	used for **3** ..... , etc.
	inner layer (shell)	a source of **4** ..... (when halved) for **5** .....
	coconut water	a drink a source of **6** ..... for other plants
	coconut flesh	oil and milk for cooking and **7** ..... glycerine (an ingredient in **8** .....)

Questions 9–13

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

In boxes 9–13 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*

9 Coconut seeds need shade in order to germinate.

10 Coconuts were probably transported to Asia from America in the 16th century.

11 Coconuts found on the west coast of America were a different type from those found on the east coast.

12 All the coconuts found in Asia are cultivated varieties.

13 Coconuts are cultivated in different ways in America and the Pacific.

READING PASSAGE 2

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

How baby talk gives infant brains a boost

A The typical way of talking to a baby – high-pitched, exaggerated and repetitious – is a source of fascination for linguists who hope to understand how 'baby talk' impacts on learning. Most babies start developing their hearing while still in the womb, prompting some hopeful parents to play classical music to their pregnant bellies. Some research even suggests that infants are listening to adult speech as early as 10 weeks before being born, gathering the basic building blocks of their family's native tongue.

B Early language exposure seems to have benefits to the brain – for instance, studies suggest that babies raised in bilingual homes are better at learning how to mentally prioritize information. So how does the sweet if sometimes absurd sound of infant-directed speech influence a baby's development? Here are some recent studies that explore the science behind baby talk.

C Fathers don't use baby talk as often or in the same ways as mothers – and that's perfectly OK, according to a new study. Mark VanDam of Washington State University at Spokane and colleagues equipped parents with recording devices and speech-recognition software to study the way they interacted with their youngsters during a normal day. 'We found that moms do exactly what you'd expect and what's been described many times over,' VanDam explains. 'But we found that dads aren't doing the same thing. Dads didn't raise their pitch or fundamental frequency when they talked to kids.' Their role may be rooted in what is called the bridge hypothesis which dates back to 1975. It suggests that fathers use less familial language to provide their children with a bridge to the kind of speech they'll hear in public. 'The idea is that a kid gets to practice a certain kind of speech with mom and another kind of speech with dad, so the kid then has a wider repertoire of kinds of speech to practice,' says VanDam.

D Scientists from the University of Washington and the University of Connecticut collected thousands of 30-second conversations between parents and their babies, fitting 26 children with audio-recording vests that captured language and sound during a typical eight-hour day. The study found that the more baby talk parents used, the more their youngsters began to babble. And when researchers saw the same babies at age two, they found that frequent baby talk had dramatically boosted vocabulary, regardless of socioeconomic status. 'Those children who listened to a lot of baby talk were talking more than the babies that listened to more

adult talk or standard speech,' says Nairán Ramírez-Esparza of the University of Connecticut. 'We also found that it really matters whether you use baby talk in a one-on-one context,' she adds. 'The more parents use baby talk one-on-one, the more babies babble, and the more they babble, the more words they produce later in life.'

E Another study suggests that parents might want to pair their youngsters up so they can babble more with their own kind. Researchers from McGill University and Université du Québec à Montréal found that babies seem to like listening to each other rather than to adults – which may be why baby talk is such a universal tool among parents. They played repeating vowel sounds made by a special synthesizing device that mimicked sounds made by either an adult woman or another baby. This way, only the impact of the auditory cues was observed. The team then measured how long each type of sound held the infants' attention. They found that the 'infant' sounds held babies' attention nearly 40 percent longer. The baby noises also induced more reactions in the listening infants, like smiling or lip moving, which approximates sound making. The team theorizes that this attraction to other infant sounds could help launch the learning process that leads to speech. 'It may be some property of the sound that is just drawing their attention,' says study co-author Linda Polka. 'Or maybe they are really interested in that particular type of sound because they are starting to focus on their own ability to make sounds. We are speculating here but it might catch their attention because they recognize it as a sound they could possibly make.'

F In a study published in *Proceedings of the National Academy of Sciences*, a total of 57 babies from two slightly different age groups – seven months and eleven and a half months – were played a number of syllables from both their native language (English) and a non-native tongue (Spanish). The infants were placed in a brain-activation scanner that recorded activity in a brain region known to guide the motor movements that produce speech. The results suggest that listening to baby talk prompts infant brains to start practicing their language skills. 'Finding activation in motor areas of the brain when infants are simply listening is significant, because it means the baby brain is engaged in trying to talk back right from the start, and suggests that seven-month-olds' brains are already trying to figure out how to make the right movements that will produce words,' says co-author Patricia Kuhl. Another interesting finding was that while the seven-month-olds responded to all speech sounds regardless of language, the brains of the older infants worked harder at the motor activations of non-native sounds compared to native sounds. The study may have also uncovered a process by which babies recognize differences between their native language and other tongues.

Questions 14–17

Look at the following ideas (Questions 14–17) and the list of researchers below.

*Match each idea with the correct researcher, **A**, **B** or **C**.*

*Write the correct letter, **A**, **B** or **C**, in boxes 14–17 on your answer sheet.*

***NB** You may use any letter more than once.*

14 the importance of adults giving babies individual attention when talking to them

15 the connection between what babies hear and their own efforts to create speech

16 the advantage for the baby of having two parents each speaking in a different way

17 the connection between the amount of baby talk babies hear and how much vocalising they do themselves

	List of Researchers
A	Mark VanDam
B	Nairán Ramirez-Esparza
C	Patricia Kuhl

Questions 18–23

Complete the summary below.

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

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

Research into how parents talk to babies

Researchers at Washington State University used **18** ..... , together with specialised computer programs, to analyse how parents interacted with their babies during a normal day. The study revealed that **19** ..... tended not to modify their ordinary speech patterns when interacting with their babies. According to an idea known as the **20** ..... , they may use a more adult type of speech to prepare infants for the language they will hear outside the family home. According to the researchers, hearing baby talk from one parent and 'normal' language from the other expands the baby's **21** ..... of types of speech which they can practise.

Meanwhile, another study carried out by scientists from the University of Washington and the University of Connecticut recorded speech and sound using special **22** ..... that the babies were equipped with. When they studied the babies again at age two, they found that those who had heard a lot of baby talk in infancy had a much larger **23** ..... than those who had not.

Questions 24–26

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

Which paragraph contains the following information?

*Write the correct letter, **A–F**, in boxes 24–26 on your answer sheet.*

24 a reference to a change which occurs in babies' brain activity before the end of their first year

25 an example of what some parents do for their baby's benefit before birth

26 a mention of babies' preference for the sounds that other babies make

READING PASSAGE 3

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

Whatever happened to the Harappan Civilisation?

New research sheds light on the disappearance of an ancient society

A The Harappan Civilisation of ancient Pakistan and India flourished 5,000 years ago, but a thousand years later their cities were abandoned. The Harappan Civilisation was a sophisticated Bronze Age society who built 'megacities' and traded internationally in luxury craft products, and yet seemed to have left almost no depictions of themselves. But their lack of self-imagery – at a time when the Egyptians were carving and painting representations of themselves all over their temples – is only part of the mystery.

B 'There is plenty of archaeological evidence to tell us about the rise of the Harappan Civilisation, but relatively little about its fall,' explains archaeologist Dr Cameron Petrie of the University of Cambridge. 'As populations increased, cities were built that had great baths, craft workshops, palaces and halls laid out in distinct sectors. Houses were arranged in blocks, with wide main streets and narrow alleyways, and many had their own wells and drainage systems. It was very much a "thriving" civilisation.' Then around 2100 BC, a transformation began. Streets went uncleaned, buildings started to be abandoned, and ritual structures fell out of use. After their final demise, a millennium passed before really large-scale cities appeared once more in South Asia.

C Some have claimed that major glacier-fed rivers changed their course, dramatically affecting the water supply and agriculture; or that the cities could not cope with an increasing population, they exhausted their resource base, the trading economy broke down or they succumbed to invasion and conflict; and yet others that climate change caused an environmental change that affected food and water provision. 'It is unlikely that there was a single cause for the decline of the civilisation. But the fact is, until now, we have had little solid evidence from the area for most of the key elements,' said Petrie. 'A lot of the archaeological debate has really only been well-argued speculation.'

D A research team led by Petrie, together with Dr Ravindanath Singh of Banaras Hindu University in India, found early in their investigations that many of the archaeological sites were not where they were supposed to be, completely altering understanding of the way that this region was inhabited in the past. When they carried out a survey of how the larger area was settled in relation to sources of water, they found inaccuracies in the published geographic locations of ancient settlements ranging from several hundred metres to many kilometres. They realised

that any attempts to use the existing data were likely to be fundamentally flawed. Over the course of several seasons of fieldwork they carried out new surveys, finding an astonishing 198 settlement sites that were previously unknown.

E Now, research published by Dr Yama Dixit and Professor David Hodell, both from Cambridge's Department of Earth Sciences, has provided the first definitive evidence for climate change affecting the plains of north-western India, where hundreds of Harappan sites are known to have been situated. The researchers gathered shells of *Melanoides tuberculata* snails from the sediments of an ancient lake and used geochemical analysis as a means of tracing the climate history of the region. 'As today, the major source of water into the lake is likely to have been the summer monsoon,' says Dixit. 'But we have observed that there was an abrupt change about 4,100 years ago, when the amount of evaporation from the lake exceeded the rainfall – indicative of a drought.' Hodell adds: 'We estimate that the weakening of the Indian summer monsoon climate lasted about 200 years before recovering to the previous conditions, which we still see today.'

F It has long been thought that other great Bronze Age civilisations also declined at a similar time, with a global-scale climate event being seen as the cause. While it is possible that these local-scale processes were linked, the real archaeological interest lies in understanding the impact of these larger-scale events on different environments and different populations. 'Considering the vast area of the Harappan Civilisation with its variable weather systems,' explains Singh, 'it is essential that we obtain more climate data from areas close to the two great cities at Mohenjodaro and Harappa and also from the Indian Punjab.'

G Petrie and Singh's team is now examining archaeological records and trying to understand details of how people led their lives in the region five millennia ago. They are analysing grains cultivated at the time, and trying to work out whether they were grown under extreme conditions of water stress, and whether they were adjusting the combinations of crops they were growing for different weather systems. They are also looking at whether the types of pottery used, and other aspects of their material culture, were distinctive to specific regions or were more similar across larger areas. This gives us insight into the types of interactive networks that the population was involved in, and whether those changed.

H Petrie believes that archaeologists are in a unique position to investigate how past societies responded to environmental and climatic change. 'By investigating responses to environmental pressures and threats, we can learn from the past to engage with the public, and the relevant governmental and administrative bodies, to be more proactive in issues such as the management and administration of water supply, the balance of urban and rural development, and the importance of preserving cultural heritage in the future.'

Questions 27–31

Reading Passage 3 has eight paragraphs, **A–H**.

Which paragraph contains the following information?

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

NB *You may use any letter more than once.*

27 proposed explanations for the decline of the Harappan Civilisation

28 reference to a present-day application of some archaeological research findings

29 a difference between the Harappan Civilisation and another culture of the same period

30 a description of some features of Harappan urban design

31 reference to the discovery of errors made by previous archaeologists

Questions 32–36

Complete the summary below.

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

Write your answers in boxes 32–36 on your answer sheet.

Looking at evidence of climate change

Yama Dixit and David Hodell have found the first definitive evidence of climate change affecting the plains of north-western India thousands of years ago. By collecting the **32** ..... of snails and analysing them, they discovered evidence of a change in water levels in a **33** ..... in the region. This occurred when there was less **34** ..... than evaporation, and suggests that there was an extended period of drought.

Petrie and Singh's team are using archaeological records to look at **35** ..... from five millennia ago, in order to know whether people had adapted their agricultural practices to changing climatic conditions. They are also examining objects including **36** ..... , so as to find out about links between inhabitants of different parts of the region and whether these changed over time.

Questions 37–40

Look at the following statements (Questions 37–40) and the list of researchers below.

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

*Write the correct letter, **A**, **B**, **C** or **D**, in boxes 37–40 on your answer sheet.*

NB *You may use any letter more than once.*

37 Finding further information about changes to environmental conditions in the region is vital.

38 Examining previous patterns of behaviour may have long-term benefits.

39 Rough calculations indicate the approximate length of a period of water shortage.

40 Information about the decline of the Harappan Civilisation has been lacking.

	List of Researchers
A	Cameron Petrie
B	Ravindanath Singh
C	Yama Dixit
D	David Hodell

TEST 3

READING

Reading Passage 1, Questions 1–13

1 furniture
2 sugar
3 ropes
4 charcoal
5 bowls
6 hormones
7 cosmetics
8 dynamite
9 FALSE
10 FALSE
11 NOT GIVEN
12 TRUE
13 NOT GIVEN

Reading Passage 2, Questions 14–26

14 B
15 C
16 A
17 B
18 recording devices
19 fathers / dads
20 bridge hypothesis
21 repertoire
22 (audio-recording) vests
23 vocabulary
24 F
25 A
26 E

Reading Passage 3, Questions 27–40

27 C
28 H
29 A
30 B
31 D
32 shells
33 lake
34 rainfall
35 grains
36 pottery
37 B
38 A
39 D
40 A

If you score ...

0–16	17–24	25–40
you are unlikely to get an acceptable score under examination conditions and we recommend that you spend a lot of time improving your English before you take IELTS.	you may get an acceptable score under examination conditions but we recommend that you think about having more practice or lessons before you take IELTS.	you are likely to get an acceptable score under examination conditions but remember that different institutions will find different scores acceptable.