40 IELTS READING TESTS

PASSAGE 2

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With Explained Answers

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TEST 1

READING PASSAGE 2

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

Nature or Nurture?

A A few years ago, in one of the most fascinating and disturbing experiments in behavioural psychology, Stanley Milgram of Yale University tested 40 subjects from all walks of life for their willingness to obey instructions given by a 'leader' in a situation in which the subjects might feel a personal distaste for the actions they were called upon to perform. Specifically, Milgram told each volunteer 'teacher-subject' that the experiment was in the noble cause of education, and was designed to test whether or not punishing pupils for their mistakes would have a positive effect on the pupils' ability to learn.

B Milgram's experimental set-up involved placing the teacher-subject before a panel of thirty switches with labels ranging from '15 volts of electricity (slight shock)' to '450 volts (danger – severe shock)' in steps of 15 volts each. The teacher-subject was told that whenever the pupil gave the wrong answer to a question, a shock was to be administered, beginning at the lowest level and increasing in severity with each successive wrong answer. The supposed 'pupil' was in reality an actor hired by Milgram to simulate receiving the shocks by emitting a spectrum of groans, screams and writhings together with an assortment of statements and expletives denouncing both the experiment and the experimenter. Milgram told the teacher-subject to ignore the reactions of the pupil, and to administer whatever level of shock was called for, as per the rule governing the experimental situation of the moment.

C As the experiment unfolded, the pupil would deliberately give the wrong answers to questions posed by the teacher, thereby bringing on various electrical punishments, even up to the danger level of 300 volts and beyond. Many of the teacher-subjects balked at administering the higher levels of punishment, and turned to Milgram with questioning looks and/or complaints about continuing the experiment. In these situations, Milgram calmly explained that the teacher-subject was to ignore the pupil's cries for mercy and carry on with the experiment. If the subject was still reluctant to proceed, Milgram said that it was important for the sake of the experiment that the procedure be followed through to the end. His final argument was, 'You have no other choice. You must go on.' What Milgram was trying to discover was the number of teacher-subjects who would be willing to administer the highest levels of shock, even in the face of strong personal and moral revulsion against the rules and conditions of the experiment.

D Prior to carrying out the experiment, Milgram explained his idea to a group of 39 psychiatrists and asked them to predict the average percentage of people in an ordinary population who would be willing to administer the highest shock level of 450 volts. The overwhelming consensus was that virtually all the teacher-subjects would refuse to obey the experimenter. The psychiatrists felt that 'most subjects would not go beyond 150 volts' and they further anticipated that only four per cent would go up to 300 volts.

Furthermore, they thought that only a lunatic fringe of about one in 1,000 would give the highest shock of 450 volts.

E What were the actual results? Well, over 60 per cent of the teacher-subjects continued to obey Milgram up to the 450-volt limit! In repetitions of the experiment in other countries, the percentage of obedient teacher-subjects was even higher, reaching 85 per cent in one country. How can we possibly account for this vast discrepancy between what calm, rational, knowledgeable people predict in the comfort of their study and what pressured, flustered, but cooperative 'teachers' actually do in the laboratory of real life?

F One's first inclination might be to argue that there must be some sort of built-in animal aggression instinct that was activated by the experiment, and that Milgram's teacher-subjects were just following a genetic need to discharge this pent-up primal urge onto the pupil by administering the electrical shock. A modern hard-core sociobiologist might even go so far as to claim that this aggressive instinct evolved as an advantageous trait, having been of survival value to our ancestors in their struggle against the hardships of life on the plains and in the caves, ultimately finding its way into our genetic make-up as a remnant of our ancient animal ways.

G An alternative to this notion of genetic programming is to see the teacher-subjects' actions as a result of the social environment under which the experiment was carried out. As Milgram himself pointed out, 'Most subjects in the experiment see their behaviour in a larger context that is benevolent and useful to society – the pursuit of scientific truth. The psychological laboratory has a strong claim to legitimacy and evokes trust and confidence in those who perform there. An action such as shocking a victim, which in isolation appears evil, acquires a completely different meaning when placed in this setting.'

H Thus, in this explanation the subject merges his unique personality and personal and moral code with that of larger institutional structures, surrendering individual properties like loyalty, self-sacrifice and discipline to the service of malevolent systems of authority.

I Here we have two radically different explanations for why so many teacher-subjects were willing to forgo their sense of personal responsibility for the sake of an institutional authority figure. The problem for biologists, psychologists and anthropologists is to sort out which of these two polar explanations is more plausible. This, in essence, is the problem of modern sociobiology – to discover the degree to which hard-wired genetic programming dictates, or at least strongly biases, the interaction of animals and humans with their environment, that is, their behaviour. Put another way, sociobiology is concerned with elucidating the biological basis of all behaviour.

Questions 14–19

Reading Passage 2 has nine paragraphs, **A–I.**

Which paragraph contains the following information?

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

14 a biological explanation of the teacher-subjects' behaviour

15 the explanation Milgram gave the teacher-subjects for the experiment

16 the identity of the pupils

17 the expected statistical outcome

18 the general aim of sociobiological study

19 the way Milgram persuaded the teacher-subjects to continue

Questions 20–22

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

Write your answers in boxes 20–22 on your answer sheet.

20 The teacher-subjects were told that they were testing whether

A a 450-volt shock was dangerous.
B punishment helps learning.
C the pupils were honest.
D they were suited to teaching.

21 The teacher-subjects were instructed to

A stop when a pupil asked them to.
B denounce pupils who made mistakes.
C reduce the shock level after a correct answer.
D give punishment according to a rule.

22 Before the experiment took place the psychiatrists

A believed that a shock of 150 volts was too dangerous.
B failed to agree on how the teacher-subjects would respond to instructions.
C underestimated the teacher-subjects' willingness to comply with experimental procedure.
D thought that many of the teacher-subjects would administer a shock of 450 volts.

Questions 23–26

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

In boxes 23–26 on your answer sheet, write

TRUE	*if the statement agrees with the information*
FALSE	*if the statement contradicts the information*
NOT GIVEN	*if there is no information on this*

23 Several of the subjects were psychology students at Yale University.

24 Some people may believe that the teacher-subjects' behaviour could be explained as a positive survival mechanism.

25 In a sociological explanation, personal values are more powerful than authority.

26 Milgram's experiment solves an important question in sociobiology.

READING PASSAGE 2

You should spend about 20 minutes on ***Questions 14–27****, which are based on Reading Passage 2 below.*

What's so funny?

John McCrone reviews recent research on humour

The joke comes over the headphones: 'Which side of a dog has the most hair? The left.' No, not funny. Try again. 'Which side of a dog has the most hair? The outside.' Hah! The punchline is silly yet fitting, tempting a smile, even a laugh. Laughter has always struck people as deeply mysterious, perhaps pointless. The writer Arthur Koestler dubbed it the luxury reflex: 'unique in that it serves no apparent biological purpose'.

Theories about humour have an ancient pedigree. Plato expressed the idea that humour is simply a delighted feeling of superiority over others. Kant and Freud felt that joke-telling relies on building up a psychic tension which is safely punctured by the ludicrousness of the punchline. But most modern humour theorists have settled on some version of Aristotle's belief that jokes are based on a reaction to or resolution of incongruity, when the punchline is either a nonsense or, though appearing silly, has a clever second meaning.

Graeme Ritchie, a computational linguist in Edinburgh, studies the linguistic structure of jokes in order to understand not only humour but language understanding and reasoning in machines. He says that while there is no single format for jokes, many revolve around a sudden and surprising conceptual shift. A comedian will present a situation followed by an unexpected interpretation that is also apt.

So even if a punchline sounds silly, the listener can see there is a clever semantic fit and that sudden mental 'Aha!' is the buzz that makes us laugh. Viewed from this angle, humour is just a form of creative insight, a sudden leap to a new perspective.

However, there is another type of laughter, the laughter of social appeasement and it is important to understand this too. Play is a crucial part of development in most young mammals. Rats produce ultrasonic squeaks to prevent their scuffles turning nasty. Chimpanzees have a 'play-face' – a gaping expression accompanied by a panting 'ah, ah' noise. In humans, these signals have mutated into smiles and laughs. Researchers believe social situations, rather than cognitive events such as jokes, trigger these instinctual markers of play or appeasement. People laugh on fairground rides or when tickled to flag a play situation, whether they feel amused or not.

Both social and cognitive types of laughter tap into the same expressive machinery in our brains, the emotion and motor circuits that produce smiles and excited vocalisations. However, if cognitive laughter is the product of more general thought processes, it should result from more expansive brain activity.

Psychologist Vinod Goel investigated humour using the new technique of 'single event' functional magnetic resonance imaging (fMRI). An MRI scanner uses magnetic fields and radio waves to track the changes in oxygenated blood that accompany mental activity. Until recently, MRI scanners needed several minutes of activity and so could not be used to track rapid thought processes such as comprehending a joke. New developments now allow half-second 'snapshots' of all sorts of reasoning and problem-solving activities.

Although Goel felt being inside a brain scanner was hardly the ideal place for appreciating a joke, he found evidence that understanding a joke involves a widespread mental shift. His scans showed that at the beginning of a joke the listener's prefrontal cortex lit up, particularly the right prefrontal believed to be critical for problem solving. But there was also activity in the temporal lobes at the side of the head (consistent with attempts to rouse stored knowledge) and in many other brain areas. Then when the punchline arrived, a new area sprang to life – the orbital prefrontal cortex. This patch of brain tucked behind the orbits of the eyes is associated with evaluating information.

Making a rapid emotional assessment of the events of the moment is an extremely demanding job for the brain, animal or human. Energy and arousal levels may need to be retuned in the blink of an eye. These abrupt changes will produce either positive or negative feelings. The orbital cortex, the region that becomes active in Goel's experiment, seems the best candidate for the site that feeds such feelings into higher-level thought processes, with its close connections to the brain's sub-cortical arousal apparatus and centres of metabolic control.

All warm-blooded animals make constant tiny adjustments in arousal in response to external events, but humans, who have developed a much more complicated internal life as a result of language, respond emotionally not only to their surroundings, but to their own thoughts. Whenever a sought-for answer snaps into place, there is a shudder of pleased recognition. Creative discovery being pleasurable, humans have learned to find ways of milking this natural response. The fact that jokes tap into our general evaluative machinery explains why the line between funny and disgusting, or funny and frightening, can be so fine. Whether a joke gives pleasure or pain depends on a person's outlook.

Humour may be a luxury, but the mechanism behind it is no evolutionary accident. As Peter Derks, a psychologist at William and Mary College in Virginia, says: 'I like to think of humour as the distorted mirror of the mind. It's creative, perceptual, analytical and lingual. If we can figure out how the mind processes humour, then we'll have a pretty good handle on how it works in general.'

Questions 14–20

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

In boxes 14–20 on your answer sheet, write

TRUE	*if the statement agrees with the information*
FALSE	*if the statement contradicts the information*
NOT GIVEN	*if there is no information on this*

14 Arthur Koestler considered laughter biologically important in several ways.

15 Plato believed humour to be a sign of above-average intelligence.

16 Kant believed that a successful joke involves the controlled release of nervous energy.

17 Current thinking on humour has largely ignored Aristotle's view on the subject.

18 Graeme Ritchie's work links jokes to artificial intelligence.

19 Most comedians use personal situations as a source of humour.

20 Chimpanzees make particular noises when they are playing.

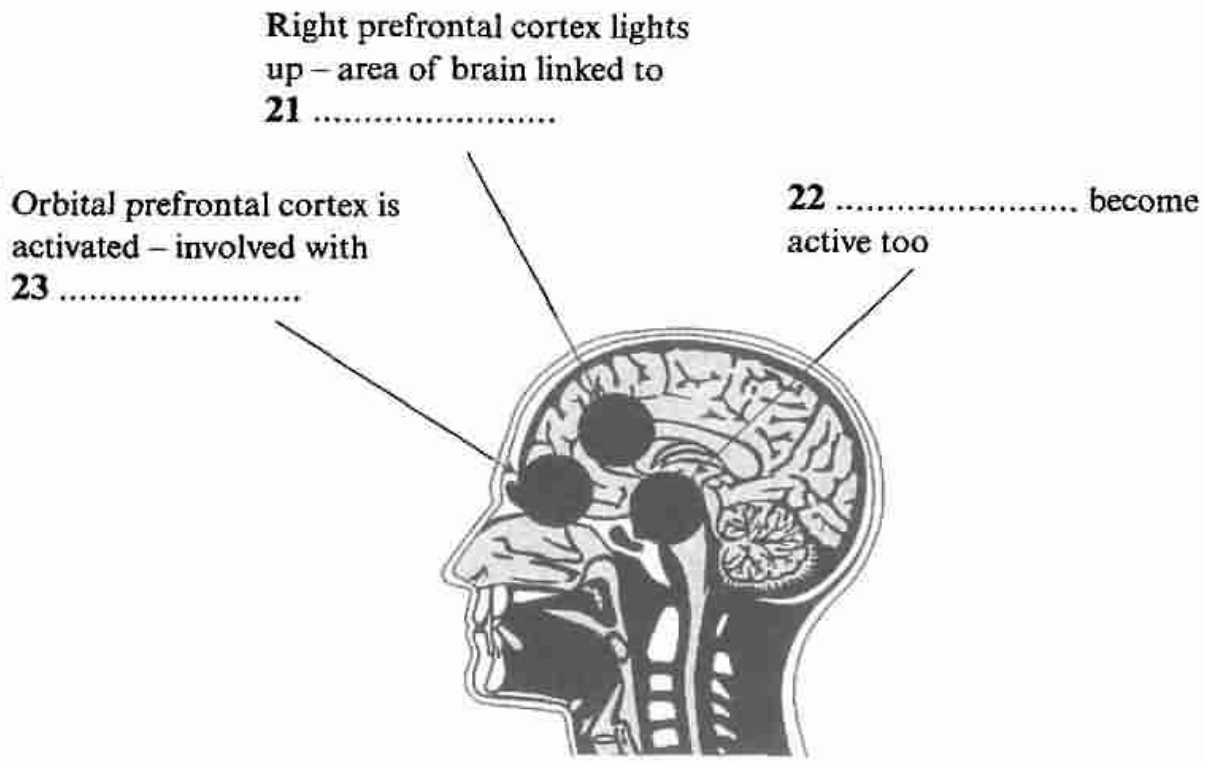
Questions 21–23

The diagram below shows the areas of the brain activated by jokes.

Label the diagram.

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

Write your answers in boxes 21–23 on your answer sheet.



Questions 24–27

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

*Write the correct letter **A–G** in boxes 24–27 on your answer sheet.*

24 One of the brain's most difficult tasks is to

25 Because of the language they have developed, humans

26 Individual responses to humour

27 Peter Derks believes that humour

A	react to their own thoughts.
B	helped create language in humans.
C	respond instantly to whatever is happening.
D	may provide valuable information about the operation of the brain.
E	cope with difficult situations.
F	relate to a person's subjective views.
G	led our ancestors to smile and then laugh.

TEST 3

READING PASSAGE 2

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

Questions 14–17

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

Choose the correct heading for paragraphs ***B*** *and* ***D–F*** *from the list of headings below.*

Write the correct number ***i–viii*** *in boxes 14–17 on your answer sheet.*

List of Headings

i	Effects of irrigation on sedimentation
ii	The danger of flooding the Cairo area
iii	Causing pollution in the Mediterranean
iv	Interrupting a natural process
v	The threat to food production
vi	Less valuable sediment than before
vii	Egypt's disappearing coastline
viii	Looking at the long-term impact

Example	Paragraph **A**	*Answer*	**vii**
14	Paragraph **B**		
Example	Paragraph **C**	*Answer*	**vi**
15	Paragraph **D**		
16	Paragraph **E**		
17	Paragraph **F**		

Disappearing Delta

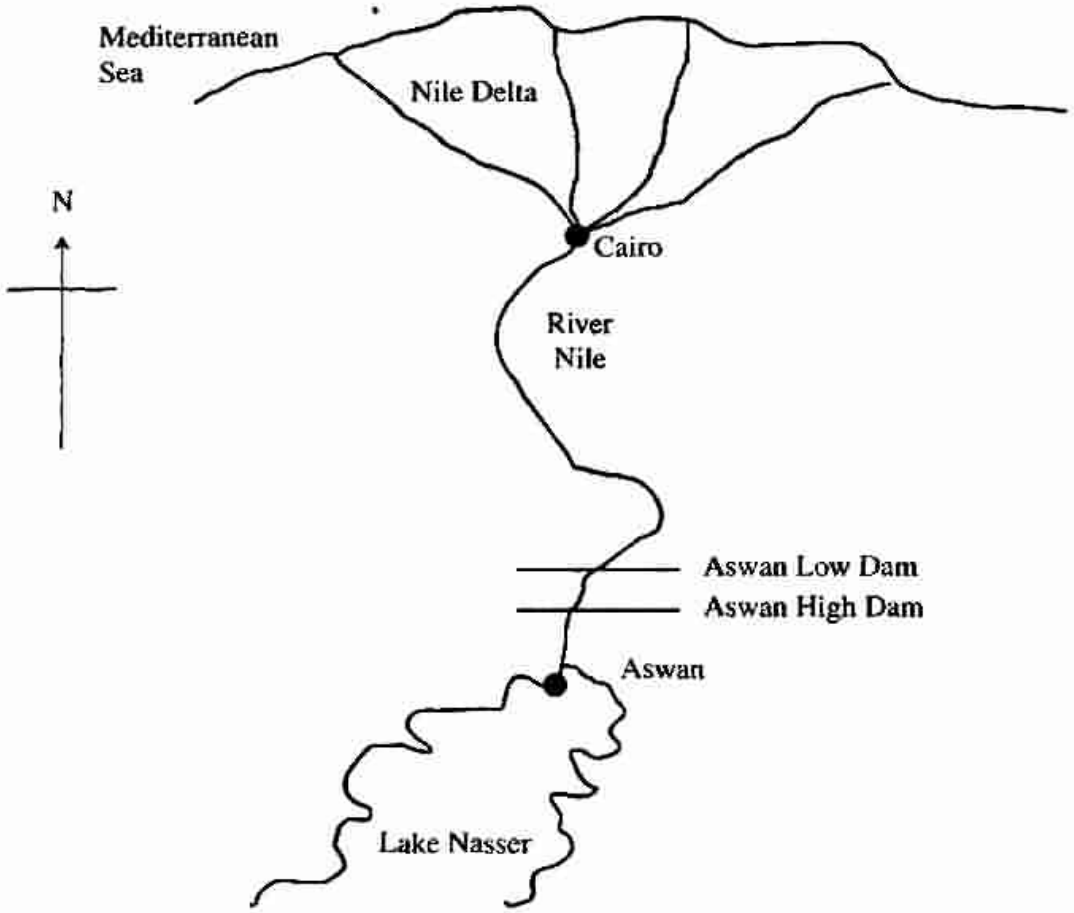
A The fertile land of the Nile delta is being eroded along Egypt's Mediterranean coast at an astounding rate, in some parts estimated at 100 metres per year. In the past, land scoured away from the coastline by the currents of the Mediterranean Sea used to be replaced by sediment brought down to the delta by the River Nile, but this is no longer happening.

B Up to now, people have blamed this loss of delta land on the two large dams at Aswan in the south of Egypt, which hold back virtually all of the sediment that used to flow down the river. Before the dams were built, the Nile flowed freely, carrying huge quantities of sediment north from Africa's interior to be deposited on the Nile delta. This continued for 7,000 years, eventually covering a region of over 22,000 square kilometres with layers of fertile silt. Annual flooding brought in new, nutrient-rich soil to the delta region, replacing what had been washed away by the sea, and dispensing with the need for fertilizers in Egypt's richest food-growing area. But when the Aswan dams were constructed in the 20th century to provide electricity and irrigation, and to protect the huge population centre of Cairo and its surrounding areas from annual flooding and drought, most of the sediment with its natural fertilizer accumulated up above the dam in the southern, upstream half of Lake Nasser, instead of passing down to the delta.

C Now, however, there turns out to be more to the story. It appears that the sediment-free water emerging from the Aswan dams picks up silt and sand as it erodes the river bed and banks on the 800-kilometre trip to Cairo. Daniel Jean Stanley of the Smithsonian Institute noticed that water samples taken in Cairo, just before the river enters the delta, indicated that the river sometimes carries more than 850 grams of sediment per cubic metre of water – almost half of what it carried before the dams were built. 'I'm ashamed to say that the significance of this didn't strike me until after I had read 50 or 60 studies,' says Stanley in *Marine Geology*. 'There is still a lot of sediment coming into the delta, but virtually no sediment comes out into the Mediterranean to replenish the coastline. So this sediment must be trapped on the delta itself.'

D Once north of Cairo, most of the Nile water is diverted into more than 10,000 kilometres of irrigation canals and only a small proportion reaches the sea directly through the rivers in the delta. The water in the irrigation canals is still or very slow-moving and thus cannot carry sediment, Stanley explains. The sediment sinks to the bottom of the canals and then is added to fields by farmers or pumped with the water into the four large freshwater lagoons that are located near the outer edges of the delta. So very little of it actually reaches the coastline to replace what is being washed away by the Mediterranean currents.

E The farms on the delta plains and fishing and aquaculture in the lagoons account for much of Egypt's food supply. But by the time the sediment has come to rest in the fields and lagoons it is laden with municipal, industrial and agricultural waste from the Cairo region, which is home to more than 40 million people. 'Pollutants are building up faster and faster,' says Stanley.



Based on his investigations of sediment from the delta lagoons, Frederic Siegel of George Washington University concurs. 'In Manzalah Lagoon, for example, the increase in mercury, lead, copper and zinc coincided with the building of the High Dam at Aswan, the availability of cheap electricity, and the development of major power-based industries,' he says. Since that time the concentration of mercury has increased significantly. Lead from engines that use leaded fuels and from other industrial sources has also increased dramatically. These poisons can easily enter the food chain, affecting the productivity of fishing and farming. Another problem is that agricultural wastes include fertilizers which stimulate increases in plant growth in the lagoons and upset the ecology of the area, with serious effects on the fishing industry.

F According to Siegel, international environmental organisations are beginning to pay closer attention to the region, partly because of the problems of erosion and pollution of the Nile delta, but principally because they fear the impact this situation could have on the whole Mediterranean coastal ecosystem. But there are no easy solutions. In the immediate future, Stanley believes that one solution would be to make artificial floods to flush out the delta waterways, in the same way that natural floods did before the construction of the dams. He says, however, that in the long term an alternative process such as desalination may have to be used to increase the amount of water available. 'In my view, Egypt must devise a way to have more water running through the river and the delta,' says Stanley. Easier said than done in a desert region with a rapidly growing population.

Questions 18–23

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

In boxes 18–23 on your answer sheet, write

YES	*if the statement reflects 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*

18 Coastal erosion occurred along Egypt's Mediterranean coast before the building of the Aswan dams.

19 Some people predicted that the Aswan dams would cause land loss before they were built.

20 The Aswan dams were built to increase the fertility of the Nile delta.

21 Stanley found that the levels of sediment in the river water in Cairo were relatively high.

22 Sediment in the irrigation canals on the Nile delta causes flooding.

23 Water is pumped from the irrigation canals into the lagoons.

Questions 24–26

*Complete the summary of paragraphs E and F with the list of words **A–H** below.*

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

In addition to the problem of coastal erosion, there has been a marked increase in the level of **24** ..... contained in the silt deposited in the Nile delta. To deal with this, Stanley suggests the use of **25** ..... in the short term, and increasing the amount of water available through **26** ..... in the longer term.

A artificial floods	**B** desalination	**C** delta waterways	**D** natural floods
E nutrients	**F** pollutants	**G** population control	**H** sediment

READING PASSAGE 2

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

Flawed Beauty: the problem with toughened glass

On 2nd August 1999, a particularly hot day in the town of Cirencester in the UK, a large pane of toughened glass in the roof of a shopping centre at Bishops Walk shattered without warning and fell from its frame. When fragments were analysed by experts at the giant glass manufacturer Pilkington, which had made the pane, they found that minute crystals of nickel sulphide trapped inside the glass had almost certainly caused the failure.

'The glass industry is aware of the issue,' says Brian Waldron, chairman of the standards committee at the Glass and Glazing Federation, a British trade association, and standards development officer at Pilkington. But he insists that cases are few and far between. 'It's a very rare phenomenon,' he says.

Others disagree. 'On average I see about one or two buildings a month suffering from nickel sulphide related failures,' says Barrie Josie, a consultant engineer involved in the Bishops Walk investigation. Other experts tell of similar experiences. Tony Wilmott of London-based consulting engineers Sandberg, and Simon Armstrong at CladTech Associates in Hampshire both say they know of hundreds of cases. 'What you hear is only the tip of the iceberg,' says Trevor Ford, a glass expert at Resolve Engineering in Brisbane, Queensland. He believes the reason is simple: 'No-one wants bad press.'

Toughened glass is found everywhere, from cars and bus shelters to the windows, walls and roofs of thousands of buildings around the world. It's easy to see why. This glass has five times the strength of standard glass, and when it does break it shatters into tiny cubes rather than large, razor-sharp shards. Architects love it because large panels can be bolted together to make transparent walls, and turning it into ceilings and floors is almost as easy.

It is made by heating a sheet of ordinary glass to about 620°C to soften it slightly, allowing its structure to expand, and then cooling it rapidly with jets of cold air. This causes the outer layer of the pane to contract and solidify before the interior. When the interior finally solidifies and shrinks, it exerts a pull on the outer layer that leaves it in permanent compression and produces a tensile force inside the glass. As cracks propagate best in materials under tension, the compressive force on the surface must be overcome before the pane will break, making it more resistant to cracking.

The problem starts when glass contains nickel sulphide impurities. Trace amounts of nickel and sulphur are usually present in the raw materials used to make glass, and nickel can also be introduced by fragments of nickel alloys falling into the molten glass. As the glass is heated, these atoms react to

form tiny crystals of nickel sulphide. Just a tenth of a gram of nickel in the furnace can create up to 50,000 crystals.

These crystals can exist in two forms: a dense form called the alpha phase, which is stable at high temperatures, and a less dense form called the beta phase, which is stable at room temperatures. The high temperatures used in the toughening process convert all the crystals to the dense, compact alpha form. But the subsequent cooling is so rapid that the crystals don't have time to change back to the beta phase. This leaves unstable alpha crystals in the glass, primed like a coiled spring, ready to revert to the beta phase without warning.

When this happens, the crystals expand by up to 4%. And if they are within the central, tensile region of the pane, the stresses this unleashes can shatter the whole sheet. The time that elapses before failure occurs is unpredictable. It could happen just months after manufacture, or decades later, although if the glass is heated – by sunlight, for example – the process is speeded up. Ironically, says Graham Dodd, of consulting engineers Arup in London, the oldest pane of toughened glass known to have failed due to nickel sulphide inclusions was in Pilkington's glass research building in Lathom, Lancashire. The pane was 27 years old.

Data showing the scale of the nickel sulphide problem is almost impossible to find. The picture is made more complicated by the fact that these crystals occur in batches. So even if, on average, there is only one inclusion in 7 tonnes of glass, if you experience one nickel sulphide failure in your building, that probably means you've got a problem in more than one pane. Josie says that in the last decade he has worked on over 15 buildings with the number of failures into double figures.

One of the worst examples of this is Waterfront Place, which was completed in 1990. Over the following decade the 40-storey Brisbane block suffered a rash of failures. Eighty panes of its toughened glass shattered due to inclusions before experts were finally called in. John Barry, an expert in nickel sulphide contamination at the University of Queensland, analysed every glass pane in the building. Using a studio camera, a photographer went up in a cradle to take photos of every pane. These were scanned under a modified microfiche reader for signs of nickel sulphide crystals. 'We discovered at least another 120 panes with potentially dangerous inclusions which were then replaced,' says Barry. 'It was a very expensive and time-consuming process that took around six months to complete.' Though the project cost A$1.6 million (nearly £700,000), the alternative – re-cladding the entire building – would have cost ten times as much.

Questions 14–17

Look at the following people and the list of statements below.

Match each person with the correct statement.

*Write the correct letter **A–H** in boxes 14–17 on your answer sheet.*

14 Brian Waldron

15 Trevor Ford

16 Graham Dodd

17 John Barry

List of Statements

A suggests that publicity about nickel sulphide failure has been suppressed

B regularly sees cases of nickel sulphide failure

C closely examined all the glass in one building

D was involved with the construction of Bishops Walk

E recommended the rebuilding of Waterfront Place

F thinks the benefits of toughened glass are exaggerated

G claims that nickel sulphide failure is very unusual

H refers to the most extreme case of delayed failure

Questions 18–23

Complete the summary with the list of words A–P below.

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

Toughened Glass

Toughened glass is favoured by architects because it is much stronger than ordinary glass, and the fragments are not as **18** ..... when it breaks. However, it has one disadvantage: it can shatter **19** ..... . This fault is a result of the manufacturing process. Ordinary glass is first heated, then cooled very **20** ..... . The outer layer **21** ..... before the inner layer, and the tension between the two layers which is created because of this makes the glass stronger. However, if the glass contains nickel sulphide impurities, crystals of nickel sulphide are formed. These are unstable, and can expand suddenly, particularly if the weather is **22** ..... . If this happens, the pane of glass may break. The frequency with which such problems occur is **23** ..... by glass experts. Furthermore, the crystals cannot be detected without sophisticated equipment.

A numerous	**B** detected	**C** quickly
D agreed	**E** warm	**F** sharp
G expands	**H** slowly	**I** unexpectedly
J removed	**K** contracts	**L** disputed
M cold	**N** moved	**O** small
P calculated		

Questions 24–26

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

In boxes 24–26 on your answer sheet, write

TRUE	*if the statement agrees with the information*
FALSE	*if the statement contradicts the information*
NOT GIVEN	*if there is no information on this*

24 Little doubt was expressed about the reason for the Bishops Walk accident.

25 Toughened glass has the same appearance as ordinary glass.

26 There is plenty of documented evidence available about the incidence of nickel sulphide failure.

TEST 5

READING PASSAGE 2

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

DELIVERING THE GOODS

The vast expansion in international trade owes much to a revolution in the business of moving freight

A International trade is growing at a startling pace. While the global economy has been expanding at a bit over 3% a year, the volume of trade has been rising at a compound annual rate of about twice that. Foreign products, from meat to machinery, play a more important role in almost every economy in the world, and foreign markets now tempt businesses that never much worried about sales beyond their nation's borders.

B What lies behind this explosion in international commerce? The general worldwide decline in trade barriers, such as customs duties and import quotas, is surely one explanation. The economic opening of countries that have traditionally been minor players is another. But one force behind the import–export boom has passed all but unnoticed: the rapidly falling cost of getting goods to market. Theoretically, in the world of trade, shipping costs do not matter. Goods, once they have been made, are assumed to move instantly and at no cost from place to place. The real world, however, is full of frictions. Cheap labour may make Chinese clothing competitive in America, but if delays in shipment tie up working capital and cause winter coats to arrive in spring, trade may lose its advantages.

C At the turn of the 20th century, agriculture and manufacturing were the two most important sectors almost everywhere, accounting for about 70% of total output in Germany, Italy and France, and 40–50% in America, Britain and Japan. International commerce was therefore dominated by raw materials, such as wheat, wood and iron ore, or processed commodities, such as meat and steel. But these sorts of products are heavy and bulky and the cost of transporting them relatively high.

D Countries still trade disproportionately with their geographic neighbours. Over time, however, world output has shifted into goods whose worth is unrelated to their size and weight. Today, it is finished manufactured products that dominate the flow of trade, and, thanks to technological advances such as lightweight components, manufactured goods themselves have tended to become lighter and less bulky. As a result, less transportation is required for every dollar's worth of imports or exports.

E To see how this influences trade, consider the business of making disk drives for computers. Most of the world's disk-drive manufacturing is concentrated in South-east Asia. This is possible only because disk drives, while valuable, are small and light and so cost little to ship. Computer manufacturers in Japan or Texas will not face hugely bigger freight bills if they import drives from Singapore rather than purchasing them on the domestic market. Distance therefore poses no obstacle to the globalisation of the disk-drive industry.

F This is even more true of the fast-growing information industries. Films and compact discs cost little to transport, even by aeroplane. Computer software can be 'exported' without ever loading it onto a ship, simply by transmitting it over telephone lines from one country to another, so freight rates and cargo-handling schedules become insignificant factors in deciding where to make the product. Businesses can locate based on other considerations, such as the availability of labour, while worrying less about the cost of delivering their output.

G In many countries deregulation has helped to drive the process along. But, behind the scenes, a series of technological innovations known broadly as *containerisation* and *intermodal transportation* has led to swift productivity improvements in cargo-handling. Forty years ago, the process of exporting or importing involved a great many stages of handling, which risked portions of the shipment being damaged or stolen along the way. The invention of the container crane made it possible to load and unload containers without capsizing the ship and the adoption of standard container sizes allowed almost any box to be transported on any ship. By 1967, dual-purpose ships, carrying loose cargo in the hold* and containers on the deck, were giving way to all-container vessels that moved thousands of boxes at a time.

H The shipping container transformed ocean shipping into a highly efficient, intensely competitive business. But getting the cargo to and from the dock was a different story. National governments, by and large, kept a much firmer hand on truck and railroad tariffs than on charges for ocean freight. This started changing, however, in the mid-1970s, when America began to deregulate its transportation industry. First airlines, then road hauliers and railways, were freed from restrictions on what they could carry, where they could haul it and what price they could charge. Big productivity gains resulted. Between 1985 and 1996, for example, America's freight railways dramatically reduced their employment, trackage, and their fleets of locomotives – while increasing the amount of cargo they hauled. Europe's railways have also shown marked, albeit smaller, productivity improvements.

I In America the period of huge productivity gains in transportation may be almost over, but in most countries the process still has far to go. State ownership of railways and airlines, regulation of freight rates and toleration of anti-competitive practices, such as cargo-handling monopolies, all keep the cost of shipping unnecessarily high and deter international trade. Bringing these barriers down would help the world's economies grow even closer.

* *hold:* ship's storage area below deck

Questions 14–17

Reading Passage 2 has nine paragraphs, **A–I**.

Which paragraph contains the following information?

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

14 a suggestion for improving trade in the future

15 the effects of the introduction of electronic delivery

16 the similar cost involved in transporting a product from abroad or from a local supplier

17 the weakening relationship between the value of goods and the cost of their delivery

Questions 18–22

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

In boxes 18–22 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*

18 International trade is increasing at a greater rate than the world economy.

19 Cheap labour guarantees effective trade conditions.

20 Japan imports more meat and steel than France.

21 Most countries continue to prefer to trade with nearby nations.

22 Small computer components are manufactured in Germany.

Questions 23–26

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

*Write the correct letter, **A–K**, in boxes 23–26 on your answer sheet.*

THE TRANSPORT REVOLUTION

Modern cargo-handling methods have had a significant effect on **23** ..... as the business of moving freight around the world becomes increasingly streamlined. Manufacturers of computers, for instance, are able to import **24** ..... from overseas, rather than having to rely on a local supplier. The introduction of **25** ..... has meant that bulk cargo can be safely and efficiently moved over long distances. While international shipping is now efficient, there is still a need for governments to reduce **26** ..... in order to free up the domestic cargo sector.

A	tariffs	**B**	components	**C**	container ships
D	output	**E**	employees	**F**	insurance costs
G	trade	**H**	freight	**I**	fares
J	software	**K**	international standards		

Test 2

READING PASSAGE 2

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

GREYING POPULATION STAYS IN THE PINK

Elderly people are growing healthier, happier and more independent, say American scientists. The results of a 14-year study to be announced later this month reveal that the diseases associated with old age are afflicting fewer and fewer people and when they do strike, it is much later in life.

In the last 14 years, the National Long-term Health Care Survey has gathered data on the health and lifestyles of more than 20,000 men and women over 65. Researchers, now analysing the results of data gathered in 1994, say arthritis, high blood pressure and circulation problems - the major medical complaints in this age group - are troubling a smaller proportion every year. And the data confirms that the rate at which these diseases are declining continues to accelerate. Other diseases of old age - dementia, stroke, arteriosclerosis and emphysema - are also troubling fewer and fewer people.

'It really raises the question of what should be considered normal ageing,' says Kenneth Manton, a demographer from Duke University in North Carolina. He says the problems doctors accepted as normal in a 65-year-old in 1982 are often not appearing until people are 70 or 75.

Clearly, certain diseases are beating a retreat in the face of medical advances. But there may be other contributing factors. Improvements in childhood nutrition in the first quarter of the twentieth century, for example, gave today's elderly people a better start in life than their predecessors,

On the downside, the data also reveals failures in public health that have caused surges in some illnesses. An increase in some cancers and bronchitis may reflect changing smoking habits and poorer air quality, say the researchers. These may be subtle influences ' says Manton, 'but our subjects have been exposed to worse and worse pollution for over 60 years. It's not surprising we see some effect.'

One interesting correlation Manton uncovered is that better-educated people are likely to live longer. For example, 65-year-old women with fewer than eight years of schooling are expected on average, to live to 82. Those who continued their education live an extra seven years Although some of this can be attributed to a higher income, Manton believes it is mainly because educated people seek more medical attention.

The survey also assessed how independent people over 65 were, and again found a striking trend. Almost 80% of those in the 1994 survey could complete everyday activities ranging from eating and dressing unaided to complex tasks such as cooking and managing their finances. That represents a significant drop in the number of disabled old people in the population. If the trends apparent in the United States 14 years ago had continued,

researchers calculate there would be an additional one million disabled elderly people in today's population. According to Manton, slowing the trend has saved the United States government's Medicare system more than $200 billion, suggesting that the greying of America's population may prove less of a financial burden than expected.

The increasing self-reliance of many elderly people is probably linked to a massive increase in the use of simple home medical aids. For instance, the use of raised toilet seats has more than doubled since the start of the study, and the use of bath seats has grown by more than 50%. These developments also bring some health benefits, according to a report from the Macarthur Foundation's research group on successful ageing. The group found that those elderly people who were able to retain a sense of independence were more likely to stay healthy in old age.

Maintaining a level of daily physical activity may help mental functioning, says Carl Cotman, a neuroscientist at the University of California at Irvine. He found that rats that exercise on a treadmill have raised levels of brain-derived neurotrophic factor coursing through their brains. Cotman believes this hormone, which keeps neurons functioning, may prevent the brains of active humans from deteriorating.

As part of the same study, Teresa Seeman, a social epidemiologist at the University of Southern California in Los Angeles, found a connection between self-esteem and stress in people over 70. In laboratory simulations of challenging activities such as driving, those who feit in control of their lives pumped out lower levels of stress hormones such as cortisol. Chronically high levels of these hormones have been linked to heart disease.

But independence can have drawbacks. Seeman found that elderly people who felt emotionally isolated maintained higher levels of stress hormones even when asleep. The research suggests that older people fare best when they feel independent but know they can get help when they need it.

'Like much research into ageing, these results support common sense,' says Seeman, They also show that we may be underestimating the impact of these simple factors. 'The sort of thing that your grandmother always told you turns out to be right on target,' she says.

Questions 14-22

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

Write the correct letter, A-Q, in boxes 14-22 on your answer sheet.

Research carried out by scientists in the United States has shown that the proportion of people over 65 suffering from the most common age-related medical problems is 14 ..... and that the speed of this change is 15..... It also seems that these diseases *ere* affecting people 16 ..... in life than they did in the past. This is largely due to developments in 17 ....., but other factors such as improved 18..... may also be playing a part. Increases in some other illnesses may be due to changes in personal habits and to 19..... The research establishes a link between levels of 20 ..... and life expectancy. It also shows that there has been a considerable reduction in the number of elderly people who are 21 ..... which means that the 22 ..... involved in supporting this section of the population may be less than previously predicted.

A cost	B falling	C technology
D undernourished	E earlier	F later
G disabled	H more	I increasing
J nutrition	K education	L constant
M medicine	N pollution	O environmental
P health	Q independent	

Questions 23-26

Complete each sentence with the correct ending, A-H, below. Write the correct letter, A-H, in boxes 23-26 on your answer sheet.

23 Home medical aids

24 Regular amounts or exercise

25 Feelings of control over life

26 Feelings of loneliness

A may cause heart disease.
B can be helped by hormone treatment.
C may cause rises in levels of stress hormones.
D have cost the United States government more than $200 billion.
E may help prevent mental decline.
F may get stronger at night.
G allow old people to be more independent.
H can reduce stress in difficult situations.

TEST 7

READING PASSAGE 2

*You should spend about 20 minutes on **Questions 14-27,** which are based on Reading Passage 2 on the following pages.*

Questions 14-18

Reading Passage 2 contains six Key Points,

*Choose the correct heading for Key Points **TWO** to **SIX** from the list of headings below.*

*Write the correct number, **i-viii,** in boxes 14-18 on your answer sheet.*

List of Headings

i Ensure the reward system is fair
ii Match rewards lo individuals
iii Ensure targets are realistic
iv Link rewards to achievement
v Encourage managers to take more responsibility
vi Recognise changes in employees' performance over time
vii Establish targets and give feedback
viii Ensure employees are suited to their jobs

Example	*Answer*
Key Point **One**	**viii**

14 Key Point **Two**

15 Key Point **Three**

16 Key Point **Four**

17 Key Point **Five**

18 Key Point **Six**

Test 3

Motivating Employees under Adverse Condition

THE CHALLENGE

It is a great deal easier to motivate employees in a growing organisation than a declining one. When organisations are expanding and adding personnel, promotional opportunities, pay rises, and the excitement of being associated with a dynamic organisation create Slings of optimism. Management is able ta use the growth to entice and encourage employees. When an organisation is shrinking, the best and most mobile workers are prone to leave voluntarily. Unfortunately, they are the ones the organisation can least afford to lose - those with me highest skills and experience. The minor employees remain because their]ob options are limited.

Morale also surfers during decline. People fear they may be the next to be made redundant. Productivity often suffers, as employees spend their time sharing rumours and providing one another with moral support rather than focusing on their jobs. For those whose jobs are secure, pay increases are rarely possible. Pay cuts, unheard of during times of growth, may even be imposed. The challenge to management is how to motivate employees under such retrenchment conditions. The ways of meeting this challenge can be broadly divided into six Key Points, which are outlined below.

KEY POINT ONE

There is an abundance of evidence to support the motivational benefits that result from carefully matching people to jobs. For example, if the job is running a small business or an autonomous unit within a larger business, high achievers should be sought. However, if the job to be filled is a managerial post in a large bureaucratic organisation, a candidate who has a high need for power and a low need for affiliation should be selected. Accordingly, high achievers should not be put into jobs that are inconsistent with their needs. High achievers will do best when the job provides moderately challenging goals and where there is independence and feedback. However, it should be remembered that not everybody is motivated by jobs that are high in independence, variety and responsibility.

KEY POINT TWO

The literature on goal-setting theory suggests that managers should ensure that all employees have specific goals and receive comments on how well they are doing in those goals. For those with high achievement needs, typically a minority in any organisation, the existence of external goals is less important because high achievers are already internally motivated. The next factor to be determined is whether the goals should be assigned by a manager or collectively set in conjunction with the employees. The answer to that depends on perceptions

the culture, however, goals should be assigned. If participation and the culture are incongruous, employees are likely to perceive the participation process as manipulative and be negatively affected by it.

KEY POINT THREE

Regardless of whether goals are achievable or well within management's perceptions of the employee's ability, if employees see them as unachievable they will reduce their effort. Managers must be sure, therefore, that employees feel confident that their efforts *can* lead to performance goals. For managers, this means that employees must have the capability of doing the job and must regard the appraisal process as valid.

KEY POINT FOUR

Since employees have different needs, what acts as a reinforcement far one may not for another. Managers could use their knowledge of each employee to personalise the rewards over which they have control. Some of the more obvious rewards that managers allocate include pay, promotions, autonomy, job scope and depth, and the opportunity lo participate in goal-setting and decision-making.

KEY POINT FIVE

Managers need to make rewards contingent on performance. To reward factors other than performance will only reinforce those other factors. Key rewards such as pay increases and promotions or advancements should be allocated for the attainment of the employee's specific goals. Consistent with maximising the impact of rewards, managers should look for ways to increase their visibility. Eliminating the secrecy surrounding pay by openly communicating everyone's remuneration, publicising performance bonuses and allocating annual salary increases in a lump sum rather than spreading them out over an entire year are examples of actions that will make rewards more visible and potentially more motivating.

KEY POINT SIX

The way rewards ore distributed should be transparent so that employees perceive that rewards or outcomes are equitable and equal to the inputs given. On a simplistic level, experience, abilities, effort and other obvious inputs should explain differences in pay, responsibility and other obvious outcomes. The problem, however, is complicated by the existence of dozens of inputs and outcomes ana by the Fact that employee groups place different degrees of importance on them. For instance, a study comparing clerical and production workers identified nearly twenty inputs and outcomes. The clerical workers considered factors such as quality of work performed and job knowledge near the top of their list, but these were at the bottom of the production workers' list. Similarly, production workers thought that the most important inputs were intelligence and personal involvement with task accomplishment, two factors that were quite low in the importance ratings of the clerks. There were also important, though less dramatic, differences on the outcome side. For example, production workers rated advancement very highly, whereas clerical workers rated advancement in the lower third of their list. Such findings suggest that one person's equity is another's inequity, so an ideal should probably weigh different inputs and outcomes according to employee group.

Questions 19-24

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

In boxes 19-24 on your answer sheet, write

YES *if the statement t 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*

19 A shrinking organisation lends to lose its less skilled employees rather than its more skilled employees,

20 **It is easier ,o manage** a **small business .ban a large business.**

21 **High achievers are well suited lo team work.**

22 **Some employees can fee! manipulated when asked to participate ,in goal-setting.**

23 **The staff appraisal process should be designed by employees.**

24 **Employees' earnings should be disclosed to everyone within the organisation.**

Questions 25-27

Look at ,the follow groups of worker (Question25-27)and the list of descriptions **below**

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

Write the correct letter, A-E, in boxes 25-27 on your answer sheet.

25 high achievers

26 clerical workers

27 production workers

List of Descriptions

A They judge promotion to be important.
B They have less need of external goats.
C They think that the quality of their work is important.
D They resist goals which are imposed.
E They have limited job options.

TEST 8

READINGPASSAGE 2

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

Literate women make better mothers?

Children in developing countries are healthier and more likely to survive past the age of five when their mothers can read and write. Experts in public health accepted this idea decades ago, but until now no one has been able to show that a woman's ability to read in itself improves her children's chances of survival.

Most literate women learnt to read in primary school, and the fact that a woman has had an education may simply indicate her family's wealth or that it values its children more highly. Now a long-term study carried out in Nicaragua has eliminated these factors by showing that teaching reading to poor adult women, who would otherwise have remained illiterate, has a direct effect on their children's health and survival.

In 1979, the government of Nicaragua established a number of social programmes, including a National Literacy Crusade. By 1985, about 300,000 illiterate adults from all over the country, many of whom had never attended primary school, had learnt how to read, write and use numbers.

During this period, researchers from the Liverpool School of Tropical Medicine, the Central American Institute of Health in Nicaragua, the National Autonomous University of Nicaragua and the Costa Rican Institute of Health interviewed nearly 3,000 women, some of whom had learnt to read as children, some during the literacy crusade and some who had never learnt at all. The women were asked how many children they had given birth to and how many of them had died in infancy. The research teams also examined the surviving children to find out how well-nourished they were.

The investigators' findings were striking. In the late 1970s, the infant mortality rate for the children of illiterate mothers was around 110 deaths per thousand live births. At this point in their lives, Those mothers who later went on to learn to read had a similar level of child mortality(105/1000).For women educated in primary school, however, the infant mortality rate was significantly lower, at 80 per thousand.

In 1985, after the National Literacy Crusade had ended, the infant mortality figures for those who remained illiterate and for those educated in primary school remained more or less unchanged. For those women who learnt to read through the campaign, the infant mortality rate was 84 per thousand, an impressive 21 points lower than for those women who were still illiterate. The children of the newly-literate mothers were also better nourished than those of women who could not read.

Why are the children of literate mothers better off? According to Peter Sandiford of the Liverpool School of Tropical Medicine, no one knows for certain. Child health was not on the curriculum during the women's lessons, so he and his colleagues are looking at other factors. They are working with the same group of 3,000 women, to try to find out whether reading mothers make better use of hospitals and clinics, opt for smaller families, exert more control at home, learn modern childcare techniques more quickly, or whether they merely have more respect for themselves and their children.

The Nicaraguan study may have important implications for governments and aid agencies that need to know where to direct their resources. Sandiford says that there is increasing evidence that female education, at any age, is 'an important health intervention in its own right' .The results of the study lend support to the World Bank's recommendation that education budgets in developing countries should be increased, not just to help their economies, but also to improve child health.

'We've known for a long time that maternal education is important,' says John Cleland of the London School of Hygiene and Tropical Medicine. 'But we thought that even if we started educating girls today, we'd have to wait a generation for the pay-off. The Nicaraguan study suggests we may be able to bypass that.'

Cleland warns that the Nicaraguan crusade was special in many ways, and similar campaigns elsewhere might not work as well. It is notoriously difficult to teach adults skills that do not have an immediate impact on their everyday lives, and many literacy campaigns in other countries have been much less successful. 'The crusade was part of a larger effort to bring a better life to the people,' says Cleland. Replicating these conditions in other countries will be a major challenge for development workers.

Questions 14-18

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

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

NB You may use any letter more than once

The Nicaraguan National Literacy Crusade aimed to teach large numbers of illiterate **14**……. to read and write. Public health experts have known for many years that there is a connection between child health and **15**…… However, it has not previously been known whether these two factors were directly linked or not. This question has been investigated by **16**……. in Nicaragua. As a result, factors such as **I7**…….. and attitudes to children have been eliminated, and it has been shown that**18**……. can in itself improve infant health and survival.

A child literacy	B men und women	C an international research team
D medical care	E mortality	F maternal literacy
G adults and children	H paternal literacy	I a National Literacy Crusade
J family wealth		

91

Test 4

Questions 19-24

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

In boxes 19-24 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

19 About a thousand or the women interviewed by the researchers had learnt to read they were children.

20 Before the National Literacy Crusade, illiterate women had approximately the same levels of infant mortality as those who had learnt to read in primary school. "

21 Before and after the National Literacy Crusade, the child mortality rate for the illiterate. women stayed at about 110 deaths for each thousand live births.

22 The women who had learnt to read through the National Literacy Crusade showed the greatest change in infant mortality levels.

23 The women who had learnt to read through the National Literacy Crusade had the lowest rates of child mortality.

24 After the National Literacy Crusade, the children of the women who remained illiterate were found to be severely malnourished.

Questions 25 and 26

Choose TWO letters, A-E

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

Which TWO important implications drawn from the Nicaraguan study are mentioned by the writer of the passage?

A It is better to educate mature women than young girls

B Similar campaigns in other countries would be equally successful.

C The effects of maternal literacy programmes can be seen very quickly

D Improving child health can quickly affect a country's economy.

E Money spent on female education will improve child health.

TEST 9

READING PASSAGE 2

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

Questions 14–20

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

*Choose the correct heading for paragraphs **A** and **C–H** from the list of headings below.*

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

List of Headings

i	Scientists' call for a revision of policy
ii	An explanation for reduced water use
iii	How a global challenge was met
iv	Irrigation systems fall into disuse
v	Environmental effects
vi	The financial cost of recent technological improvements
vii	The relevance to health
viii	Addressing the concern over increasing populations
ix	A surprising downward trend in demand for water
x	The need to raise standards
xi	A description of ancient water supplies

14 Paragraph **A**

Example	*Answer*
Paragraph **B**	**iii**

15 Paragraph **C**

16 Paragraph **D**

17 Paragraph **E**

18 Paragraph **F**

19 Paragraph **G**

20 Paragraph **H**

MAKING EVERY DROP COUNT

A The history of human civilisation is entwined with the history of the ways we have learned to manipulate water resources. As towns gradually expanded, water was brought from increasingly remote sources, leading to sophisticated engineering efforts such as dams and aqueducts. At the height of the Roman Empire, nine major systems, with an innovative layout of pipes and well-built sewers, supplied the occupants of Rome with as much water per person as is provided in many parts of the industrial world today.

B During the industrial revolution and population explosion of the 19th and 20th centuries, the demand for water rose dramatically. Unprecedented construction of tens of thousands of monumental engineering projects designed to control floods, protect clean water supplies, and provide water for irrigation and hydropower brought great benefits to hundreds of millions of people. Food production has kept pace with soaring populations mainly because of the expansion of artificial irrigation systems that make possible the growth of 40 % of the world's food. Nearly one fifth of all the electricity generated worldwide is produced by turbines spun by the power of falling water.

C Yet there is a dark side to this picture: despite our progress, half of the world's population still suffers, with water services inferior to those available to the ancient Greeks and Romans. As the United Nations report on access to water reiterated in November 2001, more than one billion people lack access to clean drinking water; some two and a half billion do not have adequate sanitation services. Preventable water-related diseases kill an estimated 10,000 to 20,000 children every day, and the latest evidence suggests that we are falling behind in efforts to solve these problems.

D The consequences of our water policies extend beyond jeopardising human health. Tens of millions of people have been forced to move from their homes – often with little warning or compensation – to make way for the reservoirs behind dams. More than 20 % of all freshwater fish species are now threatened or endangered because dams and water withdrawals have destroyed the free-flowing river ecosystems where they thrive. Certain irrigation practices degrade soil quality and reduce agricultural productivity. Groundwater aquifers* are being pumped down faster than they are naturally replenished in parts of India, China, the USA and elsewhere. And disputes over shared water resources have led to violence and continue to raise local, national and even international tensions.

* underground stores of water

E At the outset of the new millennium, however, the way resource planners think about water is beginning to change. The focus is slowly shifting back to the provision of basic human and environmental needs as top priority – ensuring 'some for all,' instead of 'more for some'. Some water experts are now demanding that existing infrastructure be used in smarter ways rather than building new facilities, which is increasingly considered the option of last, not first, resort. This shift in philosophy has not been universally accepted, and it comes with strong opposition from some established water organisations. Nevertheless, it may be the only way to address successfully the pressing problems of providing everyone with clean water to drink, adequate water to grow food and a life free from preventable water-related illness.

F Fortunately – and unexpectedly – the demand for water is not rising as rapidly as some predicted. As a result, the pressure to build new water infrastructures has diminished over the past two decades. Although population, industrial output and economic productivity have continued to soar in developed nations, the rate at which people withdraw water from aquifers, rivers and lakes has slowed. And in a few parts of the world, demand has actually fallen.

G What explains this remarkable turn of events? Two factors: people have figured out how to use water more efficiently, and communities are rethinking their priorities for water use. Throughout the first three-quarters of the 20th century, the quantity of freshwater consumed per person doubled on average; in the USA, water withdrawals increased tenfold while the population quadrupled. But since 1980, the amount of water consumed per person has actually decreased, thanks to a range of new technologies that help to conserve water in homes and industry. In 1965, for instance, Japan used approximately 13 million gallons* of water to produce $1 million of commercial output; by 1989 this had dropped to 3.5 million gallons (even accounting for inflation) – almost a quadrupling of water productivity. In the USA, water withdrawals have fallen by more than 20 % from their peak in 1980.

H On the other hand, dams, aqueducts and other kinds of infrastructure will still have to be built, particularly in developing countries where basic human needs have not been met. But such projects must be built to higher specifications and with more accountability to local people and their environment than in the past. And even in regions where new projects seem warranted, we must find ways to meet demands with fewer resources, respecting ecological criteria and to a smaller budget.

* 1 gallon: 4.546 litres

Questions 21–26

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

In boxes 21–26 on your answer sheet, write

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*

21 Water use per person is higher in the industrial world than it was in Ancient Rome.

22 Feeding increasing populations is possible due primarily to improved irrigation systems.

23 Modern water systems imitate those of the ancient Greeks and Romans.

24 Industrial growth is increasing the overall demand for water.

25 Modern technologies have led to a reduction in domestic water consumption.

26 In the future, governments should maintain ownership of water infrastructures.

TEST 10

READING PASSAGE 2

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

The True Cost of Food

A For more than forty years the cost of food has been rising. It has now reached a point where a growing number of people believe that it is far too high, and that bringing it down will be one of the great challenges of the twenty first century. That cost, however, is not in immediate cash. In the West at least, most food is now far cheaper to buy in relative terms than it was in 1960. The cost is in the collateral damage of the very methods of food production that have made the food cheaper: in the pollution of water, the enervation of soil, the destruction of wildlife, the harm to animal welfare and the threat to human health caused by modern industrial agriculture.

B First mechanisation, then mass use of chemical fertilisers and pesticides, then monocultures, then battery rearing of livestock, and now genetic engineering – the onward march of intensive farming has seemed unstoppable in the last half-century, as the yields of produce have soared. But the damage it has caused has been colossal. In Britain, for example, many of our best-loved farmland birds, such as the skylark, the grey partridge, the lapwing and the corn bunting, have vanished from huge stretches of countryside, as have even more wild flowers and insects. This is a direct result of the way we have produced our food in the last four decades. Thousands of miles of hedgerows, thousands of ponds, have disappeared from the landscape. The faecal filth of salmon farming has driven wild salmon from many of the sea lochs and rivers of Scotland. Natural soil fertility is dropping in many areas because of continuous industrial fertiliser and pesticide use, while the growth of algae is increasing in lakes because of the fertiliser run-off.

C Put it all together and it looks like a battlefield, but consumers rarely make the connection at the dinner table. That is mainly because the costs of all this damage are what economists refer to as externalities: they are outside the main transaction, which is for example producing and selling a field of wheat, and are borne directly by neither producers nor consumers. To many, the costs may not even appear to be financial at all, but merely aesthetic – a terrible shame, but nothing to do with money. And anyway they, as consumers of food, certainly aren't paying for it, are they?

D But the costs to society can actually be quantified and, when added up, can amount to staggering sums. A remarkable exercise in doing this has been carried out by one of the world's leading thinkers on the future of agriculture, Professor Jules Pretty, Director of the Centre for Environment and Society at the University of Essex. Professor Pretty and his colleagues calculated the externalities of British agriculture for one particular year. They added up the costs of repairing the damage it caused, and came up with a total figure of £2,343m. This is equivalent to £208 for every hectare of arable land and permanent pasture, almost as much again as the total government and EU spend on British farming in that year. And according to Professor Pretty, it was a conservative estimate.

E The costs included: £120m for removal of pesticides; £16m for removal of nitrates; £55m for removal of phosphates and soil; £23m for the removal of the bug cryptosporidium from drinking water by water companies; £125m for damage to wildlife habitats, hedgerows and dry stone walls; £1,113m from emissions of gases likely to contribute to climate change; £106m from soil erosion and organic carbon losses; £169m from food poisoning; and £607m from cattle disease. Professor Pretty draws a simple but memorable conclusion from all this: our food bills are actually threefold. We are paying for our supposedly cheaper food in three separate ways: once over the counter, secondly through our taxes, which provide the enormous subsidies propping up modern intensive farming, and thirdly to clean up the mess that modern farming leaves behind.

F So can the true cost of food be brought down? Breaking away from industrial agriculture as the solution to hunger may be very hard for some countries, but in Britain, where the immediate need to supply food is less urgent, and the costs and the damage of intensive farming have been clearly seen, it may be more feasible. The government needs to create sustainable, competitive and diverse farming and food sectors, which will contribute to a thriving and sustainable rural economy, and advance environmental, economic, health, and animal welfare goals.

G But if industrial agriculture is to be replaced, what is a viable alternative? Professor Pretty feels that organic farming would be too big a jump in thinking and in practices for many farmers. Furthermore, the price premium would put the produce out of reach of many poorer consumers. He is recommending the immediate introduction of a 'Greener Food Standard', which would push the market towards more sustainable environmental practices than the current norm, while not requiring the full commitment to organic production. Such a standard would comprise agreed practices for different kinds of farming, covering agrochemical use, soil health, land management, water and energy use, food safety and animal health. It could go a long way, he says, to shifting consumers as well as farmers towards a more sustainable system of agriculture.

Questions 14–17

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

Which paragraph contains the following information?

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

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

14 a cost involved in purifying domestic water

15 the stages in the development of the farming industry

16 the term used to describe hidden costs

17 one effect of chemicals on water sources

Questions 18–21

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

In boxes 18–21 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*

18 Several species of wildlife in the British countryside are declining.

19 The taste of food has deteriorated in recent years.

20 The financial costs of environmental damage are widely recognised.

21 One of the costs calculated by Professor Pretty was illness caused by food.

Questions 22–26

Complete the summary below.

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

Write your answers in boxes 22–26 on your answer sheet.

Professor Pretty concludes that our **22** ..... are higher than most people realise, because we make three different types of payment. He feels it is realistic to suggest that Britain should reduce its reliance on **23** ..... .
Although most farmers would be unable to adapt to **24** ....., Professor Pretty wants the government to initiate change by establishing what he refers to as a **25** ..... . He feels this would help to change the attitudes of both **26** .....and ..... .

READING PASSAGE 2

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

Questions 14–19

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

*Choose the correct headings for sections **A–F** from the list of headings below.*

*Write the correct number, **i–x**, in boxes 14–19 on your answer sheet.*

List of Headings

- **i** The results of the research into blood-variants
- **ii** Dental evidence
- **iii** Greenberg's analysis of the dental and linguistic evidence
- **iv** Developments in the methods used to study early population movements
- **v** Indian migration from Canada to the U.S.A.
- **vi** Further genetic evidence relating to the three-wave theory
- **vii** Long-standing questions about prehistoric migration to America
- **viii** Conflicting views of the three-wave theory, based on non-genetic evidence
- **ix** Questions about the causes of prehistoric migration to America
- **x** How analysis of blood-variants measures the closeness of the relationship between different populations

14 Section **A**

15 Section **B**

16 Section **C**

17 Section **D**

18 Section **E**

19 Section **F**

Example	*Answer*
Section **G**	**viii**

Population movements and genetics

A Study of the origins and distribution of human populations used to be based on archaeological and fossil evidence. A number of techniques developed since the 1950s, however, have placed the study of these subjects on a sounder and more objective footing. The best information on early population movements is now being obtained from the 'archaeology of the living body', the clues to be found in genetic material.

B Recent work on the problem of when people first entered the Americas is an example of the value of these new techniques. North-east Asia and Siberia have long been accepted as the launching ground for the first human colonisers of the New World[1]. But was there one major wave of migration across the Bering Strait into the Americas, or several? And when did this event, or events, take place? In recent years, new clues have come from research into genetics, including the distribution of genetic markers in modern Native Americans[2].

C An important project, led by the biological anthropologist Robert Williams, focused on the variants (called Gm allotypes) of one particular protein – immunoglobin G – found in the fluid portion of human blood. All proteins 'drift', or produce variants, over the generations, and members of an interbreeding human population will share a set of such variants. Thus, by comparing the Gm allotypes of two different populations (e.g. two Indian tribes), one can establish their genetic 'distance', which itself can be calibrated to give an indication of the length of time since these populations last interbred.

D Williams and his colleagues sampled the blood of over 5,000 American Indians in western North America during a twenty-year period. They found that their Gm allotypes could be divided into two groups, one of which also corresponded to the genetic typing of Central and South American Indians. Other tests showed that the Inuit (or Eskimo) and Aleut[3] formed a third group. From this evidence it was deduced that there had been three major waves of migration across the Bering Strait. The first, Paleo-Indian, wave more than 15,000 years ago was ancestral to all Central and South American Indians. The second wave, about 14,000–12,000 years ago, brought Na-Dene hunters, ancestors of the Navajo and Apache (who only migrated south from Canada about 600 or 700 years ago). The third wave, perhaps 10,000 or 9,000 years ago, saw the migration from North-east Asia of groups ancestral to the modern Eskimo and Aleut.

E How far does other research support these conclusions? Geneticist Douglas Wallace has studied mitochondrial DNA[4] in blood samples from three widely separated Native American groups: Pima-Papago Indians in Arizona, Maya Indians on the Yucatán peninsula, Mexico, and

[1] New World: the American continent, as opposed to the so-called Old World of Europe, Asia and Africa
[2] modern Native American: an American descended from the groups that were native to America
[3] Inuit and Aleut: two of the ethnic groups native to the northern regions of North America (i.e. northern Canada and Greenland)
[4] DNA: the substance in which genetic information is stored

Ticuna Indians in the Upper Amazon region of Brazil. As would have been predicted by Robert Williams's work, all three groups appear to be descended from the same ancestral (Paleo-Indian) population.

F There are two other kinds of research that have thrown some light on the origins of the Native American population; they involve the study of teeth and of languages. The biological anthropologist Christy Turner is an expert in the analysis of changing physical characteristics in human teeth. He argues that tooth crowns and roots[5] have a high genetic component, minimally affected by environmental and other factors. Studies carried out by Turner of many thousands of New and Old World specimens, both ancient and modern, suggest that the majority of prehistoric Americans are linked to Northern Asian populations by crown and root traits such as incisor[6] shoveling (a scooping out on one or both surfaces of the tooth), single-rooted upper first premolars[6] and triple-rooted lower first molars[6].

According to Turner, this ties in with the idea of a single Paleo-Indian migration out of North Asia, which he sets at before 14,000 years ago by calibrating rates of dental micro-evolution. Tooth analyses also suggest that there were two later migrations of Na-Denes and Eskimo-Aleut.

G The linguist Joseph Greenberg has, since the 1950s, argued that all Native American languages belong to a single 'Amerind' family, except for Na-Dene and Eskimo-Aleut – a view that gives credence to the idea of three main migrations. Greenberg is in a minority among fellow linguists, most of whom favour the notion of a great many waves of migration to account for the more than 1,000 languages spoken at one time by American Indians. But there is no doubt that the new genetic and dental evidence provides strong backing for Greenberg's view. Dates given for the migrations should nevertheless be treated with caution, except where supported by hard archaeological evidence.

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[5] crown/root: parts of the tooth
[6] incisor/premolar/molar: kinds of teeth

Questions 20 and 21

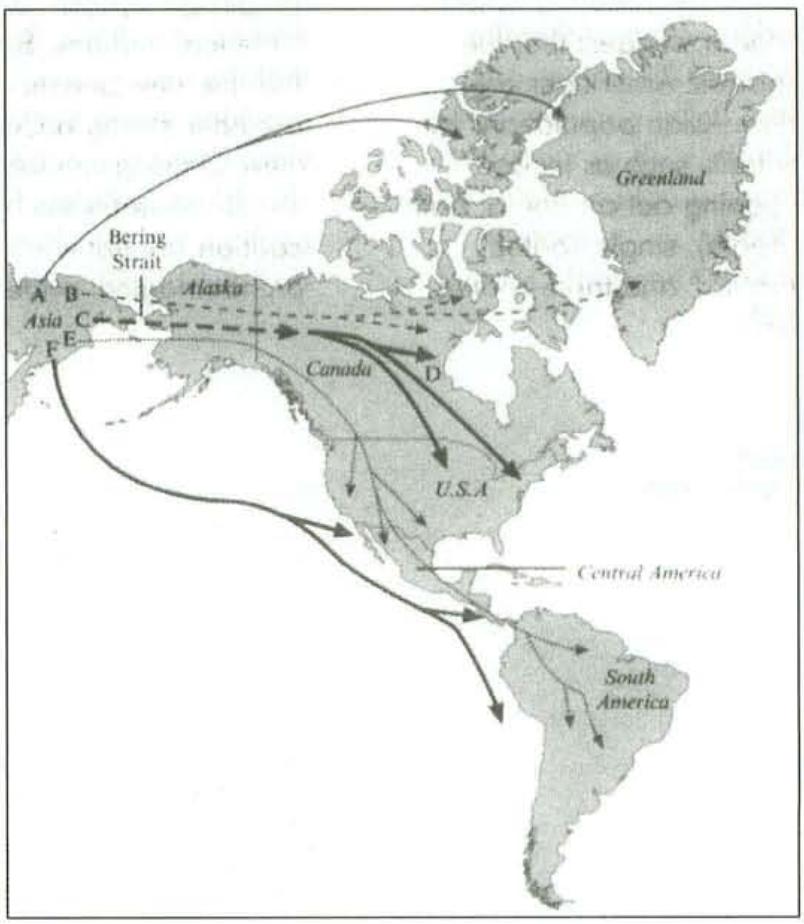
The discussion of Williams's research indicates the periods at which early people are thought to have migrated along certain routes. There are six routes, **A–F**, marked on the map below.

Complete the table below.

*Write the correct letter, **A–F**, in boxes 20 and 21 on your answer sheet.*

Route	Period (number of years ago)
20	15,000 or more
21	600 to 700

Early Population Movement to the Americas



Questions 22–25

Reading Passage 2 refers to the three-wave theory of early migration to the Americas. It also suggests in which of these three waves the ancestors of various groups of modern native Americans first reached the continent.

Classify the groups named in the table below as originating from

A the first wave
B the second wave
C the third wave

*Write the correct letter, **A**, **B** or **C**, in boxes 22–25 on your answer sheet.*

Name of group	**Wave number**
Inuit	**22** .....
Apache	**23** .....
Pima-Papago	**24** .....
Ticuna	**25** .....

Question 26

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

Write the correct letter in box 26 on your answer sheet.

Christy Turner's research involved the examination of

A teeth from both prehistoric and modern Americans and Asians.
B thousands of people who live in either the New or the Old World.
C dental specimens from the majority of prehistoric Americans.
D the eating habits of American and Asian populations.

TEST 12

READING PASSAGE 2

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

Endless Harvest

More than two hundred years ago, Russian explorers and fur hunters landed on the Aleutian Islands, a volcanic archipelago in the North Pacific, and learned of a land mass that lay farther to the north. The islands' native inhabitants called this land mass Aleyska, the 'Great Land'; today, we know it as Alaska.

The forty-ninth state to join the United States of America (in 1959), Alaska is fully one-fifth the size of the mainland 48 states combined. It shares, with Canada, the second longest river system in North America and has over half the coastline of the United States. The rivers feed into the Bering Sea and Gulf of Alaska – cold, nutrient-rich waters which support tens of millions of seabirds, and over 400 species of fish, shellfish, crustaceans, and molluscs. Taking advantage of this rich bounty, Alaska's commercial fisheries have developed into some of the largest in the world.

According to the Alaska Department of Fish and Game (ADF&G), Alaska's commercial fisheries landed hundreds of thousands of tonnes of shellfish and herring, and well over a million tonnes of groundfish (cod, sole, perch and pollock) in 2000. The true cultural heart and soul of Alaska's fisheries, however, is salmon. 'Salmon,' notes writer Susan Ewing in The Great Alaska Nature Factbook, 'pump through Alaska like blood through a heart, bringing rhythmic, circulating nourishment to land, animals and people.' The 'predictable abundance of salmon allowed some native cultures to flourish,' and 'dying spawners* feed bears, eagles, other animals, and ultimately the soil itself.' All five species of Pacific salmon – chinook, or king; chum, or dog; coho, or silver; sockeye, or red; and pink, or humpback – spawn** in Alaskan waters, and 90% of all Pacific salmon commercially caught in North America are produced there. Indeed, if Alaska was an independent nation, it would be the largest producer of wild salmon in the world. During 2000, commercial catches of Pacific salmon in Alaska exceeded 320,000 tonnes, with an ex-vessel value of over $US260 million.

Catches have not always been so healthy. Between 1940 and 1959, overfishing led to crashes in salmon populations so severe that in 1953 Alaska was declared a federal disaster area. With the onset of statehood, however, the State of Alaska took over management of its own fisheries, guided by a state constitution which mandates that Alaska's natural resources be managed on a sustainable basis. At that time, statewide harvests totalled around 25 million salmon. Over the next few decades average catches steadily increased as a result of this policy of sustainable

* spawners: fish that have released eggs
** spawn: release eggs

management, until, during the 1990s, annual harvests were well in excess of 100 million, and on several occasions over 200 million fish.

The primary reason for such increases is what is known as 'In-Season Abundance-Based Management'. There are biologists throughout the state constantly monitoring adult fish as they show up to spawn. The biologists sit in streamside counting towers, study sonar, watch from aeroplanes, and talk to fishermen. The salmon season in Alaska is not pre-set. The fishermen know the approximate time of year when they will be allowed to fish, but on any given day, one or more field biologists in a particular area can put a halt to fishing. Even sport fishing can be brought to a halt. It is this management mechanism that has allowed Alaska salmon stocks – and, accordingly, Alaska salmon fisheries – to prosper, even as salmon populations in the rest of the United States are increasingly considered threatened or even endangered.

In 1999, the Marine Stewardship Council (MSC)*** commissioned a review of the Alaska salmon fishery. The Council, which was founded in 1996, certifies fisheries that meet high environmental standards, enabling them to use a label that recognises their environmental responsibility. The MSC has established a set of criteria by which commercial fisheries can be judged. Recognising the potential benefits of being identified as environmentally responsible, fisheries approach the Council requesting to undergo the certification process. The MSC then appoints a certification committee, composed of a panel of fisheries experts, which gathers information and opinions from fishermen, biologists, government officials, industry representatives, non-governmental organisations and others.

Some observers thought the Alaska salmon fisheries would not have any chance of certification when, in the months leading up to MSC's final decision, salmon runs throughout western Alaska completely collapsed. In the Yukon and Kuskokwim rivers, chinook and chum runs were probably the poorest since statehood; subsistence communities throughout the region, who normally have priority over commercial fishing, were devastated.

The crisis was completely unexpected, but researchers believe it had nothing to do with impacts of fisheries. Rather, they contend, it was almost certainly the result of climatic shifts, prompted in part by cumulative effects of the el niño/la niña phenomenon on Pacific Ocean temperatures, culminating in a harsh winter in which huge numbers of salmon eggs were frozen. It could have meant the end as far as the certification process was concerned. However, the state reacted quickly, closing down all fisheries, even those necessary for subsistence purposes.

In September 2000, MSC announced that the Alaska salmon fisheries qualified for certification. Seven companies producing Alaska salmon were immediately granted permission to display the MSC logo on their products. Certification is for an initial period of five years, with an annual review to ensure that the fishery is continuing to meet the required standards.

*** MSC: a joint venture between WWF (World Wildlife Fund) and Unilever, a Dutch-based multi-national

Questions 14–20

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

In boxes 14–20 on your answer sheet, write

TRUE	*if the statement agrees with the information*
FALSE	*if the statement contradicts the information*
NOT GIVEN	*if there is no information on this*

14 The inhabitants of the Aleutian islands renamed their islands 'Aleyska'.

15 Alaska's fisheries are owned by some of the world's largest companies.

16 Life in Alaska is dependent on salmon.

17 Ninety per cent of all Pacific salmon caught are sockeye or pink salmon.

18 More than 320,000 tonnes of salmon were caught in Alaska in 2000.

19 Between 1940 and 1959, there was a sharp decrease in Alaska's salmon population.

20 During the 1990s, the average number of salmon caught each year was 100 million.

Questions 21–26

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

*Write the correct letter, **A–K**, in boxes 21–26 on your answer sheet.*

21 In Alaska, biologists keep a check on adult fish

22 Biologists have the authority

23 In-Season Abundance-Based Management has allowed the Alaska salmon fisheries

24 The Marine Stewardship Council (MSC) was established

25 As a result of the collapse of the salmon runs in 1999, the state decided

26 In September 2000, the MSC allowed seven Alaska salmon companies

A	to recognise fisheries that care for the environment.
B	to be successful.
C	to stop fish from spawning.
D	to set up environmental protection laws.
E	to stop people fishing for sport.
F	to label their products using the MSC logo.
G	to ensure that fish numbers are sufficient to permit fishing.
H	to assist the subsistence communities in the region.
I	to freeze a huge number of salmon eggs.
J	to deny certification to the Alaska fisheries.
K	to close down all fisheries.

TEST 13

READING PASSAGE 2

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

Questions 14–19

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

*Choose the correct heading for paragraphs **A** and **C–G** from the list below.*

*Write the correct number, **i–x**, in boxes 14–19 on your answer sheet.*

List of Headings

i	Disobeying FAA regulations
ii	Aviation disaster prompts action
iii	Two coincidental developments
iv	Setting altitude zones
v	An oversimplified view
vi	Controlling pilots' licences
vii	Defining airspace categories
viii	Setting rules to weather conditions
ix	Taking off safely
x	First steps towards ATC

14 Paragraph **A**

Example	*Answer*
Paragraph **B**	**x**

15 Paragraph **C**

16 Paragraph **D**

17 Paragraph **E**

18 Paragraph **F**

19 Paragraph **G**

AIR TRAFFIC CONTROL IN THE USA

A An accident that occurred in the skies over the Grand Canyon in 1956 resulted in the establishment of the Federal Aviation Administration (FAA) to regulate and oversee the operation of aircraft in the skies over the United States, which were becoming quite congested. The resulting structure of air traffic control has greatly increased the safety of flight in the United States, and similar air traffic control procedures are also in place over much of the rest of the world.

B Rudimentary air traffic control (ATC) existed well before the Grand Canyon disaster. As early as the 1920s, the earliest air traffic controllers manually guided aircraft in the vicinity of the airports, using lights and flags, while beacons and flashing lights were placed along cross-country routes to establish the earliest airways. However, this purely visual system was useless in bad weather, and, by the 1930s, radio communication was coming into use for ATC. The first region to have something approximating today's ATC was New York City, with other major metropolitan areas following soon after.

C In the 1940s, ATC centres could and did take advantage of the newly developed radar and improved radio communication brought about by the Second World War, but the system remained rudimentary. It was only after the creation of the FAA that full-scale regulation of America's airspace took place, and this was fortuitous, for the advent of the jet engine suddenly resulted in a large number of very fast planes, reducing pilots' margin of error and practically demanding some set of rules to keep everyone well separated and operating safely in the air.

D Many people think that ATC consists of a row of controllers sitting in front of their radar screens at the nation's airports, telling arriving and departing traffic what to do. This is a very incomplete part of the picture. The FAA realised that the airspace over the United States would at any time have many different kinds of planes, flying for many different purposes, in a variety of weather conditions, and the same kind of structure was needed to accommodate all of them.

E To meet this challenge, the following elements were put into effect. First, ATC extends over virtually the entire United States. In general, from 365m above the ground and higher, the entire country is blanketed by controlled airspace. In certain areas, mainly near airports, controlled airspace extends down to 215m above the ground, and, in the immediate vicinity of an airport, all the way down to the surface. Controlled airspace is that airspace in which FAA regulations apply. Elsewhere, in uncontrolled airspace, pilots are bound by fewer regulations. In this way, the recreational pilot who simply wishes to go flying for a while without all the

restrictions imposed by the FAA has only to stay in uncontrolled airspace, below 365m, while the pilot who does want the protection afforded by ATC can easily enter the controlled airspace.

F The FAA then recognised two types of operating environments. In good meteorological conditions, flying would be permitted under Visual Flight Rules (VFR), which suggests a strong reliance on visual cues to maintain an acceptable level of safety. Poor visibility necessitated a set of Instrumental Flight Rules (IFR), under which the pilot relied on altitude and navigational information provided by the plane's instrument panel to fly safely. On a clear day, a pilot in controlled airspace can choose a VFR or IFR flight plan, and the FAA regulations were devised in a way which accommodates both VFR and IFR operations in the same airspace. However, a pilot can only choose to fly IFR if they possess an instrument rating which is above and beyond the basic pilot's license that must also be held.

G Controlled airspace is divided into several different types, designated by letters of the alphabet. Uncontrolled airspace is designated Class F, while controlled airspace below 5,490m above sea level and not in the vicinity of an airport is Class E. All airspace above 5,490m is designated Class A. The reason for the division of Class E and Class A airspace stems from the type of planes operating in them. Generally, Class E airspace is where one finds general aviation aircraft (few of which can climb above 5,490m anyway), and commercial turboprop aircraft. Above 5,490m is the realm of the heavy jets, since jet engines operate more efficiently at higher altitudes. The difference between Class E and A airspace is that in Class A, all operations are IFR, and pilots must be instrument-rated, that is, skilled and licensed in aircraft instrumentation. This is because ATC control of the entire space is essential. Three other types of airspace, Classes D, C and B, govern the vicinity of airports. These correspond roughly to small municipal, medium-sized metropolitan and major metropolitan airports respectively, and encompass an increasingly rigorous set of regulations. For example, all a VFR pilot has to do to enter Class C airspace is establish two-way radio contact with ATC. No explicit permission from ATC to enter is needed, although the pilot must continue to obey all regulations governing VFR flight. To enter Class B airspace, such as on approach to a major metropolitan airport, an explicit ATC clearance is required. The private pilot who cruises without permission into this airspace risks losing their license.

Questions 20–26

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

In boxes 20–26 on your answer sheet, write

TRUE	*if the statement agrees with the information*
FALSE	*if the statement contradicts the information*
NOT GIVEN	*if there is no information on this*

20 The FAA was created as a result of the introduction of the jet engine.

21 Air Traffic Control started after the Grand Canyon crash in 1956.

22 Beacons and flashing lights are still used by ATC today.

23 Some improvements were made in radio communication during World War II.

24 Class F airspace is airspace which is below 365m and not near airports.

25 All aircraft in Class E airspace must use IFR.

26 A pilot entering Class C airspace is flying over an average-sized city.

READING PASSAGE 2

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

Questions 14–17

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

*Choose the correct heading for paragraphs **B** and **D–F** from the list of headings below.*

*Write the correct number, **i–ix**, in boxes 14–17 on your answer sheet.*

List of Headings

i	Predicting climatic changes
ii	The relevance of the Little Ice Age today
iii	How cities contribute to climate change
iv	Human impact on the climate
v	How past climatic conditions can be determined
vi	A growing need for weather records
vii	A study covering a thousand years
viii	People have always responded to climate change
ix	Enough food at last

Example	*Answer*
Paragraph **A**	**viii**

14 Paragraph **B**

Example	*Answer*
Paragraph **C**	**v**

15 Paragraph **D**

16 Paragraph **E**

17 Paragraph **F**

THE LITTLE ICE AGE

A This book will provide a detailed examination of the Little Ice Age and other climatic shifts, but, before I embark on that, let me provide a historical context. We tend to think of climate – as opposed to weather – as something unchanging, yet humanity has been at the mercy of climate change for its entire existence, with at least eight glacial episodes in the past 730,000 years. Our ancestors adapted to the universal but irregular global warming since the end of the last great Ice Age, around 10,000 years ago, with dazzling opportunism. They developed strategies for surviving harsh drought cycles, decades of heavy rainfall or unaccustomed cold; adopted agriculture and stock-raising, which revolutionised human life; and founded the world's first pre-industrial civilisations in Egypt, Mesopotamia and the Americas. But the price of sudden climate change, in famine, disease and suffering, was often high.

B The Little Ice Age lasted from roughly 1300 until the middle of the nineteenth century. Only two centuries ago, Europe experienced a cycle of bitterly cold winters; mountain glaciers in the Swiss Alps were the lowest in recorded memory, and pack ice surrounded Iceland for much of the year. The climatic events of the Little Ice Age did more than help shape the modern world. They are the deeply important context for the current unprecedented global warming. The Little Ice Age was far from a deep freeze, however; rather an irregular seesaw of rapid climatic shifts, few lasting more than a quarter-century, driven by complex and still little understood interactions between the atmosphere and the ocean. The seesaw brought cycles of intensely cold winters and easterly winds, then switched abruptly to years of heavy spring and early summer rains, mild winters, and frequent Atlantic storms, or to periods of droughts, light northeasterly winds, and summer heat waves.

C Reconstructing the climate changes of the past is extremely difficult, because systematic weather observations began only a few centuries ago, in Europe and North America. Records from India and tropical Africa are even more recent. For the time before records began, we have only 'proxy records' reconstructed largely from tree rings and ice cores, supplemented by a few incomplete written accounts. We now have hundreds of tree-ring records from throughout the northern hemisphere, and many from south of the equator, too, amplified with a growing body of temperature data from ice cores drilled in Antarctica, Greenland, the Peruvian Andes, and other locations. We are close to a knowledge of annual summer and winter temperature variations over much of the northern hemisphere going back 600 years.

D This book is a narrative history of climatic shifts during the past ten centuries, and some of the ways in which people in Europe adapted to them. Part One describes the Medieval Warm Period, roughly 900 to 1200. During these three centuries, Norse voyagers from Northern Europe explored northern seas, settled Greenland, and visited North America. It was not a time of uniform warmth, for then, as always since the Great Ice Age, there were constant shifts in rainfall and temperature. Mean European temperatures were about the same as today, perhaps slightly cooler.

E It is known that the Little Ice Age cooling began in Greenland and the Arctic in about 1200. As the Arctic ice pack spread southward, Norse voyages to the west were rerouted into the open Atlantic, then ended altogether. Storminess increased in the North Atlantic and North Sea. Colder, much wetter weather descended on Europe between 1315 and 1319, when thousands perished in a continent-wide famine. By 1400, the weather had become decidedly more unpredictable and stormier, with sudden shifts and lower temperatures that culminated in the cold decades of the late sixteenth century. Fish were a vital commodity in growing towns and cities, where food supplies were a constant concern. Dried cod and herring were already the staples of the European fish trade, but changes in water temperatures forced fishing fleets to work further offshore. The Basques, Dutch, and English developed the first offshore fishing boats adapted to a colder and stormier Atlantic. A gradual agricultural revolution in northern Europe stemmed from concerns over food supplies at a time of rising populations. The revolution involved intensive commercial farming and the growing of animal fodder on land not previously used for crops. The increased productivity from farmland made some countries self-sufficient in grain and livestock and offered effective protection against famine.

F Global temperatures began to rise slowly after 1850, with the beginning of the Modern Warm Period. There was a vast migration from Europe by land-hungry farmers and others, to which the famine caused by the Irish potato blight contributed, to North America, Australia, New Zealand, and southern Africa. Millions of hectares of forest and woodland fell before the newcomers' axes between 1850 and 1890, as intensive European farming methods expanded across the world. The unprecedented land clearance released vast quantities of carbon dioxide into the atmosphere, triggering for the first time humanly caused global warming. Temperatures climbed more rapidly in the twentieth century as the use of fossil fuels proliferated and greenhouse gas levels continued to soar. The rise has been even steeper since the early 1980s. The Little Ice Age has given way to a new climatic regime, marked by prolonged and steady warming. At the same time, extreme weather events like Category 5 hurricanes are becoming more frequent.

Questions 18–22

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

*Write the correct letter, **A–I**, in boxes 18–22 on your answer sheet.*

Weather during the Little Ice Age

Documentation of past weather conditions is limited: our main sources of knowledge of conditions in the distant past are **18** ..... and **19** ..... . We can deduce that the Little Ice Age was a time of **20** ..... , rather than of consistent freezing. Within it there were some periods of very cold winters, others of **21** ..... and heavy rain, and yet others that saw **22** ..... with no rain at all.

A	climatic shifts	**B**	ice cores	**C**	tree rings
D	glaciers	**E**	interactions	**F**	weather observations
G	heat waves	**H**	storms	**I**	written accounts

Questions 23–26

Classify the following events as occurring during the

- ***A*** *Medieval Warm Period*
- ***B*** *Little Ice Age*
- ***C*** *Modern Warm Period*

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

23 Many Europeans started farming abroad.

24 The cutting down of trees began to affect the climate.

25 Europeans discovered other lands.

26 Changes took place in fishing patterns.

READING PASSAGE 2

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

The Nature of Genius

There has always been an interest in geniuses and prodigies. The word 'genius', from the Latin *gens* (= family) and the term 'genius', meaning 'begetter', comes from the early Roman cult of a divinity as the head of the family. In its earliest form, genius was concerned with the ability of the head of the family, the *paterfamilias*, to perpetuate himself. Gradually, genius came to represent a person's characteristics and thence an individual's highest attributes derived from his 'genius' or guiding spirit. Today, people still look to stars or genes, astrology or genetics, in the hope of finding the source of exceptional abilities or personal characteristics.

The concept of genius and of gifts has become part of our folk culture, and attitudes are ambivalent towards them. We envy the gifted and mistrust them. In the mythology of giftedness, it is popularly believed that if people are talented in one area, they must be defective in another, that intellectuals are impractical, that prodigies burn too brightly too soon and burn out, that gifted people are eccentric, that they are physical weaklings, that there's a thin line between genius and madness, that genius runs in families, that the gifted are so clever they don't need special help, that giftedness is the same as having a high IQ, that some races are more intelligent or musical or mathematical than others, that genius goes unrecognised and unrewarded, that adversity makes men wise or that people with gifts have a responsibility to use them. Language has been enriched with such terms as 'highbrow', 'egghead', 'blue-stocking', 'wiseacre', 'know-all', 'boffin' and, for many, 'intellectual' is a term of denigration.

The nineteenth century saw considerable interest in the nature of genius, and produced not a few studies of famous prodigies. Perhaps for us today, two of the most significant aspects of most of these studies of genius are the frequency with which early encouragement and teaching by parents and tutors had beneficial effects on the intellectual, artistic or musical development of the children but caused great difficulties of adjustment later in their lives, and the frequency with which abilities went unrecognised by teachers and schools. However, the difficulty with the evidence produced by these studies, fascinating as they are in collecting together anecdotes and apparent similarities and exceptions, is that they are not what we would today call norm-referenced. In other words, when, for instance, information is collated about early illnesses, methods of upbringing, schooling, etc., we must also take into account information from other historical sources about how common or exceptional these were at the time. For instance, infant mortality was high and life expectancy much shorter than today, home tutoring was common in the families of the nobility and wealthy, bullying and corporal punishment were common at the best independent

schools and, for the most part, the cases studied were members of the privileged classes. It was only with the growth of paediatrics and psychology in the twentieth century that studies could be carried out on a more objective, if still not always very scientific, basis.

Geniuses, however they are defined, are but the peaks which stand out through the mist of history and are visible to the particular observer from his or her particular vantage point. Change the observers and the vantage points, clear away some of the mist, and a different lot of peaks appear. Genius is a term we apply to those whom we recognise for their outstanding achievements and who stand near the end of the continuum of human abilities which reaches back through the mundane and mediocre to the incapable. There is still much truth in Dr Samuel Johnson's observation, 'The true genius is a mind of large general powers, accidentally determined to some particular direction'. We may disagree with the 'general', for we doubt if all musicians of genius could have become scientists of genius or vice versa, but there is no doubting the accidental determination which nurtured or triggered their gifts into those channels into which they have poured their powers so successfully. Along the continuum of abilities are hundreds of thousands of gifted men and women, boys and girls.

What we appreciate, enjoy or marvel at in the works of genius or the achievements of prodigies are the manifestations of skills or abilities which are similar to, but so much superior to, our own. But that their minds are not different from our own is demonstrated by the fact that the hard-won discoveries of scientists like Kepler or Einstein become the commonplace knowledge of schoolchildren and the once outrageous shapes and colours of an artist like Paul Klee so soon appear on the fabrics we wear. This does not minimise the supremacy of their achievements, which outstrip our own as the sub-four-minute milers outstrip our jogging.

To think of geniuses and the gifted as having uniquely different brains is only reasonable if we accept that each human brain is uniquely different. The purpose of instruction is to make us even more different from one another, and in the process of being educated we can learn from the achievements of those more gifted than ourselves. But before we try to emulate geniuses or encourage our children to do so we should note that some of the things we learn from them may prove unpalatable. We may envy their achievements and fame, but we should also recognise the price they may have paid in terms of perseverance, single-mindedness, dedication, restrictions on their personal lives, the demands upon their energies and time, and how often they had to display great courage to preserve their integrity or to make their way to the top.

Genius and giftedness are relative descriptive terms of no real substance. We may, at best, give them some precision by defining them and placing them in a context but, whatever we do, we should never delude ourselves into believing that gifted children or geniuses are different from the rest of humanity, save in the degree to which they have developed the performance of their abilities.

Questions 14–18

*Choose **FIVE** letters, **A–K.***

Write the correct letters in boxes 14–18 on your answer sheet.

NB *Your answers may be given in any order.*

Below are listed some popular beliefs about genius and giftedness.

Which **FIVE** of these beliefs are reported by the writer of the text?

A Truly gifted people are talented in all areas.
B The talents of geniuses are soon exhausted.
C Gifted people should use their gifts.
D A genius appears once in every generation.
E Genius can be easily destroyed by discouragement.
F Genius is inherited.
G Gifted people are very hard to live with.
H People never appreciate true genius.
I Geniuses are natural leaders.
J Gifted people develop their greatness through difficulties.
K Genius will always reveal itself.

Questions 19–26

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

In boxes 19–26 on your answer sheet, write

TRUE	*if the statement agrees with the information*
FALSE	*if the statement contradicts the information*
NOT GIVEN	*if there is no information on this*

19 Nineteenth-century studies of the nature of genius failed to take into account the uniqueness of the person's upbringing.

20 Nineteenth-century studies of genius lacked both objectivity and a proper scientific approach.

21 A true genius has general powers capable of excellence in any area.

22 The skills of ordinary individuals are in essence the same as the skills of prodigies.

23 The ease with which truly great ideas are accepted and taken for granted fails to lessen their significance.

24 Giftedness and genius deserve proper scientific research into their true nature so that all talent may be retained for the human race.

25 Geniuses often pay a high price to achieve greatness.

26 To be a genius is worth the high personal cost.

READING PASSAGE 2

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

Biological control of pests

The continuous and reckless use of synthetic chemicals for the control of pests which pose a threat to agricultural crops and human health is proving to be counter-productive. Apart from engendering widespread ecological disorders, pesticides have contributed to the emergence of a new breed of chemical-resistant, highly lethal superbugs.

According to a recent study by the Food and Agriculture Organisation (FAO), more than 300 species of agricultural pests have developed resistance to a wide range of potent chemicals. Not to be left behind are the disease-spreading pests, about 100 species of which have become immune to a variety of insecticides now in use.

One glaring disadvantage of pesticides' application is that, while destroying harmful pests, they also wipe out many useful non-targeted organisms, which keep the growth of the pest population in check. This results in what agroecologists call the 'treadmill syndrome'. Because of their tremendous breeding potential and genetic diversity, many pests are known to withstand synthetic chemicals and bear offspring with a built-in resistance to pesticides.

The havoc that the 'treadmill syndrome' can bring about is well illustrated by what happened to cotton farmers in Central America. In the early 1940s, basking in the glory of chemical-based intensive agriculture, the farmers avidly took to pesticides as a sure measure to boost crop yield. The insecticide was applied eight times a year in the mid-1940s, rising to 28 in a season in the mid-1950s, following the sudden proliferation of three new varieties of chemical-resistant pests.

By the mid-1960s, the situation took an alarming turn with the outbreak of four more new pests, necessitating pesticide spraying to such an extent that 50% of the financial outlay on cotton production was accounted for by pesticides. In the early 1970s, the spraying frequently reached 70 times a season as the farmers were pushed to the wall by the invasion of genetically stronger insect species.

Most of the pesticides in the market today remain inadequately tested for properties that cause cancer and mutations as well as for other adverse effects on health, says a study by United States environmental agencies. The United States National Resource Defense Council has found that DDT was the most popular of a long list of dangerous chemicals in use.

In the face of the escalating perils from indiscriminate applications of pesticides, a more effective and ecologically sound strategy of biological control, involving the selective use of natural enemies of the pest population, is fast gaining popularity – though, as yet, it is a new field with limited potential. The advantage of biological control in contrast to other methods is that it provides a relatively low-cost, perpetual control system with a minimum of detrimental side-effects. When handled by experts, bio-control is safe, non-polluting and self-dispersing.

The Commonwealth Institute of Biological Control (CIBC) in Bangalore, with its global network of research laboratories and field stations, is one of the most active, non-commercial research agencies engaged in pest control by setting natural predators against parasites. CIBC also serves as a clearing-house for the export and import of biological agents for pest control world-wide.

CIBC successfully used a seed-feeding weevil, native to Mexico, to control the obnoxious parthenium weed, known to exert devious influence on agriculture and human health in both India and Australia. Similarly the Hyderabad-based Regional Research Laboratory (RRL), supported by CIBC, is now trying out an Argentinian weevil for the eradication of water hyacinth, another dangerous weed, which has become a nuisance in many parts of the world. According to Mrs Kaiser Jamil of RRL, 'The Argentinian weevil does not attack any other plant and a pair of adult bugs could destroy the weed in 4–5 days.' CIBC is also perfecting the technique for breeding parasites that prey on 'disapene scale' insects – notorious defoliants of fruit trees in the US and India.

How effectively biological control can be pressed into service is proved by the following examples. In the late 1960s, when Sri Lanka's flourishing coconut groves were plagued by leaf-mining hispides, a larval parasite imported from Singapore brought the pest under control. A natural predator indigenous to India, Neodumetia sangawani, was found useful in controlling the Rhodes grass-scale insect that was devouring forage grass in many parts of the US. By using Neochetina bruci, a beetle native to Brazil, scientists at Kerala Agricultural University freed a 12-kilometre-long canal from the clutches of the weed Salvinia molesta, popularly called 'African Payal' in Kerala. About 30,000 hectares of rice fields in Kerala are infested by this weed.

Questions 14–17

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

Write the correct letter in boxes 14–17 on your answer sheet.

14 The use of pesticides has contributed to

A a change in the way ecologies are classified by agroecologists.
B an imbalance in many ecologies around the world.
C the prevention of ecological disasters in some parts of the world.
D an increase in the range of ecologies which can be usefully farmed.

15 The Food and Agriculture Organisation has counted more than 300 agricultural pests which

A are no longer responding to most pesticides in use.
B can be easily controlled through the use of pesticides.
C continue to spread disease in a wide range of crops.
D may be used as part of bio-control's replacement of pesticides.

16 Cotton farmers in Central America began to use pesticides

A because of an intensive government advertising campaign.
B in response to the appearance of new varieties of pest.
C as a result of changes in the seasons and the climate.
D to ensure more cotton was harvested from each crop.

17 By the mid-1960s, cotton farmers in Central America found that pesticides

A were wiping out 50% of the pests plaguing the crops.
B were destroying 50% of the crops they were meant to protect.
C were causing a 50% increase in the number of new pests reported.
D were costing 50% of the total amount they spent on their crops.

Questions 18–21

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

In boxes 18–21 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*

18 Disease-spreading pests respond more quickly to pesticides than agricultural pests do.

19 A number of pests are now born with an innate immunity to some pesticides.

20 Biological control entails using synthetic chemicals to try and change the genetic make-up of the pests' offspring.

21 Bio-control is free from danger under certain circumstances.

Questions 22–26

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

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

22 Disapene scale insects feed on

23 Neodumetia sangawani ate

24 Leaf-mining hispides blighted

25 An Argentinian weevil may be successful in wiping out

26 Salvinia molesta plagues

A	forage grass.
B	rice fields.
C	coconut trees.
D	fruit trees.
E	water hyacinth.
F	parthenium weed.
G	Brazilian beetles.
H	grass-scale insects.
I	larval parasites.

READING PASSAGE 2

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

Questions 14–17

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

*Choose the correct heading for paragraphs **B–E** from the list of headings below.*

*Write the correct number, **i–vii**, in boxes 14–17 on your answer sheet.*

List of Headings

i	Seeking the transmission of radio signals from planets
ii	Appropriate responses to signals from other civilisations
iii	Vast distances to Earth's closest neighbours
iv	Assumptions underlying the search for extra-terrestrial intelligence
v	Reasons for the search for extra-terrestrial intelligence
vi	Knowledge of extra-terrestrial life forms
vii	Likelihood of life on other planets

Example	*Answer*
Paragraph **A**	**v**

14 Paragraph **B**

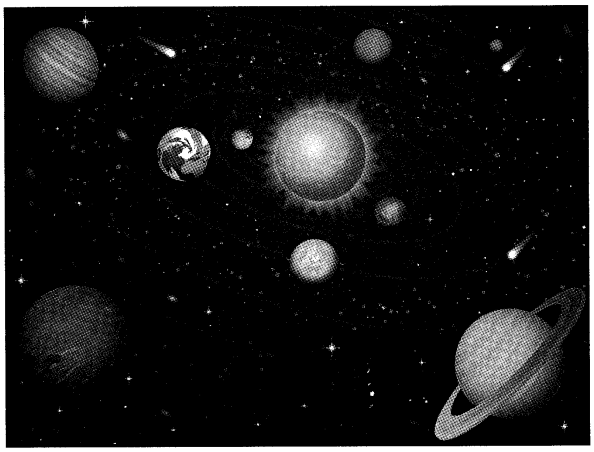
15 Paragraph **C**

16 Paragraph **D**

17 Paragraph **E**

IS THERE ANYBODY OUT THERE?
The Search for Extra-terrestrial Intelligence

The question of whether we are alone in the Universe has haunted humanity for centuries, but we may now stand poised on the brink of the answer to that question, as we search for radio signals from other intelligent civilisations. This search, often known by the acronym SETI (search for extra-terrestrial intelligence), is a difficult one. Although groups around the world have been searching intermittently for three decades, it is only now that we have reached the level of technology where we can make a determined attempt to search all nearby stars for any sign of life.



A

The primary reason for the search is basic curiosity – the same curiosity about the natural world that drives all pure science. We want to know whether we are alone in the Universe. We want to know whether life evolves naturally if given the right conditions, or whether there is something very special about the Earth to have fostered the variety of life forms that we see around us on the planet. The simple detection of a radio signal will be sufficient to answer this most basic of all questions. In this sense, SETI is another cog in the machinery of pure science which is continually pushing out the horizon of our knowledge. However, there are other reasons for being interested in whether life exists elsewhere. For example, we have had civilisation on Earth for perhaps only a few thousand years, and the threats of nuclear war and pollution over the last few decades have told us that our survival may be tenuous. Will we last another two thousand years or will we wipe ourselves out? Since the lifetime of a planet like ours is several billion years, we can expect that, if other civilisations do survive in our galaxy, their ages will range from zero to several billion years. Thus any other civilisation that we hear from is likely to be far older, on average, than ourselves. The mere existence of such a civilisation will tell us that long-term survival is possible, and gives us some cause for optimism. It is even possible that the older civilisation may pass on the benefits of their experience in dealing with threats to survival such as nuclear war and global pollution, and other threats that we haven't yet discovered.

B

In discussing whether we are alone, most SETI scientists adopt two ground rules. First, UFOs (Unidentified Flying Objects) are generally ignored since most scientists don't consider the evidence for them to be strong enough to bear serious consideration (although it is also important to keep an open mind in case any really convincing evidence emerges in the future). Second, we make a very conservative assumption that we are looking for a life form that is pretty well like us, since if it differs radically from us we may well not recognise it as a life form, quite apart from whether we are able to communicate

with it. In other words, the life form we are looking for may well have two green heads and seven fingers, but it will nevertheless resemble us in that it should communicate with its fellows, be interested in the Universe, live on a planet orbiting a star like our Sun, and perhaps most restrictively, have a chemistry, like us, based on carbon and water.

C

Even when we make these assumptions, our understanding of other life forms is still severely limited. We do not even know, for example, how many stars have planets, and we certainly do not know how likely it is that life will arise naturally, given the right conditions. However, when we look at the 100 billion stars in our galaxy (the Milky Way), and 100 billion galaxies in the observable Universe, it seems inconceivable that at least one of these planets does not have a life form on it; in fact, the best educated guess we can make, using the little that we do know about the conditions for carbon-based life, leads us to estimate that perhaps one in 100,000 stars might have a life-bearing planet orbiting it. That means that our nearest neighbours are perhaps 100 light years away, which is almost next door in astronomical terms.

D

An alien civilisation could choose many different ways of sending information across the galaxy, but many of these either require too much energy, or else are severely attenuated while traversing the vast distances across the galaxy. It turns out that, for a given amount of transmitted power, radio waves in the frequency range 1000 to 3000 MHz travel the greatest distance, and so all searches to date have concentrated on looking for radio waves in this frequency range. So far there have been a number of searches by various groups around the world, including Australian searches using the radio telescope at Parkes, New South Wales. Until now there have not been any detections from the few hundred stars which have been searched. The scale of the searches has been increased dramatically since 1992, when the US Congress voted NASA $10 million per year for ten years to conduct a thorough search for extra-terrestrial life. Much of the money in this project is being spent on developing the special hardware needed to search many frequencies at once. The project has two parts. One part is a targeted search using the world's largest radio telescopes, the American-operated telescope in Arecibo, Puerto Rico and the French telescope in Nancy in France. This part of the project is searching the nearest 1000 likely stars with high sensitivity for signals in the frequency range 1000 to 3000 MHz. The other part of the project is an undirected search which is monitoring all of space with a lower sensitivity, using the smaller antennas of NASA's Deep Space Network.

E

There is considerable debate over how we should react if we detect a signal from an alien civilisation. Everybody agrees that we should not reply immediately. Quite apart from the impracticality of sending a reply over such large distances at short notice, it raises a host of ethical questions that would have to be addressed by the global community before any reply could be sent. Would the human race face the culture shock if faced with a superior and much older civilisation? Luckily, there is no urgency about this. The stars being searched are hundreds of light years away, so it takes hundreds of years for their signal to reach us, and a further few hundred years for our reply to reach them. It's not important, then, if there's a delay of a few years, or decades, while the human race debates the question of whether to reply, and perhaps carefully drafts a reply.

Questions 18–20

Answer the questions below.

*Choose **NO MORE THAN THREE WORDS AND/OR A NUMBER** from the passage for each answer.*

Write your answers in boxes 18–20 on your answer sheet.

18 What is the life expectancy of Earth?

19 What kind of signals from other intelligent civilisations are SETI scientists searching for?

20 How many stars are the world's most powerful radio telescopes searching?

Questions 21–26

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

In boxes 21–26 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*

21 Alien civilisations may be able to help the human race to overcome serious problems.

22 SETI scientists are trying to find a life form that resembles humans in many ways.

23 The Americans and Australians have co-operated on joint research projects.

24 So far SETI scientists have picked up radio signals from several stars.

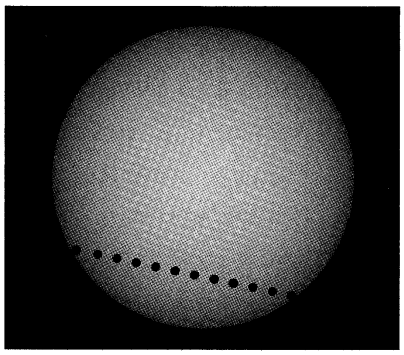
25 The NASA project attracted criticism from some members of Congress.

26 If a signal from outer space is received, it will be important to respond promptly.

READING PASSAGE 2

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

Venus in transit



June 2004 saw the first passage, known as a 'transit', of the planet Venus across the face of the Sun in 122 years. Transits have helped shape our view of the whole Universe, as Heather Cooper and Nigel Henbest explain

A On 8 June 2004, more than half the population of the world were treated to a rare astronomical event. For over six hours, the planet Venus steadily inched its way over the surface of the Sun. This 'transit' of Venus was the first since 6 December 1882. On that occasion, the American astronomer Professor Simon Newcomb led a party to South Africa to observe the event. They were based at a girls' school, where – it is alleged – the combined forces of three schoolmistresses outperformed the professionals with the accuracy of their observations.

B For centuries, transits of Venus have drawn explorers and astronomers alike to the four corners of the globe. And you can put it all down to the extraordinary polymath Edmond Halley. In November 1677, Halley observed a transit of the innermost planet, Mercury, from the desolate island of St Helena in the South Pacific. He realised that, from different latitudes, the passage of the planet across the Sun's disc would appear to differ. By timing the transit from two widely-separated locations, teams of astronomers could calculate the parallax angle – the apparent difference in position of an astronomical body due to a difference in the observer's position. Calculating this angle would allow astronomers to measure what was then the ultimate goal: the distance of the Earth from the Sun. This distance is known as the 'astronomical unit' or AU.

C Halley was aware that the AU was one of the most fundamental of all astronomical measurements. Johannes Kepler, in the early 17th century, had shown that the distances of the planets from the Sun governed their orbital speeds, which were easily measurable. But no-one had found a way to calculate accurate distances to the planets from the Earth. The goal was to measure the AU; then, knowing the orbital speeds of all the other planets round the Sun, the scale of the Solar System would fall into place. However, Halley realised that Mercury was so far away that its parallax angle would be very difficult to determine. As Venus was closer to the Earth, its parallax angle would be larger, and Halley worked out that by using Venus it would be possible to measure the

Sun's distance to 1 part in 500. But there was a problem: transits of Venus, unlike those of Mercury, are rare, occurring in pairs roughly eight years apart every hundred or so years. Nevertheless, he accurately predicted that Venus would cross the face of the Sun in both 1761 and 1769 – though he didn't survive to see either.

D Inspired by Halley's suggestion of a way to pin down the scale of the Solar System, teams of British and French astronomers set out on expeditions to places as diverse as India and Siberia. But things weren't helped by Britain and France being at war. The person who deserves most sympathy is the French astronomer Guillaume Le Gentil. He was thwarted by the fact that the British were besieging his observation site at Pondicherry in India. Fleeing on a French warship crossing the Indian Ocean, Le Gentil saw a wonderful transit – but the ship's pitching and rolling ruled out any attempt at making accurate observations. Undaunted, he remained south of the equator, keeping himself busy by studying the islands of Mauritius and Madagascar before setting off to observe the next transit in the Philippines. Ironically after travelling nearly 50,000 kilometres, his view was clouded out at the last moment, a very dispiriting experience.

E While the early transit timings were as precise as instruments would allow, the measurements were dogged by the 'black drop' effect. When Venus begins to cross the Sun's disc, it looks smeared not circular – which makes it difficult to establish timings. This is due to diffraction of light. The second problem is that Venus exhibits a halo of light when it is seen just outside the Sun's disc. While this showed astronomers that Venus was surrounded by a thick layer of gases refracting sunlight around it, both effects made it impossible to obtain accurate timings.

F But astronomers laboured hard to analyse the results of these expeditions to observe Venus transits. Johann Franz Encke, Director of the Berlin Observatory, finally determined a value for the AU based on all these parallax measurements: 153,340,000 km. Reasonably accurate for the time, that is quite close to today's value of 149,597,870 km, determined by radar, which has now superseded transits and all other methods in accuracy. The AU is a cosmic measuring rod, and the basis of how we scale the Universe today. The parallax principle can be extended to measure the distances to the stars. If we look at a star in January – when Earth is at one point in its orbit – it will seem to be in a different position from where it appears six months later. Knowing the width of Earth's orbit, the parallax shift lets astronomers calculate the distance.

G June 2004's transit of Venus was thus more of an astronomical spectacle than a scientifically important event. But such transits have paved the way for what might prove to be one of the most vital breakthroughs in the cosmos – detecting Earth-sized planets orbiting other stars.

Questions 14–17

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

Which paragraph contains the following information?

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

14 examples of different ways in which the parallax principle has been applied

15 a description of an event which prevented a transit observation

16 a statement about potential future discoveries leading on from transit observations

17 a description of physical states connected with Venus which early astronomical instruments failed to overcome

Questions 18–21

Look at the following statements (Questions 18–21) 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 18–21 on your answer sheet.*

18 He calculated the distance of the Sun from the Earth based on observations of Venus with a fair degree of accuracy.

19 He understood that the distance of the Sun from the Earth could be worked out by comparing observations of a transit.

20 He realised that the time taken by a planet to go round the Sun depends on its distance from the Sun.

21 He witnessed a Venus transit but was unable to make any calculations.

List of People

A Edmond Halley

B Johannes Kepler

C Guillaume Le Gentil

D Johann Franz Encke

Questions 22–26

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

In boxes 22–26 on your answer sheet, write

TRUE	*if the statement agrees with the information*
FALSE	*if the statement contradicts the information*
NOT GIVEN	*if there is no information on this*

22 Halley observed one transit of the planet Venus.

23 Le Gentil managed to observe a second Venus transit.

24 The shape of Venus appears distorted when it starts to pass in front of the Sun.

25 Early astronomers suspected that the atmosphere on Venus was toxic.

26 The parallax principle allows astronomers to work out how far away distant stars are from the Earth.

READING PASSAGE 2

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

Tidal Power

Undersea turbines which produce electricity from the tides are set to become an important source of renewable energy for Britain. It is still too early to predict the extent of the impact they may have, but all the signs are that they will play a significant role in the future

A Operating on the same principle as wind turbines, the power in sea turbines comes from tidal currents which turn blades similar to ships' propellers, but, unlike wind, the tides are predictable and the power input is constant. The technology raises the prospect of Britain becoming self-sufficient in renewable energy and drastically reducing its carbon dioxide emissions. If tide, wind and wave power are all developed, Britain would be able to close gas, coal and nuclear power plants and export renewable power to other parts of Europe. Unlike wind power, which Britain originally developed and then abandoned for 20 years allowing the Dutch to make it a major industry, undersea turbines could become a big export earner to island nations such as Japan and New Zealand.

B Tidal sites have already been identified that will produce one sixth or more of the UK's power – and at prices competitive with modern gas turbines and undercutting those of the already ailing nuclear industry. One site alone, the Pentland Firth, between Orkney and mainland Scotland, could produce 10% of the country's electricity with banks of turbines under the sea, and another at Alderney in the Channel Islands three times the 1,200 megawatts of Britain's largest and newest nuclear plant, Sizewell B, in Suffolk. Other sites identified include the Bristol Channel and the west coast of Scotland, particularly the channel between Campbeltown and Northern Ireland.

C Work on designs for the new turbine blades and sites are well advanced at the University of Southampton's sustainable energy research group. The first station is expected to be installed off Lynmouth in Devon shortly to test the technology in a venture jointly funded by the department of Trade and Industry and the European Union. AbuBakr Bahaj, in charge of the Southampton research, said: 'The prospects for energy from tidal currents are far better than from wind because the flows of water are predictable and constant. The technology for dealing with the hostile saline environment under the sea has been developed in the North Sea oil industry and much

is already known about turbine blade design, because of wind power and ship propellers. There are a few technical difficulties, but I believe in the next five to ten years we will be installing commercial marine turbine farms.' Southampton has been awarded £215,000 over three years to develop the turbines and is working with Marine Current Turbines, a subsidiary of IT power, on the Lynmouth project. EU research has now identified 106 potential sites for tidal power, 80% round the coasts of Britain. The best sites are between islands or around heavily indented coasts where there are strong tidal currents.

D A marine turbine blade needs to be only one third of the size of a wind generator to produce three times as much power. The blades will be about 20 metres in diameter, so around 30 metres of water is required. Unlike wind power, there are unlikely to be environmental objections. Fish and other creatures are thought unlikely to be at risk from the relatively slow-turning blades. Each turbine will be mounted on a tower which will connect to the national power supply grid via underwater cables. The towers will stick out of the water and be lit, to warn shipping, and also be designed to be lifted out of the water for maintenance and to clean seaweed from the blades.

E Dr Bahaj has done most work on the Alderney site, where there are powerful currents. The single undersea turbine farm would produce far more power than needed for the Channel Islands and most would be fed into the French Grid and be re-imported into Britain via the cable under the Channel.

F One technical difficulty is cavitation, where low pressure behind a turning blade causes air bubbles. These can cause vibration and damage the blades of the turbines. Dr Bahaj said: 'We have to test a number of blade types to avoid this happening or at least make sure it does not damage the turbines or reduce performance. Another slight concern is submerged debris floating into the blades. So far we do not know how much of a problem it might be. We will have to make the turbines robust because the sea is a hostile environment, but all the signs that we can do it are good.'

Questions 14–17

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

Which paragraph contains the following information?

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

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

14 the location of the first test site

15 a way of bringing the power produced on one site back into Britain

16 a reference to a previous attempt by Britain to find an alternative source of energy

17 mention of the possibility of applying technology from another industry

Questions 18–22

*Choose **FIVE** letters, **A–J**.*

Write the correct letters in boxes 18–22 on your answer sheet.

Which **FIVE** of the following claims about tidal power are made by the writer?

A It is a more reliable source of energy than wind power.
B It would replace all other forms of energy in Britain.
C Its introduction has come as a result of public pressure.
D It would cut down on air pollution.
E It could contribute to the closure of many existing power stations in Britain.
F It could be a means of increasing national income.
G It could face a lot of resistance from other fuel industries.
H It could be sold more cheaply than any other type of fuel.
I It could compensate for the shortage of inland sites for energy production.
J It is best produced in the vicinity of coastlines with particular features.

Questions 23–26

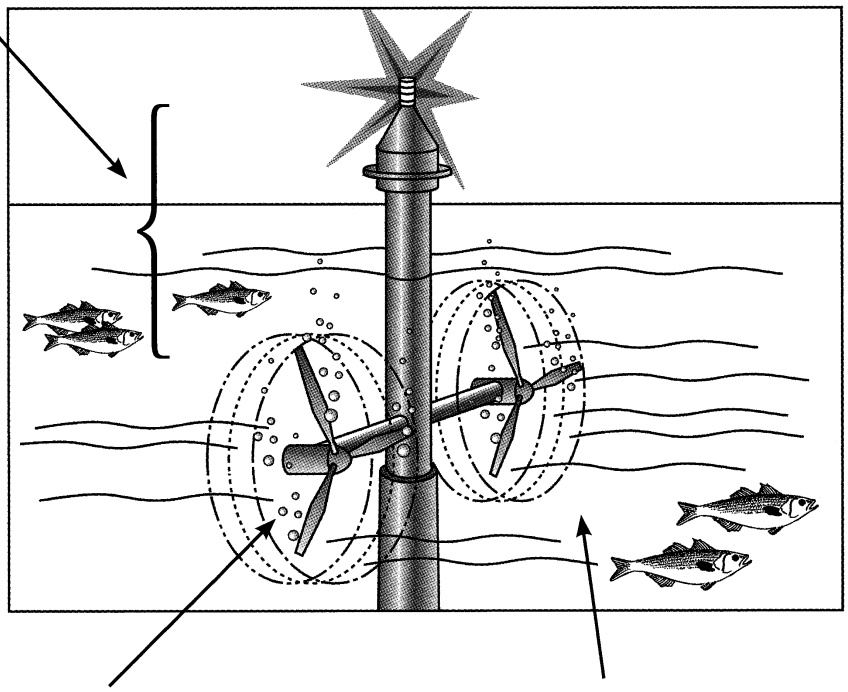
Label the diagram below.

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

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

An Undersea Turbine

Whole tower can be raised
for **23** ..... and the extraction
of seaweed from the blades



Air bubbles result from
the **25** ..... behind blades.
This is known as **26** .....

Sea life not in danger due to the
fact that blades are comparatively
24 .....

READING PASSAGE 2

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

Young children's sense of identity

A A sense of self develops in young children by degrees. The process can usefully be thought of in terms of the gradual emergence of two somewhat separate features: the *self as a subject*, and the *self as an object*. William James introduced the distinction in 1892, and contemporaries of his, such as Charles Cooley, added to the developing debate. Ever since then psychologists have continued building on the theory.

B According to James, a child's first step on the road to self-understanding can be seen as the recognition that he or she exists. This is an aspect of the self that he labelled 'self-as-subject', and he gave it various elements. These included an awareness of one's own agency (i.e. one's power to act), and an awareness of one's distinctiveness from other people. These features gradually emerge as infants explore their world and interact with caregivers. Cooley (1902) suggested that a sense of the self-as-subject was primarily concerned with being able to exercise power. He proposed that the earliest examples of this are an infant's attempts to control physical objects, such as toys or his or her own limbs. This is followed by attempts to affect the behaviour of other people. For example, infants learn that when they cry or smile someone responds to them.

C Another powerful source of information for infants about the effects they can have on the world around them is provided when others mimic them. Many parents spend a lot of time, particularly in the early months, copying their infant's vocalizations and expressions. In addition, young children enjoy looking in mirrors, where the movements they can see are dependent upon their own movements. This is not to say that infants recognize the reflection as their *own* image (a later development). However, Lewis and Brooks-Gunn (1979) suggest that infants' developing understanding that the movements they see in the mirror are contingent on their own, leads to a growing awareness that they are distinct from other people. This is because they, and only they, can change the reflection in the mirror.

D This understanding that children gain of themselves as active agents continues to develop in their attempts to co-operate with others in play. Dunn (1988) points out that it is in such day-to-day relationships and interactions that the child's understanding of his- or herself emerges. Empirical investigations of the self-as-subject in young children are, however, rather scarce because of difficulties of communication: even if young infants can reflect on their experience, they certainly cannot express this aspect of the self directly.

E Once children have acquired a certain level of self-awareness, they begin to place themselves in a whole series of categories, which together play such an important part in defining them uniquely as 'themselves'. This second step in the development of a full sense of self is what James called the 'self-as-object'. This has been seen by many to be the aspect of the self which is most influenced by social elements, since it is made up of social roles (such as student, brother, colleague) and characteristics which derive their meaning from comparison or interaction with other people (such as trustworthiness, shyness, sporting ability).

F Cooley and other researchers suggested a close connection between a person's own understanding of their identity and other people's understanding of it. Cooley believed that people build up their sense of identity from the reactions of others to them, and from the view they believe others have of them. He called the self-as-object the 'looking-glass self', since people come to see themselves as they are reflected in others. Mead (1934) went even further, and saw the self and the social world as inextricably bound together: 'The self is essentially a social structure, and it arises in social experience ... it is impossible to conceive of a self arising outside of social experience.'

G Lewis and Brooks-Gunn argued that an important developmental milestone is reached when children become able to recognize themselves visually without the support of seeing contingent movement. This recognition occurs around their second birthday. In one experiment, Lewis and Brooks-Gunn (1979) dabbed some red powder on the noses of children who were playing in front of a mirror, and then observed how often they touched their noses. The psychologists reasoned that if the children knew what they usually looked like, they would be surprised by the unusual red mark and would start touching it. On the other hand, they found that children of 15 to 18 months are generally not able to recognize themselves unless other cues such as movement are present.

H Finally, perhaps the most graphic expressions of self-awareness in general can be seen in the displays of rage which are most common from 18 months to 3 years of age. In a longitudinal study of groups of three or four children, Bronson (1975) found that the intensity of the frustration and anger in their disagreements increased sharply between the ages of 1 and 2 years. Often, the children's disagreements involved a struggle over a toy that none of them had played with before or after the tug-of-war: the children seemed to be disputing ownership rather than wanting to play with it. Although it may be less marked in other societies, the link between the sense of 'self' and of 'ownership' is a notable feature of childhood in Western societies.

Questions 14–19

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

Which paragraph contains the following information?

*Write the correct letter, **A–H**, in boxes 14–19 on your answer sheet.*

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

14 an account of the method used by researchers in a particular study

15 the role of imitation in developing a sense of identity

16 the age at which children can usually identify a static image of themselves

17 a reason for the limitations of scientific research into 'self-as-subject'

18 reference to a possible link between culture and a particular form of behaviour

19 examples of the wide range of features that contribute to the sense of 'self-as-object'

Questions 20–23

Look at the following findings (Questions 20–23) and the list of researchers below.

Match each finding with the correct researcher or researchers, ***A–E.***

Write the correct letter, ***A–E****, in boxes 20–23 on your answer sheet.*

20 A sense of identity can never be formed without relationships with other people.

21 A child's awareness of self is related to a sense of mastery over things and people.

22 At a certain age, children's sense of identity leads to aggressive behaviour.

23 Observing their own reflection contributes to children's self awareness.

List of Researchers

A James
B Cooley
C Lewis and Brooks-Gunn
D Mead
E Bronson

Questions 24–26

Complete the summary below.

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

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

How children acquire a sense of identity

First, children come to realise that they can have an effect on the world around them, for example by handling objects, or causing the image to move when they face a **24** ..... . This aspect of self-awareness is difficult to research directly, because of **25** ..... problems.

Secondly, children start to become aware of how they are viewed by others. One important stage in this process is the visual recognition of themselves which usually occurs when they reach the age of two. In Western societies at least, the development of self awareness is often linked to a sense of **26** ..... , and can lead to disputes.

READING PASSAGE 2

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

Questions 14–21

Reading Passage 2 has nine paragraphs, **A–I**.

*Choose the correct heading for paragraphs **A–E** and **G–I** from the list of headings below.*

*Write the correct number, **i–xi**, in boxes 14–21 on your answer sheet.*

List of Headings

i	A fresh and important long-term goal
ii	Charging for roads and improving other transport methods
iii	Changes affecting the distances goods may be transported
iv	Taking all the steps necessary to change transport patterns
v	The environmental costs of road transport
vi	The escalating cost of rail transport
vii	The need to achieve transport rebalance
viii	The rapid growth of private transport
ix	Plans to develop major road networks
x	Restricting road use through charging policies alone
xi	Transport trends in countries awaiting EU admission

14 Paragraph **A**

15 Paragraph **B**

16 Paragraph **C**

17 Paragraph **D**

18 Paragraph **E**

19 Paragraph **G**

20 Paragraph **H**

21 Paragraph **I**

Example	*Answer*
Paragraph **F**	**vii**

EUROPEAN TRANSPORT SYSTEMS 1990–2010

What have been the trends and what are the prospects for European transport systems?

A It is difficult to conceive of vigorous economic growth without an efficient transport system. Although modern information technologies can reduce the demand for physical transport by facilitating teleworking and teleservices, the requirement for transport continues to increase. There are two key factors behind this trend. For passenger transport, the determining factor is the spectacular growth in car use. The number of cars on European Union (EU) roads saw an increase of three million cars each year from 1990 to 2010, and in the next decade the EU will see a further substantial increase in its fleet.

B As far as goods transport is concerned, growth is due to a large extent to changes in the European economy and its system of production. In the last 20 years, as internal frontiers have been abolished, the EU has moved from a 'stock' economy to a 'flow' economy. This phenomenon has been emphasised by the relocation of some industries, particularly those which are labour intensive, to reduce production costs, even though the production site is hundreds or even thousands of kilometres away from the final assembly plant or away from users.

C The strong economic growth expected in countries which are candidates for entry to the EU will also increase transport flows, in particular road haulage traffic. In 1998, some of these countries already exported more than twice their 1990 volumes and imported more than five times their 1990 volumes. And although many candidate countries inherited a transport system which encourages rail, the distribution between modes has tipped sharply in favour of road transport since the 1990s. Between 1990 and 1998, road haulage increased by 19.4%, while during the same period rail haulage decreased by 43.5%, although – and this could benefit the enlarged EU – it is still on average at a much higher level than in existing member states.

D However, a new imperative – sustainable development – offers an opportunity for adapting the EU's common transport policy. This objective, agreed by the Gothenburg European Council, has to be achieved by integrating environmental considerations into Community policies, and shifting the balance between modes of transport lies at the heart of its strategy. The ambitious objective can only be fully achieved by 2020, but proposed measures are nonetheless a first essential step towards a sustainable transport system which will ideally be in place in 30 years' time, that is by 2040.

E In 1998, energy consumption in the transport sector was to blame for 28% of emissions of CO_2, the leading greenhouse gas. According to the latest estimates, if nothing is done to reverse the traffic growth trend, CO_2 emissions from transport can be expected to increase by around 50% to 1,113 billion tonnes by 2020, compared with the 739 billion tonnes recorded in 1990. Once again, road transport is the main culprit since it alone accounts for 84% of the CO_2 emissions attributable to transport. Using alternative fuels and improving energy efficiency is thus both an ecological necessity and a technological challenge.

F At the same time greater efforts must be made to achieve a modal shift. Such a change cannot be achieved overnight, all the less so after over half a century of constant deterioration in favour of road. This has reached such a pitch that today rail freight services are facing marginalisation, with just 8% of market share, and with international goods trains struggling along at an average speed of 18km/h. Three possible options have emerged.

G The first approach would consist of focusing on road transport solely through pricing. This option would not be accompanied by complementary measures in the other modes of transport. In the short term it might curb the growth in road transport through the better loading ratio of goods vehicles and occupancy rates of passenger vehicles expected as a result of the increase in the price of transport. However, the lack of measures available to revitalise other modes of transport would make it impossible for more sustainable modes of transport to take up the baton.

H The second approach also concentrates on road transport pricing but is accompanied by measures to increase the efficiency of the other modes (better quality of services, logistics, technology). However, this approach does not include investment in new infrastructure, nor does it guarantee better regional cohesion. It could help to achieve greater uncoupling than the first approach, but road transport would keep the lion's share of the market and continue to concentrate on saturated arteries, despite being the most polluting of the modes. It is therefore not enough to guarantee the necessary shift of the balance.

I The third approach, which is not new, comprises a series of measures ranging from pricing to revitalising alternative modes of transport and targeting investment in the trans-European network. This integrated approach would allow the market shares of the other modes to return to their 1998 levels and thus make a shift of balance. It is far more ambitious than it looks, bearing in mind the historical imbalance in favour of roads for the last fifty years, but would achieve a marked break in the link between road transport growth and economic growth, without placing restrictions on the mobility of people and goods.

Questions 22–26

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

In boxes 22–26 on your answer sheet, write

TRUE	*if the statement agrees with the information*
FALSE	*if the statement contradicts the information*
NOT GIVEN	*if there is no information on this*

22 The need for transport is growing, despite technological developments.

23 To reduce production costs, some industries have been moved closer to their relevant consumers.

24 Cars are prohibitively expensive in some EU candidate countries.

25 The Gothenburg European Council was set up 30 years ago.

26 By the end of this decade, CO_2 emissions from transport are predicted to reach 739 billion tonnes.

READING PASSAGE 2

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

Gifted children and learning

A Internationally, 'giftedness' is most frequently determined by a score on a general intelligence test, known as an IQ test, which is above a chosen cut-off point, usually at around the top 2–5%. Children's educational environment contributes to the IQ score and the way intelligence is used. For example, a very close positive relationship was found when children's IQ scores were compared with their home educational provision (Freeman, 2010). The higher the children's IQ scores, especially over IQ 130, the better the quality of their educational backup, measured in terms of reported verbal interactions with parents, number of books and activities in their home etc. Because IQ tests are decidedly influenced by what the child has learned, they are to some extent measures of current achievement based on age-norms; that is, how well the children have learned to manipulate their knowledge and know-how within the terms of the test. The vocabulary aspect, for example, is dependent on having heard those words. But IQ tests can neither identify the processes of learning and thinking nor predict creativity.

B Excellence does not emerge without appropriate help. To reach an exceptionally high standard in any area very able children need the means to learn, which includes material to work with and focused challenging tuition – and the encouragement to follow their dream. There appears to be a qualitative difference in the way the intellectually highly able think, compared with more average-ability or older pupils, for whom external regulation by the teacher often compensates for lack of internal regulation. To be at their most effective in their self-regulation, all children can be helped to identify their own ways of learning – metacognition – which will include strategies of planning, monitoring, evaluation, and choice of what to learn. Emotional awareness is also part of metacognition, so children should be helped to be aware of their feelings around the area to be learned, feelings of curiosity or confidence, for example.

C High achievers have been found to use self-regulatory learning strategies more often and more effectively than lower achievers, and are better able to transfer these strategies to deal with unfamiliar tasks. This happens to such a high degree in some children that they appear to be demonstrating talent in particular areas. Overviewing research on the thinking process of highly able

children, (Shore and Kanevsky, 1993) put the instructor's problem succinctly: 'If they [the gifted] merely think more quickly, then we need only teach more quickly. If they merely make fewer errors, then we can shorten the practice'. But of course, this is not entirely the case; adjustments have to be made in methods of learning and teaching, to take account of the many ways individuals think.

D Yet in order to learn by themselves, the gifted do need some support from their teachers. Conversely, teachers who have a tendency to 'overdirect' can diminish their gifted pupils' learning autonomy. Although 'spoon-feeding' can produce extremely high examination results, these are not always followed by equally impressive life successes. Too much dependence on the teacher risks loss of autonomy and motivation to discover. However, when teachers help pupils to reflect on their own learning and thinking activities, they increase their pupils' self-regulation. For a young child, it may be just the simple question 'What have you learned today?' which helps them to recognise what they are doing. Given that a fundamental goal of education is to transfer the control of learning from teachers to pupils, improving pupils' learning to learn techniques should be a major outcome of the school experience, especially for the highly competent. There are quite a number of new methods which can help, such as child-initiated learning, ability-peer tutoring, etc. Such practices have been found to be particularly useful for bright children from deprived areas.

E But scientific progress is not all theoretical, knowledge is also vital to outstanding performance: individuals who know a great deal about a specific domain will achieve at a higher level than those who do not (Elshout, 1995). Research with creative scientists by Simonton (1988) brought him to the conclusion that above a certain high level, characteristics such as independence seemed to contribute *more* to reaching the highest levels of expertise than intellectual skills, due to the great demands of effort and time needed for learning and practice. Creativity in all forms can be seen as expertise mixed with a high level of motivation (Weisberg, 1993).

F To sum up, learning is affected by emotions of both the individual and significant others. Positive emotions facilitate the creative aspects of learning and negative emotions inhibit it. Fear, for example, can limit the development of curiosity, which is a strong force in scientific advance, because it motivates problem-solving behaviour. In Boekaerts' (1991) review of emotion in the learning of very high IQ and highly achieving children, she found emotional forces in harness. They were not only curious, but often had a strong desire to control their environment, improve their learning efficiency, and increase their own learning resources.

Questions 14–17

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

Which paragraph contains the following information?

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

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

14 a reference to the influence of the domestic background on the gifted child

15 reference to what can be lost if learners are given too much guidance

16 a reference to the damaging effects of anxiety

17 examples of classroom techniques which favour socially-disadvantaged children

Questions 18–22

Look at the following statements (Questions 18–22) and the list of people below.

*Match each statement with the correct person or people, **A–E**.*

*Write the correct letter, **A–E**, in boxes 18–22 on your answer sheet.*

18 Less time can be spent on exercises with gifted pupils who produce accurate work.

19 Self-reliance is a valuable tool that helps gifted students reach their goals.

20 Gifted children know how to channel their feelings to assist their learning.

21 The very gifted child benefits from appropriate support from close relatives.

22 Really successful students have learnt a considerable amount about their subject.

List of People

A Freeman

B Shore and Kanevsky

C Elshout

D Simonton

E Boekaerts

Questions 23–26

Complete the sentences below.

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

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

23 One study found a strong connection between children's IQ and the availability of ..... and ..... at home.

24 Children of average ability seem to need more direction from teachers because they do not have ..... .

25 Metacognition involves children understanding their own learning strategies, as well as developing ..... .

26 Teachers who rely on what is known as ..... often produce sets of impressive grades in class tests.

TEST 23

READING PASSAGE 2

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

Autumn leaves

Canadian writer Jay Ingram investigates the mystery of why leaves turn red in the fall

A One of the most captivating natural events of the year in many areas throughout North America is the turning of the leaves in the fall. The colours are magnificent, but the question of exactly why some trees turn yellow or orange, and others red or purple, is something which has long puzzled scientists.

B Summer leaves are green because they are full of chlorophyll, the molecule that captures sunlight and converts that energy into new building materials for the tree. As fall approaches in the northern hemisphere, the amount of solar energy available declines considerably. For many trees – evergreen conifers being an exception – the best strategy is to abandon photosynthesis* until the spring. So rather than maintaining the now redundant leaves throughout the winter, the tree saves its precious resources and discards them. But before letting its leaves go, the tree dismantles their chlorophyll molecules and ships their valuable nitrogen back into the twigs. As chlorophyll is depleted, other colours that have been dominated by it throughout the summer begin to be revealed. This unmasking explains the autumn colours of yellow and orange, but not the brilliant reds and purples of trees such as the maple or sumac.

C The source of the red is widely known: it is created by anthocyanins, water-soluble plant pigments reflecting the red to blue range of the visible spectrum. They belong to a class of sugar-based chemical compounds also known as flavonoids. What's puzzling is that anthocyanins are actually newly minted, made in the leaves at the same time as the tree is preparing to drop them. But it is hard to make sense of the manufacture of anthocyanins – why should a tree bother making new chemicals in its leaves when it's already scrambling to withdraw and preserve the ones already there?

D Some theories about anthocyanins have argued that they might act as a chemical defence against attacks by insects or fungi, or that they might attract fruit-eating birds or increase a leaf's tolerance to freezing. However there are problems with each of these theories, including the fact that leaves are red for such a relatively short period that the expense of energy needed to manufacture the anthocyanins would outweigh any anti-fungal or anti-herbivore activity achieved.

* photosynthesis: the production of new material from sunlight, water and carbon dioxide

E It has also been proposed that trees may produce vivid red colours to convince herbivorous insects that they are healthy and robust and would be easily able to mount chemical defences against infestation. If insects paid attention to such advertisements, they might be prompted to lay their eggs on a duller, and presumably less resistant host. The flaw in this theory lies in the lack of proof to support it. No one has as yet ascertained whether more robust trees sport the brightest leaves, or whether insects make choices according to colour intensity.

F Perhaps the most plausible suggestion as to why leaves would go to the trouble of making anthocyanins when they're busy packing up for the winter is the theory known as the 'light screen' hypothesis. It sounds paradoxical, because the idea behind this hypothesis is that the red pigment is made in autumn leaves to protect chlorophyll, the light-absorbing chemical, from *too much light.* Why does chlorophyll need protection when it is the natural world's supreme light absorber? Why protect chlorophyll at a time when the tree is breaking it down to salvage as much of it as possible?

G Chlorophyll, although exquisitely evolved to capture the energy of sunlight, can sometimes be overwhelmed by it, especially in situations of drought, low temperatures, or nutrient deficiency. Moreover, the problem of oversensitivity to light is even more acute in the fall, when the leaf is busy preparing for winter by dismantling its internal machinery. The energy absorbed by the chlorophyll molecules of the unstable autumn leaf is not immediately channelled into useful products and processes, as it would be in an intact summer leaf. The weakened fall leaf then becomes vulnerable to the highly destructive effects of the oxygen created by the excited chlorophyll molecules.

H Even if you had never suspected that this is what was going on when leaves turn red, there are clues out there. One is straightforward: on many trees, the leaves that are the reddest are those on the side of the tree which gets most sun. Not only that, but the red is brighter on the upper side of the leaf. It has also been recognised for decades that the best conditions for intense red colours are dry, sunny days and cool nights, conditions that nicely match those that make leaves susceptible to excess light. And finally, trees such as maples usually get much redder the more north you travel in the northern hemisphere. It's colder there, they're more stressed, their chlorophyll is more sensitive and it needs more sunblock.

I What is still not fully understood, however, is why some trees resort to producing red pigments while others don't bother, and simply reveal their orange or yellow hues. Do these trees have other means at their disposal to prevent overexposure to light in autumn? Their story, though not as spectacular to the eye, will surely turn out to be as subtle and as complex.

Questions 14–18

Reading Passage 2 has nine paragraphs, **A–I**.

Which paragraph contains the following information?

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

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

14 a description of the substance responsible for the red colouration of leaves

15 the reason why trees drop their leaves in autumn

16 some evidence to confirm a theory about the purpose of the red leaves

17 an explanation of the function of chlorophyll

18 a suggestion that the red colouration in leaves could serve as a warning signal

Questions 19–22

Complete the notes below.

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

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

Why believe the 'light screen' hypothesis?

- The most vividly coloured red leaves are found on the side of the tree facing the **19** ..... .
- The **20** ..... surfaces of leaves contain the most red pigment.
- Red leaves are most abundant when daytime weather conditions are **21** ..... and sunny.
- The intensity of the red colour of leaves increases as you go further **22** ..... .

Questions 23–25

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

In boxes 23–25 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*

23 It is likely that the red pigments help to protect the leaf from freezing temperatures.

24 The 'light screen' hypothesis would initially seem to contradict what is known about chlorophyll.

25 Leaves which turn colours other than red are more likely to be damaged by sunlight.

Question 26

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

Write the correct letter in box 26 on your answer sheet.

For which of the following questions does the writer offer an explanation?

A why conifers remain green in winter
B how leaves turn orange and yellow in autumn
C how herbivorous insects choose which trees to lay their eggs in
D why anthocyanins are restricted to certain trees

TEST 24

READING PASSAGE 2

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

Second nature

Your personality isn't necessarily set in stone. With a little experimentation, people can reshape their temperaments and inject passion, optimism, joy and courage into their lives

A Psychologists have long held that a person's character cannot undergo a transformation in any meaningful way and that the key traits of personality are determined at a very young age. However, researchers have begun looking more closely at ways we *can* change. Positive psychologists have identified 24 qualities we admire, such as loyalty and kindness, and are studying them to find out why they come so naturally to some people. What they're discovering is that many of these qualities amount to habitual behaviour that determines the way we respond to the world. The good news is that all this can be learned.

Some qualities are less challenging to develop than others, optimism being one of them. However, developing qualities requires mastering a range of skills which are diverse and sometimes surprising. For example, to bring more joy and passion into your life, you must be open to experiencing negative emotions. Cultivating such qualities will help you realise your full potential.

B 'The evidence is good that most personality traits can be altered,' says Christopher Peterson, professor of psychology at the University of Michigan, who cites himself as an example. Inherently introverted, he realised early on that as an academic, his reticence would prove disastrous in the lecture hall. So he learned to be more outgoing and to entertain his classes. 'Now my extroverted behaviour is spontaneous,' he says.

C David Fajgenbaum had to make a similar transition. He was preparing for university, when he had an accident that put an end to his sports career. On campus, he quickly found that beyond ordinary counselling, the university had no services for students who were undergoing physical rehabilitation and suffering from depression like him. He therefore launched a support group to help others in similar situations. He took action despite his own pain – a typical response of an optimist.

D Suzanne Segerstrom, professor of psychology at the University of Kentucky, believes that the key to increasing optimism is through cultivating optimistic behaviour, rather than positive thinking. She recommends you train yourself to pay attention to good fortune by writing down three positive things that come about each day. This will help you convince yourself that favourable outcomes actually happen all the time, making it easier to begin taking action.

E You can recognise a person who is passionate about a pursuit by the way they are so strongly involved in it. Tanya Streeter's passion is freediving – the sport of plunging deep into the water without tanks or other breathing equipment. Beginning in 1998, she set nine world records and can hold her breath for six minutes. The physical stamina required for this sport is intense but the psychological demands are even more overwhelming. Streeter learned to untangle her fears from her judgment of what her body and mind could do. 'In my career as a competitive freediver, there was a limit to what I could do – but it wasn't anywhere near what I thought it was,' she says.

F Finding a pursuit that excites you can improve anyone's life. The secret about consuming passions, though, according to psychologist Paul Silvia of the University of North Carolina, is that 'they require discipline, hard work and ability, which is why they are so rewarding.' Psychologist Todd Kashdan has this advice for those people taking up a new passion: 'As a newcomer, you also have to tolerate and laugh at your own ignorance. You must be willing to accept the negative feelings that come your way,' he says.

G In 2004, physician-scientist Mauro Zappaterra began his PhD research at Harvard Medical School. Unfortunately, he was miserable as his research wasn't compatible with his curiosity about healing. He finally took a break and during eight months in Santa Fe, Zappaterra learned about alternative healing techniques not taught at Harvard. When he got back, he switched labs to study how cerebrospinal fluid nourishes the developing nervous system. He also vowed to look for the joy in everything, including failure, as this could help him learn about his research and himself.

One thing that can hold joy back is a person's concentration on avoiding failure rather than their looking forward to doing something well. 'Focusing on being safe might get in the way of your reaching your goals,' explains Kashdan. For example, are you hoping to get through a business lunch without embarrassing yourself, or are you thinking about how fascinating the conversation might be?

H Usually, we think of courage in physical terms but ordinary life demands something else. For marketing executive Kenneth Pedeleose, it meant speaking out against something he thought was ethically wrong. The new manager was intimidating staff so Pedeleose carefully recorded each instance of bullying and eventually took the evidence to a senior director, knowing his own job security would be threatened. Eventually the manager was the one to go. According to Cynthia Pury, a psychologist at Clemson University, Pedeleose's story proves the point that courage is not motivated by fearlessness, but by moral obligation. Pury also believes that people can acquire courage. Many of her students said that faced with a risky situation, they first tried to calm themselves down, then looked for a way to mitigate the danger, just as Pedeleose did by documenting his allegations.

Over the long term, picking up a new character trait may help you move toward being the person you want to be. And in the short term, the effort itself could be surprisingly rewarding, a kind of internal adventure.

Questions 14–18

Complete the summary below.

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

Write your answers in boxes 14–18 on your answer sheet.

Psychologists have traditionally believed that a personality **14** ..... was impossible and that by a **15** ..... , a person's character tends to be fixed. This is not true according to positive psychologists, who say that our personal qualities can be seen as habitual behaviour. One of the easiest qualities to acquire is **16** ..... . However, regardless of the quality, it is necessary to learn a wide variety of different **17** ..... in order for a new quality to develop; for example, a person must understand and feel some **18** ..... in order to increase their happiness.

Questions 19–22

Look at the following statements (Questions 19–22) and the list of people below.

Match each statement with the correct person, ***A–G****.*

Write the correct letter, ***A–G****, in boxes 19–22 on your answer sheet.*

19 People must accept that they do not know much when first trying something new.

20 It is important for people to actively notice when good things happen.

21 Courage can be learned once its origins in a sense of responsibility are understood.

22 It is possible to overcome shyness when faced with the need to speak in public.

List of People	
A	Christopher Peterson
B	David Fajgenbaum
C	Suzanne Segerstrom
D	Tanya Streeter
E	Todd Kashdan
F	Kenneth Pedeleose
G	Cynthia Pury

Questions 23–26

Reading Passage 2 has eight sections, **A–H**.

Which section contains the following information?

*Write the correct letter, **A–H**, in boxes 23–26 on your answer sheet.*

23 a mention of how rational thinking enabled someone to achieve physical goals

24 an account of how someone overcame a sad experience

25 a description of how someone decided to rethink their academic career path

26 an example of how someone risked his career out of a sense of duty

READING PASSAGE 2

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

THE FALKIRK WHEEL

A unique engineering achievement

The Falkirk Wheel in Scotland is the world's first and only rotating boat lift. Opened in 2002, it is central to the ambitious £84.5m Millennium Link project to restore navigability across Scotland by reconnecting the historic waterways of the Forth & Clyde and Union Canals.

The major challenge of the project lay in the fact that the Forth & Clyde Canal is situated 35 metres below the level of the Union Canal. Historically, the two canals had been joined near the town of Falkirk by a sequence of 11 locks – enclosed sections of canal in which the water level could be raised or lowered – that stepped down across a distance of 1.5 km. This had been dismantled in 1933, thereby breaking the link. When the project was launched in 1994, the British Waterways authority were keen to create a dramatic twenty-first-century landmark which would not only be a fitting commemoration of the Millennium, but also a lasting symbol of the economic regeneration of the region.

Numerous ideas were submitted for the project, including concepts ranging from rolling eggs to tilting tanks, from giant see-saws to overhead monorails. The eventual winner was a plan for the huge rotating steel boat lift which was to become The Falkirk Wheel. The unique shape of the structure is claimed to have been inspired by various sources, both manmade and natural, most notably a Celtic double-headed axe, but also the vast turning propeller of a ship, the ribcage of a whale or the spine of a fish.

The various parts of The Falkirk Wheel were all constructed and assembled, like one giant toy building set, at Butterley Engineering's Steelworks in Derbyshire, some 400 km from Falkirk. A team there carefully assembled the 1,200 tonnes of steel, painstakingly fitting the pieces together to an accuracy of just 10 mm to ensure a perfect final fit. In the summer of 2001, the structure was then dismantled and transported on 35 lorries to Falkirk, before all being bolted back together again on the ground, and finally lifted into position in five large sections by crane. The Wheel would need to withstand immense and constantly changing stresses as it rotated, so to make the structure more robust, the steel sections were bolted rather than welded together. Over 45,000 bolt holes were matched with their bolts, and each bolt was hand-tightened.

The Wheel consists of two sets of opposing axe-shaped arms, attached about 25 metres apart to a fixed central spine. Two diametrically opposed water-filled 'gondolas', each with a capacity of 360,000 litres, are fitted between the ends of the arms. These gondolas always weigh the same, whether or not they are carrying boats. This is because, according to Archimedes' principle of displacement,

floating objects displace their own weight in water. So when a boat enters a gondola, the amount of water leaving the gondola weighs exactly the same as the boat. This keeps the Wheel balanced and so, despite its enormous mass, it rotates through 180° in five and a half minutes while using very little power. It takes just 1.5 kilowatt-hours (5.4 MJ) of energy to rotate the Wheel – roughly the same as boiling eight small domestic kettles of water.

Boats needing to be lifted up enter the canal basin at the level of the Forth & Clyde Canal and then enter the lower gondola of the Wheel. Two hydraulic steel gates are raised, so as to seal the gondola off from the water in the canal basin. The water between the gates is then pumped out. A hydraulic clamp, which prevents the arms of the Wheel moving while the gondola is docked, is removed, allowing the Wheel to turn. In the central machine room an array of ten hydraulic motors then begins to rotate the central axle. The axle connects to the outer arms of the Wheel, which begin to rotate at a speed of 1/8 of a revolution per minute. As the wheel rotates, the gondolas are kept in the upright position by a simple gearing system. Two eight-metre-wide cogs orbit a fixed inner cog of the same width, connected by two smaller cogs travelling in the opposite direction to the outer cogs – so ensuring that the gondolas always remain level. When the gondola reaches the top, the boat passes straight onto the aqueduct situated 24 metres above the canal basin.

The remaining 11 metres of lift needed to reach the Union Canal is achieved by means of a pair of locks. The Wheel could not be constructed to elevate boats over the full 35-metre difference between the two canals, owing to the presence of the historically important Antonine Wall, which was built by the Romans in the second century AD. Boats travel under this wall via a tunnel, then through the locks, and finally on to the Union Canal.

Questions 14–19

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

In boxes 14–19 on your answer sheet, write

TRUE	*if the statement agrees with the information*
FALSE	*if the statement contradicts the information*
NOT GIVEN	*if there is no information on this*

14 The Falkirk Wheel has linked the Forth & Clyde Canal with the Union Canal for the first time in their history.

15 There was some opposition to the design of the Falkirk Wheel at first.

16 The Falkirk Wheel was initially put together at the location where its components were manufactured.

17 The Falkirk Wheel is the only boat lift in the world which has steel sections bolted together by hand.

18 The weight of the gondolas varies according to the size of boat being carried.

19 The construction of the Falkirk Wheel site took into account the presence of a nearby ancient monument.

Questions 20–26

Label the diagram below.

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

Write your answers in boxes 20–26 on your answer sheet.

How a boat is lifted on the Falkirk Wheel

A pair of **20** ..... are lifted in order to shut out water from canal basin

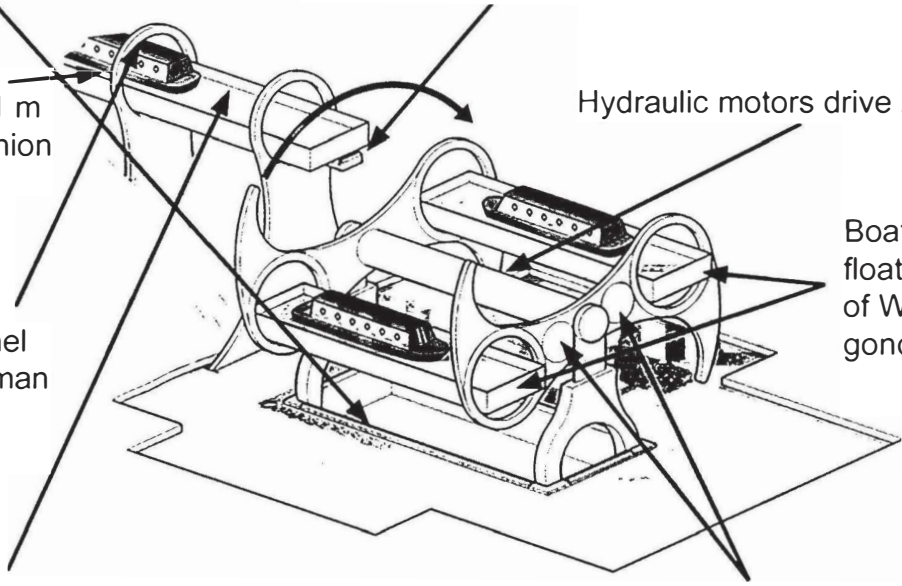
A **21** ..... is taken out, enabling Wheel to rotate

26 ..... raise boat 11 m to level of Union Canal

Hydraulic motors drive **22** .....

Boat is raised, floating in one of Wheel's two gondolas

Boat travels through tunnel beneath Roman **25** .....



Boat reaches top Wheel, then moves directly onto **24** .....

A range of different-sized **23** ..... ensures boat keeps upright

READING PASSAGE 2

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

Questions 14–20

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

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

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

List of Headings	
	Evidence of innovative environment management practices
ii	An undisputed answer to a question about the moai
iii	The future of the moai statues
iv	A theory which supports a local belief
v	The future of Easter Island
vi	Two opposing views about the Rapanui people
vii	Destruction outside the inhabitants' control
viii	How the statues made a situation worse
ix	Diminishing food resources

14 Paragraph **A**

15 Paragraph **B**

16 Paragraph **C**

17 Paragraph **D**

18 Paragraph **E**

19 Paragraph **F**

20 Paragraph **G**

What destroyed the civilisation of Easter Island?

A Easter Island, or Rapu Nui as it is known locally, is home to several hundred ancient human statues – the *moai*. After this remote Pacific island was settled by the Polynesians, it remained isolated for centuries. All the energy and resources that went into the moai – some of which are ten metres tall and weigh over 7,000 kilos – came from the island itself. Yet when Dutch explorers landed in 1722, they met a Stone Age culture. The moai were carved with stone tools, then transported for many kilometres, without the use of animals or wheels, to massive stone platforms. The identity of the moai builders was in doubt until well into the twentieth century. Thor Heyerdahl, the Norwegian ethnographer and adventurer, thought the statues had been created by pre-Inca peoples from Peru. Bestselling Swiss author Erich von Däniken believed they were built by stranded extraterrestrials. Modern science – linguistic, archaeological and genetic evidence – has definitively proved the moai builders were Polynesians, but not how they moved their creations. Local folklore maintains that the statues walked, while researchers have tended to assume the ancestors dragged the statues somehow, using ropes and logs.

B When the Europeans arrived, Rapa Nui was grassland, with only a few scrawny trees. In the 1970s and 1980s, though, researchers found pollen preserved in lake sediments, which proved the island had been covered in lush palm forests for thousands of years. Only after the Polynesians arrived did those forests disappear. US scientist Jared Diamond believes that the Rapanui people – descendants of Polynesian settlers – wrecked their own environment. They had unfortunately settled on an extremely fragile island – dry, cool, and too remote to be properly fertilised by windblown volcanic ash. When the islanders cleared the forests for firewood and farming, the forests didn't grow back. As trees became scarce and they could no longer construct wooden canoes for fishing, they ate birds. Soil erosion decreased their crop yields. Before Europeans arrived, the Rapanui had descended into civil war and cannibalism, he maintains. The collapse of their isolated civilisation, Diamond writes, is a 'worst-case scenario for what may lie ahead of us in our own future'.

C The moai, he thinks, accelerated the self-destruction. Diamond interprets them as power displays by rival chieftains who, trapped on a remote little island, lacked other ways of asserting their dominance. They competed by building ever bigger figures. Diamond thinks they laid the moai on wooden sledges, hauled over log rails, but that required both a lot of wood and a lot of people. To feed the people, even more land had to be cleared. When the wood was gone and civil war began, the islanders began toppling the moai. By the nineteenth century none were standing.

D Archaeologists Terry Hunt of the University of Hawaii and Carl Lipo of California State University agree that Easter Island lost its lush forests and that it was an 'ecological catastrophe' – but they believe the islanders themselves weren't to blame. And the moai certainly weren't. Archaeological excavations indicate that the Rapanui went to heroic efforts to protect the resources of their wind-lashed, infertile fields. They built thousands of circular stone windbreaks and gardened inside them, and used broken volcanic rocks to keep the soil moist. In short, Hunt and Lipo argue, the prehistoric Rapanui were pioneers of sustainable farming.

E Hunt and Lipo contend that moai-building was an activity that helped keep the peace between islanders. They also believe that moving the moai required few people and no wood, because they were walked upright. On that issue, Hunt and Lipo say, archaeological evidence backs up Rapanui folklore. Recent experiments indicate that as few as 18 people could, with three strong ropes and a bit of practice, easily manoeuvre a 1,000 kg moai replica a few hundred metres. The figures' fat bellies tilted them forward, and a D-shaped base allowed handlers to roll and rock them side to side.

F Moreover, Hunt and Lipo are convinced that the settlers were not wholly responsible for the loss of the island's trees. Archaeological finds of nuts from the extinct Easter Island palm show tiny grooves, made by the teeth of Polynesian rats. The rats arrived along with the settlers, and in just a few years, Hunt and Lipo calculate, they would have overrun the island. They would have prevented the reseeding of the slow-growing palm trees and thereby doomed Rapa Nui's forest, even without the settlers' campaign of deforestation. No doubt the rats ate birds' eggs too. Hunt and Lipo also see no evidence that Rapanui civilisation collapsed when the palm forest did. They think its population grew rapidly and then remained more or less stable until the arrival of the Europeans, who introduced deadly diseases to which islanders had no immunity. Then in the nineteenth century slave traders decimated the population, which shrivelled to 111 people by 1877.

G Hunt and Lipo's vision, therefore, is one of an island populated by peaceful and ingenious moai builders and careful stewards of the land, rather than by reckless destroyers ruining their own environment and society. 'Rather than a case of abject failure, Rapu Nui is an unlikely story of success', they claim. Whichever is the case, there are surely some valuable lessons which the world at large can learn from the story of Rapa Nui.

Questions 21–24

Complete the summary below.

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

Write your answers in boxes 21–24 on your answer sheet.

Jared Diamond's View

Diamond believes that the Polynesian settlers on Rapa Nui destroyed its forests, cutting down its trees for fuel and clearing land for **21** ..... . Twentieth-century discoveries of pollen prove that Rapu Nui had once been covered in palm forests, which had turned into grassland by the time the Europeans arrived on the island. When the islanders were no longer able to build the **22** ..... they needed to go fishing, they began using the island's **23** ..... as a food source, according to Diamond. Diamond also claims that the moai were built to show the power of the island's chieftains, and that the methods of transporting the statues needed not only a great number of people, but also a great deal of **24** ..... .

Questions 25 and 26

*Choose **TWO** letters, **A–E**.*

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

On what points do Hunt and Lipo disagree with Diamond?

A the period when the moai were created
B how the moai were transported
C the impact of the moai on Rapanui society
D how the moai were carved
E the origins of the people who made the moai

READING PASSAGE 2

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

Great Migrations

Animal migration, however it is defined, is far more than just the movement of animals. It can loosely be described as travel that takes place at regular intervals – often in an annual cycle – that may involve many members of a species, and is rewarded only after a long journey. It suggests inherited instinct. The biologist Hugh Dingle has identified five characteristics that apply, in varying degrees and combinations, to all migrations. They are prolonged movements that carry animals outside familiar habitats; they tend to be linear, not zigzaggy; they involve special behaviours concerning preparation (such as overfeeding) and arrival; they demand special allocations of energy. And one more: migrating animals maintain an intense attentiveness to the greater mission, which keeps them undistracted by temptations and undeterred by challenges that would turn other animals aside.

An arctic tern, on its 20,000 km flight from the extreme south of South America to the Arctic circle, will take no notice of a nice smelly herring offered from a bird-watcher's boat along the way. While local gulls will dive voraciously for such handouts, the tern flies on. Why? The arctic tern resists distraction because it is driven at that moment by an instinctive sense of something we humans find admirable: larger purpose. In other words, it is determined to reach its destination. The bird senses that it can eat, rest and mate later. Right now it is totally focused on the journey; its undivided intent is arrival. Reaching some gravelly coastline in the Arctic, upon which other arctic terns have converged, will serve its larger purpose as shaped by evolution: finding a place, a time, and a set of circumstances in which it can successfully hatch and rear offspring.

But migration is a complex issue, and biologists define it differently, depending in part on what sorts of animals they study. Joel Berger, of the University of Montana, who works on the American pronghorn and other large terrestrial mammals, prefers what he calls a simple, practical definition suited to his beasts: 'movements from a seasonal home area away to another home area and back again'. Generally the reason for such seasonal back-and-forth movement is to seek resources that aren't available within a single area year-round.

But daily vertical movements by zooplankton in the ocean – upward by night to seek food, downward by day to escape predators – can also be considered migration. So can the movement of aphids when, having depleted the young leaves on one food plant, their offspring then fly onward to a different host plant, with no one aphid ever returning to where it started.

Dingle is an evolutionary biologist who studies insects. His definition is more intricate than Berger's, citing those five features that distinguish migration from other forms of movement. They allow for the fact that, for example, aphids will

become sensitive to blue light (from the sky) when it's time for takeoff on their big journey, and sensitive to yellow light (reflected from tender young leaves) when it's appropriate to land. Birds will fatten themselves with heavy feeding in advance of a long migrational flight. The value of his definition, Dingle argues, is that it focuses attention on what the phenomenon of wildebeest migration shares with the phenomenon of the aphids, and therefore helps guide researchers towards understanding how evolution has produced them all.

Human behaviour, however, is having a detrimental impact on animal migration. The pronghorn, which resembles an antelope, though they are unrelated, is the fastest land mammal of the New World. One population, which spends the summer in the mountainous Grand Teton National Park of the western USA, follows a narrow route from its summer range in the mountains, across a river, and down onto the plains. Here they wait out the frozen months, feeding mainly on sagebrush blown clear of snow. These pronghorn are notable for the invariance of their migration route and the severity of its constriction at three bottlenecks. If they can't pass through each of the three during their spring migration, they can't reach their bounty of summer grazing; if they can't pass through again in autumn, escaping south onto those windblown plains, they are likely to die trying to overwinter in the deep snow. Pronghorn, dependent on distance vision and speed to keep safe from predators, traverse high, open shoulders of land, where they can see and run. At one of the bottlenecks, forested hills rise to form a V, leaving a corridor of open ground only about 150 metres wide, filled with private homes. Increasing development is leading toward a crisis for the pronghorn, threatening to choke off their passageway.

Conservation scientists, along with some biologists and land managers within the USA's National Park Service and other agencies, are now working to preserve migrational behaviours, not just species and habitats. A National Forest has recognised the path of the pronghorn, much of which passes across its land, as a protected migration corridor. But neither the Forest Service nor the Park Service can control what happens on private land at a bottleneck. And with certain other migrating species, the challenge is complicated further – by vastly greater distances traversed, more jurisdictions, more borders, more dangers along the way. We will require wisdom and resoluteness to ensure that migrating species can continue their journeying a while longer.

Questions 14–18

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

In boxes 14–18 on your answer sheet, write

TRUE	*if the statement agrees with the information*
FALSE	*if the statement contradicts the information*
NOT GIVEN	*if there is no information on this*

14 Local gulls and migrating arctic terns behave in the same way when offered food.

15 Experts' definitions of migration tend to vary according to their area of study.

16 Very few experts agree that the movement of aphids can be considered migration.

17 Aphids' journeys are affected by changes in the light that they perceive.

18 Dingle's aim is to distinguish between the migratory behaviours of different species.

Questions 19–22

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

Write the correct letter, ***A–G****, in boxes 19–22 on your answer sheet.*

19 According to Dingle, migratory routes are likely to

20 To prepare for migration, animals are likely to

21 During migration, animals are unlikely to

22 Arctic terns illustrate migrating animals' ability to

A be discouraged by difficulties.

B travel on open land where they can look out for predators.

C eat more than they need for immediate purposes.

D be repeated daily.

E ignore distractions.

F be governed by the availability of water.

G follow a straight line.

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 migration of pronghorns

Pronghorns rely on their eyesight and **23** ..... to avoid predators. One particular population's summer habitat is a national park, and their winter home is on the **24** ..... , where they go to avoid the danger presented by the snow at that time of year. However, their route between these two areas contains three **25** ..... . One problem is the construction of new homes in a narrow **26**..... of land on the pronghorns' route.

READING PASSAGE 2

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

An Introduction to Film Sound

Though we might think of film as an essentially visual experience, we really cannot afford to underestimate the importance of film sound. A meaningful sound track is often as complicated as the image on the screen, and is ultimately just as much the responsibility of the director. The entire sound track consists of three essential ingredients: the human voice, sound effects and music. These three tracks must be mixed and balanced so as to produce the necessary emphases which in turn create desired effects. Topics which essentially refer to the three previously mentioned tracks are discussed below. They include dialogue, synchronous and asynchronous sound effects, and music.

Let us start with dialogue. As is the case with stage drama, dialogue serves to tell the story and expresses feelings and motivations of characters as well. Often with film characterization the audience perceives little or no difference between the character and the actor. Thus, for example, the actor Humphrey Bogart is the character Sam Spade; film personality and life personality seem to merge. Perhaps this is because the very texture of a performer's voice supplies an element of character.

When voice textures fit the performer's physiognomy and gestures, a whole and very realistic persona emerges. The viewer sees not an actor working at his craft, but another human being struggling with life. It is interesting to note that how dialogue is used and the very amount of dialogue used varies widely among films. For example, in the highly successful science-fiction film *2001*, little dialogue was evident, and most of it was banal and of little intrinsic interest. In this way the film-maker was able to portray what Thomas Sobochack and Vivian Sobochack call, in *An Introduction to Film*, the 'inadequacy of human responses when compared with the magnificent technology created by man and the visual beauties of the universe'.

The comedy *Bringing Up Baby*, on the other hand, presents practically non-stop dialogue delivered at breakneck speed. This use of dialogue underscores not only the dizzy quality of the character played by Katherine Hepburn, but also the absurdity of the film itself and thus its humor. The audience is bounced from gag to gag and conversation to conversation; there is no time for audience reflection. The audience is caught up in a whirlwind of activity in simply managing to follow the plot. This film presents pure escapism – largely due to its frenetic dialogue.

Synchronous sound effects are those sounds which are synchronized or

matched with what is viewed. For example, if the film portrays a character playing the piano, the sounds of the piano are projected. Synchronous sounds contribute to the realism of film and also help to create a particular atmosphere. For example, the 'click' of a door being opened may simply serve to convince the audience that the image portrayed is real, and the audience may only subconsciously note the expected sound. However, if the 'click' of an opening door is part of an ominous action such as a burglary, the sound mixer may call attention to the 'click' with an increase in volume; this helps to engage the audience in a moment of suspense.

Asynchronous sound effects, on the other hand, are not matched with a visible source of the sound on screen. Such sounds are included so as to provide an appropriate emotional nuance, and they may also add to the realism of the film. For example, a film-maker might opt to include the background sound of an ambulance's siren while the foreground sound and image portrays an arguing couple. The asynchronous ambulance siren underscores the psychic injury incurred in the argument; at the same time the noise of the siren adds to the realism of the film by acknowledging the film's city setting.

We are probably all familiar with background music in films, which has become so ubiquitous as to be noticeable in its absence. We are aware that it is used to add emotion and rhythm. Usually not meant to be noticeable, it often provides a tone or an emotional attitude toward the story and/or the characters depicted. In addition, background music often foreshadows a change in mood. For example, dissonant music may be used in film to indicate an approaching (but not yet visible) menace or disaster.

Background music may aid viewer understanding by linking scenes. For example, a particular musical theme associated with an individual character or situation may be repeated at various points in a film in order to remind the audience of salient motifs or ideas.

Film sound comprises conventions and innovations. We have come to expect an acceleration of music during car chases and creaky doors in horror films. Yet, it is important to note as well that sound is often brilliantly conceived. The effects of sound are often largely subtle and often are noted by only our subconscious minds. We need to foster an awareness of film sound as well as film space so as to truly appreciate an art form that sprang to life during the twentieth century – the modern film.

Questions 14–18

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

Write the correct letter in boxes 14–18 on your answer sheet.

14 In the first paragraph, the writer makes a point that

A the director should plan the sound track at an early stage in filming.
B it would be wrong to overlook the contribution of sound to the artistry of films.
C the music industry can have a beneficial influence on sound in film.
D it is important for those working on the sound in a film to have sole responsibility for it.

15 One reason that the writer refers to Humphrey Bogart is to exemplify

A the importance of the actor and the character appearing to have similar personalities.
B the audience's wish that actors are visually appropriate for their roles.
C the value of the actor having had similar feelings to the character.
D the audience's preference for dialogue to be as authentic as possible.

16 In the third paragraph, the writer suggests that

A audiences are likely to be critical of film dialogue that does not reflect their own experience.
B film dialogue that appears to be dull may have a specific purpose.
C filmmakers vary considerably in the skill with which they handle dialogue.
D the most successful films are those with dialogue of a high quality.

17 What does the writer suggest about *Bringing Up Baby*?

A The plot suffers from the filmmaker's wish to focus on humorous dialogue.
B The dialogue helps to make it one of the best comedy films ever produced.
C There is a mismatch between the speed of the dialogue and the speed of actions.
D The nature of the dialogue emphasises key elements of the film.

18 The writer refers to the 'click' of a door to make the point that realistic sounds

A are often used to give the audience a false impression of events in the film.
B may be interpreted in different ways by different members of the audience.
C may be modified in order to manipulate the audience's response to the film.
D tend to be more significant in films presenting realistic situations.

Questions 19–23

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

In boxes 19–23 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*

19 Audiences are likely to be surprised if a film lacks background music.

20 Background music may anticipate a development in a film.

21 Background music has more effect on some people than on others.

22 Background music may help the audience to make certain connections within the film.

23 Audiences tend to be aware of how the background music is affecting them.

Questions 24–26

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

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

24 The audience's response to different parts of a film can be controlled

25 The feelings and motivations of characters become clear

26 A character seems to be a real person rather than an actor

A when the audience listens to the dialogue.

B if the film reflects the audience's own concerns.

C if voice, sound and music are combined appropriately.

D when the director is aware of how the audience will respond.

E when the actor's appearance, voice and moves are consistent with each other.

READING PASSAGE 2

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

COLLECTING AS A HOBBY

Collecting must be one of the most varied of human activities, and it's one that many of us psychologists find fascinating. Many forms of collecting have been dignified with a technical name: an archtophilist collects teddy bears, a philatelist collects postage stamps, and a deltiologist collects postcards. Amassing hundreds or even thousands of postcards, chocolate wrappers or whatever, takes time, energy and money that could surely be put to much more productive use. And yet there are millions of collectors around the world. Why do they do it?

There are the people who collect because they want to make money – this could be called an instrumental reason for collecting; that is, collecting as a means to an end. They'll look for, say, antiques that they can buy cheaply and expect to be able to sell at a profit. But there may well be a psychological element, too – buying cheap and selling dear can give the collector a sense of triumph. And as selling online is so easy, more and more people are joining in.

Many collectors collect to develop their social life, attending meetings of a group of collectors and exchanging information on items. This is a variant on joining a bridge club or a gym, and similarly brings them into contact with like-minded people.

Another motive for collecting is the desire to find something special, or a particular example of the collected item, such as a rare early recording by a particular singer. Some may spend their whole lives in a hunt for this. Psychologically, this can give a purpose to a life that otherwise feels aimless. There is a danger, though, that if the individual is ever lucky enough to find what they're looking for, rather than celebrating their success, they may feel empty, now that the goal that drove them on has gone.

If you think about collecting postage stamps, another potential reason for it – or, perhaps, a result of collecting – is its educational value. Stamp collecting opens a window to other countries, and to the plants, animals, or famous people shown on their stamps. Similarly, in the 19th century, many collectors amassed fossils, animals and plants from around the globe, and their collections provided a vast amount of information about the natural world. Without those collections, our understanding would be greatly inferior to what it is.

In the past – and nowadays, too, though to a lesser extent – a popular form of collecting, particularly among boys and men, was trainspotting. This might involve trying to see every locomotive of a particular type, using published data that identifies each one, and ticking off each engine as it is seen. Trainspotters exchange information, these days often by mobile phone, so they can work out where to go to, to see a particular engine. As a by-product, many practitioners of the hobby become very knowledgeable about railway

operations, or the technical specifications of different engine types.

Similarly, people who collect dolls may go beyond simply enlarging their collection, and develop an interest in the way that dolls are made, or the materials that are used. These have changed over the centuries from the wood that was standard in 16th century Europe, through the wax and porcelain of later centuries, to the plastics of today's dolls. Or collectors might be inspired to study how dolls reflect notions of what children like, or ought to like.

Not all collectors are interested in learning from their hobby, though, so what we might call a psychological reason for collecting is the need for a sense of control, perhaps as a way of dealing with insecurity. Stamp collectors, for instance, arrange their stamps in albums, usually very neatly, organising their collection according to certain commonplace principles – perhaps by country in alphabetical order, or grouping stamps by what they depict – people, birds, maps, and so on.

One reason, conscious or not, for *what* someone chooses to collect is to show the collector's individualism. Someone who decides to collect something as unexpected as dog collars, for instance, may be conveying their belief that they must be interesting themselves. And believe it or not, there is at least one dog collar museum in existence, and it grew out of a personal collection.

Of course, all hobbies give pleasure, but the common factor in collecting is usually passion: pleasure is putting it far too mildly. More than most other hobbies, collecting can be totally engrossing, and can give a strong sense of personal fulfilment. To non-collectors it may appear an eccentric, if harmless, way of spending time, but potentially, collecting has a lot going for it.

Questions 14–21

Complete the sentences below.

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

Write your answers in boxes 14–21 on your answer sheet.

14 The writer mentions collecting ..... as an example of collecting in order to make money.

15 Collectors may get a feeling of ..... from buying and selling items.

16 Collectors' clubs provide opportunities to share ..... .

17 Collectors' clubs offer ..... with people who have similar interests.

18 Collecting sometimes involves a life-long ..... for a special item.

19 Searching for something particular may prevent people from feeling their life is completely ..... .

20 Stamp collecting may be ..... because it provides facts about different countries.

21 ..... tends to be mostly a male hobby.

Questions 22–26

Do the following statements agree with the information given in the passage on *pages 20 and 21?*

In boxes 22–26 on your answer sheet, write

TRUE	*if the statement agrees with the information*
FALSE	*if the statement contradicts the information*
NOT GIVEN	*if there is no information on this*

22 The number of people buying dolls has grown over the centuries.

23 Sixteenth century European dolls were normally made of wax and porcelain.

24 Arranging a stamp collection by the size of the stamps is less common than other methods.

25 Someone who collects unusual objects may want others to think he or she is also unusual.

26 Collecting gives a feeling that other hobbies are unlikely to inspire.

TEST 30

READING PASSAGE 2

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

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	Different accounts of the same journey
ii	Bingham gains support
iii	A common belief
iv	The aim of the trip
v	A dramatic description
vi	A new route
vii	Bingham publishes his theory
viii	Bingham's lack of enthusiasm

14 Paragraph **A**

15 Paragraph **B**

16 Paragraph **C**

17 Paragraph **D**

18 Paragraph **E**

19 Paragraph **F**

20 Paragraph **G**

The Lost City

An explorer's encounter with the ruined city of Machu Picchu, the most famous icon of the Inca civilisation

A When the US explorer and academic Hiram Bingham arrived in South America in 1911, he was ready for what was to be the greatest achievement of his life: the exploration of the remote hinterland to the west of Cusco, the old capital of the Inca empire in the Andes mountains of Peru. His goal was to locate the remains of a city called Vitcos, the last capital of the Inca civilisation. Cusco lies on a high plateau at an elevation of more than 3,000 metres, and Bingham's plan was to descend from this plateau along the valley of the Urubamba river, which takes a circuitous route down to the Amazon and passes through an area of dramatic canyons and mountain ranges.

B When Bingham and his team set off down the Urubamba in late July, they had an advantage over travellers who had preceded them: a track had recently been blasted down the valley canyon to enable rubber to be brought up by mules from the jungle. Almost all previous travellers had left the river at Ollantaytambo and taken a high pass across the mountains to rejoin the river lower down, thereby cutting a substantial corner, but also therefore never passing through the area around Machu Picchu.

C On 24 July they were a few days into their descent of the valley. The day began slowly, with Bingham trying to arrange sufficient mules for the next stage of the trek. His companions showed no interest in accompanying him up the nearby hill to see some ruins that a local farmer, Melchor Arteaga, had told them about the night before. The morning was dull and damp, and Bingham also seems to have been less than keen on the prospect of climbing the hill. In his book *Lost City of the Incas*, he relates that he made the ascent without having the least expectation that he would find anything at the top.

D Bingham writes about the approach in vivid style in his book. First, as he climbs up the hill, he describes the ever-present possibility of deadly snakes, 'capable of making considerable springs when in pursuit of their prey'; not that he sees any. Then there's a sense of mounting discovery as he comes across great sweeps of terraces, then a mausoleum, followed by monumental staircases and, finally, the grand ceremonial buildings of Machu Picchu. 'It seemed like an unbelievable dream … the sight held me spellbound …' he wrote.

E We should remember, however, that *Lost City of the Incas* is a work of hindsight, not written until 1948, many years after his journey. His journal entries of the time reveal a much more gradual appreciation of his achievement. He spent the afternoon at the ruins noting down the dimensions of some of the buildings, then descended and rejoined his companions, to whom he seems to have said little about his discovery. At this stage, Bingham didn't realise the extent or the importance of the site, nor did he realise what use he could make of the discovery.

F However, soon after returning it occurred to him that he could make a name for himself from this discovery. When he came to write the National Geographic magazine article that broke the story to the world in April 1913, he knew he had to produce a big idea. He wondered whether it could have been the birthplace of the very first Inca, Manco the Great, and whether it could also have been what chroniclers described as 'the last city of the Incas'. This term refers to Vilcabamba, the settlement where the Incas had fled from Spanish invaders in the 1530s. Bingham made desperate attempts to prove this belief for nearly 40 years. Sadly, his vision of the site as both the beginning and end of the Inca civilisation, while a magnificent one, is inaccurate. We now know that Vilcabamba actually lies 65 kilometres away in the depths of the jungle.

G One question that has perplexed visitors, historians and archaeologists alike ever since Bingham, is why the site seems to have been abandoned before the Spanish Conquest. There are no references to it by any of the Spanish chroniclers – and if they had known of its existence so close to Cusco they would certainly have come in search of gold. An idea which has gained wide acceptance over the past few years is that Machu Picchu was a *moya*, a country estate built by an Inca emperor to escape the cold winters of Cusco, where the elite could enjoy monumental architecture and spectacular views. Furthermore, the particular architecture of Machu Picchu suggests that it was constructed at the time of the greatest of all the Incas, the emperor Pachacuti (c. 1438–71). By custom, Pachacuti's descendants built other similar estates for their own use, and so Machu Picchu would have been abandoned after his death, some 50 years before the Spanish Conquest.

Questions 21–24

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

In boxes 21–24 on your answer sheet, write

TRUE	*if the statement agrees with the information*
FALSE	*if the statement contradicts the information*
NOT GIVEN	*if there is no information on this*

21 Bingham went to South America in search of an Inca city.

22 Bingham chose a particular route down the Urubamba valley because it was the most common route used by travellers.

23 Bingham understood the significance of Machu Picchu as soon as he saw it.

24 Bingham returned to Machu Picchu in order to find evidence to support his theory.

Questions 25–26

Complete the sentences below.

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

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

25 The track that took Bingham down the Urubamba valley had been created for the transportation of ..... .

26 Bingham found out about the ruins of Machu Picchu from a ..... in the Urubamba valley.

READING PASSAGE 2

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

The Intersection of Health Sciences and Geography

A While many diseases that affect humans have been eradicated due to improvements in vaccinations and the availability of healthcare, there are still areas around the world where certain health issues are more prevalent. In a world that is far more globalised than ever before, people come into contact with one another through travel and living closer and closer to each other. As a result, super-viruses and other infections resistant to antibiotics are becoming more and more common.

B Geography can often play a very large role in the health concerns of certain populations. For instance, depending on where you live, you will not have the same health concerns as someone who lives in a different geographical region. Perhaps one of the most obvious examples of this idea is malaria-prone areas, which are usually tropical regions that foster a warm and damp environment in which the mosquitos that can give people this disease can grow. Malaria is much less of a problem in high-altitude deserts, for instance.

C In some countries, geographical factors influence the health and well-being of the population in very obvious ways. In many large cities, the wind is not strong enough to clear the air of the massive amounts of smog and pollution that cause asthma, lung problems, eyesight issues and more in the people who live there. Part of the problem is, of course, the massive number of cars being driven, in addition to factories that run on coal power. The rapid industrialisation of some countries in recent years has also led to the cutting down of forests to allow for the expansion of big cities, which makes it even harder to fight the pollution with the fresh air that is produced by plants.

D It is in situations like these that the field of health geography comes into its own. It is an increasingly important area of study in a world where diseases like polio are re-emerging, respiratory diseases continue to spread, and malaria-prone areas are still fighting to find a better cure. Health geography is the combination of, on the one hand, knowledge regarding geography and methods used to analyse and interpret geographical information, and on the other, the study of health, diseases and healthcare practices around the world. The aim of this hybrid science is to create solutions for common geography-based health problems. While people will always be prone to illness, the study of how geography affects our health could lead to the eradication of certain illnesses, and the prevention of others in the future. By understanding why and how we get sick, we can change the way we treat illness and disease specific to certain geographical locations.

E The geography of disease and ill health analyses the frequency with which certain diseases appear in different parts of the world, and overlays the data with the geography of the region, to see if there could be a correlation between the two. Health geographers also study factors that could make certain individuals or a population more likely to be taken ill with a specific health concern or disease, as compared with the population of another area. Health geographers in this field are usually trained as healthcare workers, and have an understanding of basic epidemiology as it relates to the spread of diseases among the population.

F Researchers study the interactions between humans and their environment that could lead to illness (such as asthma in places with high levels of pollution) and work to create a clear way of categorising illnesses, diseases and epidemics into local and global scales. Health geographers can map the spread of illnesses and attempt to identify the reasons behind an increase or decrease in illnesses, as they work to find a way to halt the further spread or re-emergence of diseases in vulnerable populations.

G The second subcategory of health geography is the geography of healthcare provision. This group studies the availability (or lack thereof) of healthcare resources to individuals and populations around the world. In both developed and developing nations there is often a very large discrepancy between the options available to people in different social classes, income brackets, and levels of education. Individuals working in the area of the geography of healthcare provision attempt to assess the levels of healthcare in the area (for instance, it may be very difficult for people to get medical attention because there is a mountain between their village and the nearest hospital). These researchers are on the frontline of making recommendations regarding policy to international organisations, local government bodies and others.

H The field of health geography is often overlooked, but it constitutes a huge area of need in the fields of geography and healthcare. If we can understand how geography affects our health no matter where in the world we are located, we can better treat disease, prevent illness, and keep people safe and well.

Questions 14–19

Reading Passage 2 has eight sections, **A–H**.

Which paragraph contains the following information?

*Write the correct letter, **A–H**, in boxes 14–19 on your answer sheet.*

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

14 an acceptance that not all diseases can be totally eliminated

15 examples of physical conditions caused by human behaviour

16 a reference to classifying diseases on the basis of how far they extend geographically

17 reasons why the level of access to healthcare can vary within a country

18 a description of health geography as a mixture of different academic fields

19 a description of the type of area where a particular illness is rare

Questions 20–26

Complete the sentences below.

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

20 Certain diseases have disappeared, thanks to better ..... and healthcare.

21 Because there is more contact between people, ... are losing their usefulness.

22 Disease-causing ..... are most likely to be found in hot, damp regions.

23 One cause of pollution is ..... that burn a particular fuel.

24 The growth of cities often has an impact on nearby ..... .

25 ..... is one disease that is growing after having been eradicated.

26 A physical barrier such as a ..... can prevent people from reaching a hospital.

READING PASSAGE 2

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

Bring back the big cats

It's time to start returning vanished native animals to Britain, says John Vesty

There is a poem, written around 598 AD, which describes hunting a mystery animal called a *llewyn*. But what was it? Nothing seemed to fit, until 2006, when an animal bone, dating from around the same period, was found in the Kinsey Cave in northern England. Until this discovery, the lynx – a large spotted cat with tasselled ears – was presumed to have died out in Britain at least 6,000 years ago, before the inhabitants of these islands took up farming. But the 2006 find, together with three others in Yorkshire and Scotland, is compelling evidence that the lynx and the mysterious *llewyn* were in fact one and the same animal. If this is so, it would bring forward the tassel-eared cat's estimated extinction date by roughly 5,000 years.

However, this is not quite the last glimpse of the animal in British culture. A 9th-century stone cross from the Isle of Eigg shows, alongside the deer, boar and aurochs pursued by a mounted hunter, a speckled cat with tasselled ears. Were it not for the animal's backside having worn away with time, we could have been certain, as the lynx's stubby tail is unmistakable. But even without this key feature, it's hard to see what else the creature could have been. The lynx is now becoming the totemic animal of a movement that is transforming British environmentalism: rewilding.

Rewilding means the mass restoration of damaged ecosystems. It involves letting trees return to places that have been denuded, allowing parts of the seabed to recover from trawling and dredging, permitting rivers to flow freely again. Above all, it means bringing back missing species. One of the most striking findings of modern ecology is that ecosystems without large predators behave in completely different ways from those that retain them. Some of them drive dynamic processes that resonate through the whole food chain, creating niches for hundreds of species that might otherwise struggle to survive. The killers turn out to be bringers of life.

Such findings present a big challenge to British conservation, which has often selected arbitrary assemblages of plants and animals and sought, at great effort and expense, to prevent them from changing. It has tried to preserve the living world as if it were a jar of pickles, letting nothing in and nothing out, keeping nature in a state of arrested development. But ecosystems are not merely collections of species; they are also the dynamic and ever-shifting relationships between them. And this dynamism often depends on large predators.

At sea the potential is even greater: by protecting large areas from commercial fishing, we could once more see what 18th-century literature describes: vast shoals of fish being chased by fin and

sperm whales, within sight of the English shore. This policy would also greatly boost catches in the surrounding seas; the fishing industry's insistence on scouring every inch of seabed, leaving no breeding reserves, could not be more damaging to its own interests.

Rewilding is a rare example of an environmental movement in which campaigners articulate what they are for rather than only what they are against. One of the reasons why the enthusiasm for rewilding is spreading so quickly in Britain is that it helps to create a more inspiring vision than the green movement's usual promise of 'Follow us and the world will be slightly less awful than it would otherwise have been.'

The lynx presents no threat to human beings: there is no known instance of one preying on people. It is a specialist predator of roe deer, a species that has exploded in Britain in recent decades, holding back, by intensive browsing, attempts to re-establish forests. It will also winkle out sika deer: an exotic species that is almost impossible for human beings to control, as it hides in impenetrable plantations of young trees. The attempt to reintroduce this predator marries well with the aim of bringing forests back to parts of our bare and barren uplands. The lynx requires deep cover, and as such presents little risk to sheep and other livestock, which are supposed, as a condition of farm subsidies, to be kept out of the woods.

On a recent trip to the Cairngorm Mountains, I heard several conservationists suggest that the lynx could be reintroduced there within 20 years. If trees return to the bare hills elsewhere in Britain, the big cats could soon follow. There is nothing extraordinary about these proposals, seen from the perspective of anywhere else in Europe. The lynx has now been reintroduced to the Jura Mountains, the Alps, the Vosges in eastern France and the Harz mountains in Germany, and has re-established itself in many more places. The European population has tripled since 1970 to roughly 10,000. As with wolves, bears, beavers, boar, bison, moose and many other species, the lynx has been able to spread as farming has left the hills and people discover that it is more lucrative to protect charismatic wildlife than to hunt it, as tourists will pay for the chance to see it. Large-scale rewilding is happening almost everywhere – except Britain.

Here, attitudes are just beginning to change. Conservationists are starting to accept that the old preservation-jar model is failing, even on its own terms. Already, projects such as Trees for Life in the Highlands provide a hint of what might be coming. An organisation is being set up that will seek to catalyse the rewilding of land and sea across Britain, its aim being to reintroduce that rarest of species to British ecosystems: hope.

Questions 14–18

*Write the correct letter, **A**, **B**, **C** or **D**, in boxes 14–18 on your answer sheet.*

14 What did the 2006 discovery of the animal bone reveal about the lynx?

A Its physical appearance was very distinctive.
B Its extinction was linked to the spread of farming.
C It vanished from Britain several thousand years ago.
D It survived in Britain longer than was previously thought.

15 What point does the writer make about large predators in the third paragraph?

A Their presence can increase biodiversity.
B They may cause damage to local ecosystems.
C Their behaviour can alter according to the environment.
D They should be reintroduced only to areas where they were native.

16 What does the writer suggest about British conservation in the fourth paragraph?

A It has failed to achieve its aims.
B It is beginning to change direction.
C It has taken a misguided approach.
D It has focused on the most widespread species.

17 Protecting large areas of the sea from commercial fishing would result in

A practical benefits for the fishing industry.
B some short-term losses to the fishing industry.
C widespread opposition from the fishing industry.
D certain changes to techniques within the fishing industry.

18 According to the author, what distinguishes rewilding from other environmental campaigns?

A Its objective is more achievable.
B Its supporters are more articulate.
C Its positive message is more appealing.
D It is based on sounder scientific principles.

Questions 19–22

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

*Write the correct letter, **A–F**, in boxes 19–22 on your answer sheet.*

Reintroducing the lynx to Britain

There would be many advantages to reintroducing the lynx to Britain. While there is no evidence that the lynx has ever put **19** ..... in danger, it would reduce the numbers of certain **20** ..... whose populations have increased enormously in recent decades. It would present only a minimal threat to **21** ..... , provided these were kept away from lynx habitats. Furthermore, the reintroduction programme would also link efficiently with initiatives to return native **22** ..... to certain areas of the country.

A	trees	**B**	endangered species	**C**	hillsides
D	wild animals	**E**	humans	**F**	farm animals

Questions 23–26

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

In boxes 23–26 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*

23 Britain could become the first European country to reintroduce the lynx.

24 The large growth in the European lynx population since 1970 has exceeded conservationists' expectations.

25 Changes in agricultural practices have extended the habitat of the lynx in Europe.

26 It has become apparent that species reintroduction has commercial advantages.

TEST 33

READING PASSAGE 2

*You should spend about 20 minutes on **Questions 14–26**, which are based on Reading Passage 2 on pages 21 and 22.*

Questions 14–19

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

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

*Write the correct number, **i–viii**, in boxes 14–19 on your answer sheet.*

List of Headings

i	The productive outcomes that may result from boredom
ii	What teachers can do to prevent boredom
iii	A new explanation and a new cure for boredom
iv	Problems with a scientific approach to boredom
v	A potential danger arising from boredom
vi	Creating a system of classification for feelings of boredom
vii	Age groups most affected by boredom
viii	Identifying those most affected by boredom

14 Paragraph **A**

15 Paragraph **B**

16 Paragraph **C**

17 Paragraph **D**

18 Paragraph **E**

19 Paragraph **F**

Why being bored is stimulating – and useful, too

This most common of emotions is turning out to be more interesting than we thought

A We all know how it feels – it's impossible to keep your mind on anything, time stretches out, and all the things you could do seem equally unlikely to make you feel better. But defining boredom so that it can be studied in the lab has proved difficult. For a start, it can include a lot of other mental states, such as frustration, apathy, depression and indifference. There isn't even agreement over whether boredom is always a low-energy, flat kind of emotion or whether feeling agitated and restless counts as boredom, too. In his book, *Boredom: A Lively History*, Peter Toohey at the University of Calgary, Canada, compares it to disgust – an emotion that motivates us to stay away from certain situations. 'If disgust protects humans from infection, boredom may protect them from "infectious" social situations,' he suggests.

B By asking people about their experiences of boredom, Thomas Goetz and his team at the University of Konstanz in Germany have recently identified five distinct types: indifferent, calibrating, searching, reactant and apathetic. These can be plotted on two axes – one running left to right, which measures low to high arousal, and the other from top to bottom, which measures how positive or negative the feeling is. Intriguingly, Goetz has found that while people experience all kinds of boredom, they tend to specialise in one. Of the five types, the most damaging is 'reactant' boredom with its explosive combination of high arousal and negative emotion. The most useful is what Goetz calls 'indifferent' boredom: someone isn't engaged in anything satisfying but still feels relaxed and calm. However, it remains to be seen whether there are any character traits that predict the kind of boredom each of us might be prone to.

C Psychologist Sandi Mann at the University of Central Lancashire, UK, goes further. 'All emotions are there for a reason, including boredom,' she says. Mann has found that being bored makes us more creative. 'We're all afraid of being bored but in actual fact it can lead to all kinds of amazing things,' she says. In experiments published last year, Mann found that people who had been made to feel bored by copying numbers out of the phone book for 15 minutes came up with more creative ideas about how to use a polystyrene cup than a control group. Mann concluded that a passive, boring activity is best for creativity because it allows the mind to wander. In fact, she goes so far as to suggest that we should seek out more boredom in our lives.

D Psychologist John Eastwood at York University in Toronto, Canada, isn't convinced. 'If you are in a state of mind-wandering you are not bored,' he says. 'In my view, by definition boredom is an undesirable state.' That doesn't necessarily mean that it isn't adaptive, he adds. 'Pain is adaptive – if we didn't have physical pain, bad things would happen to us. Does that mean that we should actively cause pain? No. But even if boredom has evolved to help us survive, it can still be toxic

if allowed to fester.' For Eastwood, the central feature of boredom is a failure to put our 'attention system' into gear. This causes an inability to focus on anything, which makes time seem to go painfully slowly. What's more, your efforts to improve the situation can end up making you feel worse. 'People try to connect with the world and if they are not successful there's that frustration and irritability,' he says. Perhaps most worryingly, says Eastwood, repeatedly failing to engage attention can lead to a state where we don't know what to do any more, and no longer care.

E Eastwood's team is now trying to explore why the attention system fails. It's early days but they think that at least some of it comes down to personality. Boredom proneness has been linked with a variety of traits. People who are motivated by pleasure seem to suffer particularly badly. Other personality traits, such as curiosity are associated with a high boredom threshold. More evidence that boredom has detrimental effects comes from studies of people who are more or less prone to boredom. It seems those who bore easily face poorer prospects in education, their career and even life in general. But of course, boredom itself cannot kill – it's the things we do to deal with it that may put us in danger. What can we do to alleviate it before it comes to that? Goetz's group has one suggestion. Working wit teenagers, they found that those who 'approach' a boring situation – in other words see that it's boring and get stuck in anyway – report less boredom than those who try to avoid it by using snacks, TV or social media for distraction.

F Psychologist Francoise Wemelsfelder speculates that our over-connected lifestyles might even be a new source of boredom. 'In modern human society there is a lot o overstimulation but still a lot of problems finding meaning,' she says. So instead of seeking yet more mental stimulation, perhaps we should leave our phones alone, and use boredom to motivate us to engage with the world in a more meaningful way.

Questions 20–23

Look at the following people (Questions 20–23) and the list of ideas below.

Match each person with the correct idea, ***A–E****.*

Write the correct letter, ***A–E****, in boxes 20–23 on your answer sheet.*

20 Peter Toohey

21 Thomas Goetz

22 John Eastwood

23 Francoise Wemelsfelder

List of Ideas

A The way we live today may encourage boredom.

B One sort of boredom is worse than all the others.

C Levels of boredom may fall in the future.

D Trying to cope with boredom can increase its negative effects.

E Boredom may encourage us to avoid an unpleasant experience.

Questions 24–26

Complete the summary below.

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

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

Responses to boredom

For John Eastwood, the central feature of boredom is that people cannot **24** ..... , due to a failure in what he calls the 'attention system', and as a result they become frustrated and irritable. His team suggests that those for whom **25** ..... is an important aim in life may have problems in coping with boredom, whereas those who have the characteristic of **26** ..... can generally cope with it.

TEST 34

Test 2

READING PASSAGE 2

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

Oxytocin

The positive and negative effects of the chemical known as the 'love hormone'

A Oxytocin is a chemical, a hormone produced in the pituitary gland in the brain. It was through various studies focusing on animals that scientists first became aware of the influence of oxytocin. They discovered that it helps reinforce the bonds between prairie voles, which mate for life, and triggers the motherly behaviour that sheep show towards their newborn lambs. It is also released by women in childbirth, strengthening the attachment between mother and baby. Few chemicals have as positive a reputation as oxytocin, which is sometimes referred to as the 'love hormone'. One sniff of it can, it is claimed, make a person more trusting, empathetic, generous and cooperative. It is time, however, to revise this wholly optimistic view. A new wave of studies has shown that its effects vary greatly depending on the person and the circumstances, and it can impact on our social interactions for worse as well as for better.

B Oxytocin's role in human behaviour first emerged in 2005. In a groundbreaking experiment, Markus Heinrichs and his colleagues at the University of Freiburg, Germany, asked volunteers to do an activity in which they could invest money with an anonymous person who was not guaranteed to be honest. The team found that participants who had sniffed oxytocin via a nasal spray beforehand invested more money than those who received a placebo instead. The study was the start of research into the effects of oxytocin on human interactions. 'For eight years, it was quite a lonesome field,' Heinrichs recalls. 'Now, everyone is interested.' These follow-up studies have shown that after a sniff of the hormone, people become more charitable, better at reading emotions on others' faces and at communicating constructively in arguments. Together, the results fuelled the view that oxytocin universally enhanced the positive aspects of our social nature.

C Then, after a few years, contrasting findings began to emerge. Simone Shamay-Tsoory at the University of Haifa, Israel, found that when volunteers played a competitive game, those who inhaled the hormone showed more pleasure when they beat other players, and felt more envy when others won. What's more, administering oxytocin also has sharply contrasting outcomes depending on a person's disposition. Jennifer Bartz from Mount Sinai School of Medicine, New York, found that it improves people's ability to read emotions, but only if they are not very socially adept to begin with. Her research also shows that oxytocin in fact reduces cooperation in subjects who are particularly anxious or sensitive to rejection.

D Another discovery is that oxytocin's effects vary depending on who we are interacting with. Studies conducted by Carolyn DeClerck of the University of Antwerp, Belgium, revealed that people who had received a dose of oxytocin actually became less cooperative when dealing with complete strangers. Meanwhile, Carsten De Dreu at the University of Amsterdam in the Netherlands discovered that volunteers given oxytocin showed favouritism: Dutch men became quicker to associate positive words with Dutch names than with foreign ones, for example. According to De Dreu, oxytocin drives people to care for those in their social circles and defend them from outside dangers. So, it appears that oxytocin strengthens biases, rather than promoting general goodwill, as was previously thought.

E There were signs of these subtleties from the start. Bartz has recently shown that in almost half of the existing research results, oxytocin influenced only certain individuals or in certain circumstances. Where once researchers took no notice of such findings, now a more nuanced understanding of oxytocin's effects is propelling investigations down new lines. To Bartz, the key to understanding what the hormone does lies in pinpointing its core function rather than in cataloguing its seemingly endless effects. There are several hypotheses which are not mutually exclusive. Oxytocin could help to reduce anxiety and fear. Or it could simply motivate people to seek out social connections. She believes that oxytocin acts as a chemical spotlight that shines on social clues – a shift in posture, a flicker of the eyes, a dip in the voice – making people more attuned to their social environment. This would explain why it makes us more likely to look others in the eye and improves our ability to identify emotions. But it could also make things worse for people who are overly sensitive or prone to interpreting social cues in the worst light.

F Perhaps we should not be surprised that the oxytocin story has become more perplexing. The hormone is found in everything from octopuses to sheep, and its evolutionary roots stretch back half a billion years. 'It's a very simple and ancient molecule that has been co-opted for many different functions,' says Sue Carter at the University of Illinois, Chicago, USA. 'It affects primitive parts of the brain like the amygdala, so it's going to have many effects on just about everything.' Bartz agrees. 'Oxytocin probably does some very basic things, but once you add our higher-order thinking and social situations, these basic processes could manifest in different ways depending on individual differences and context.'

Questions 14–17

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

Which paragraph contains the following information?

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

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

14 reference to research showing the beneficial effects of oxytocin on people

15 reasons why the effects of oxytocin are complex

16 mention of a period in which oxytocin attracted little scientific attention

17 reference to people ignoring certain aspects of their research data

Questions 18–20

Look at the following research findings (Questions 18–20) and the list of researchers below.

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

*Write the correct letter, **A–F**, in boxes 18–20 on your answer sheet.*

18 People are more trusting when affected by oxytocin.

19 Oxytocin increases people's feelings of jealousy.

20 The effect of oxytocin varies from one type of person to another.

List of Researchers

A Markus Heinrichs

B Simone Shamay-Tsoory

C Jennifer Bartz

D Carolyn DeClerck

E Carsten De Dreu

F Sue Carter

Questions 21–26

Complete the summary below.

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

Write your answers in boxes 21–26 on your answer sheet.

Oxytocin research

The earliest findings about oxytocin and bonding came from research involving **21** ..... . It was also discovered that humans produce oxytocin during **22** ..... . An experiment in 2005, in which participants were given either oxytocin or a **23** ..... , reinforced the belief that the hormone had a positive effect.

However, later research suggests that this is not always the case. A study at the University of Haifa where participants took part in a **24** ..... revealed the negative emotions which oxytocin can trigger. A study at the University of Antwerp showed people's lack of willingness to help **25** ..... while under the influence of oxytocin. Meanwhile, research at the University of Amsterdam revealed that people who have been given oxytocin consider **26** ..... that are familiar to them in their own country to have more positive associations than those from other cultures.

TEST 35

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 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.

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 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 2

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

Back to the future of skyscraper design

Answers to the problem of excessive electricity use by skyscrapers and large public buildings can be found in ingenious but forgotten architectural designs of the 19th and early-20th centuries

A *The Recovery of Natural Environments in Architecture* by Professor Alan Short is the culmination of 30 years of research and award-winning green building design by Short and colleagues in Architecture, Engineering, Applied Maths and Earth Sciences at the University of Cambridge.

'The crisis in building design is already here,' said Short. 'Policy makers think you can solve energy and building problems with gadgets. You can't. As global temperatures continue to rise, we are going to continue to squander more and more energy on keeping our buildings mechanically cool until we have run out of capacity.'

B Short is calling for a sweeping reinvention of how skyscrapers and major public buildings are designed – to end the reliance on sealed buildings which exist solely via the 'life support' system of vast air conditioning units.

Instead, he shows it is entirely possible to accommodate natural ventilation and cooling in large buildings by looking into the past, before the widespread introduction of air conditioning systems, which were 'relentlessly and aggressively marketed' by their inventors.

C Short points out that to make most contemporary buildings habitable, they have to be sealed and air conditioned. The energy use and carbon emissions this generates is spectacular and largely unnecessary. Buildings in the West account for 40–50% of electricity usage, generating substantial carbon emissions, and the rest of the world is catching up at a frightening rate. Short regards glass, steel and air-conditioned skyscrapers as symbols of status, rather than practical ways of meeting our requirements.

D Short's book highlights a developing and sophisticated art and science of ventilating buildings through the 19th and earlier-20th centuries, including the design of ingeniously ventilated hospitals. Of particular interest were those built to the designs of John Shaw Billings, including the first Johns Hopkins Hospital in the US city of Baltimore (1873–1889).

'We spent three years digitally modelling Billings' final designs,' says Short. 'We put pathogens* in the airstreams, modelled for someone with tuberculosis (TB) coughing in the wards and we found the ventilation systems in the room would have kept other patients safe from harm.

*pathogen: microorganisms that can cause diseases

E ‘We discovered that 19th-century hospital wards could generate up to 24 air changes an hour – that’s similar to the performance of a modern-day, computer-controlled operating theatre. We believe you could build wards based on these principles now.

Single rooms are not appropriate for all patients. Communal wards appropriate for certain patients – older people with dementia, for example – would work just as well in today’s hospitals, at a fraction of the energy cost.’

Professor Short contends the mindset and skill-sets behind these designs have been completely lost, lamenting the disappearance of expertly designed theatres, opera houses, and other buildings where up to half the volume of the building was given over to ensuring everyone got fresh air.

F Much of the ingenuity present in 19th-century hospital and building design was driven by a panicked public clamouring for buildings that could protect against what was thought to be the lethal threat of miasmas – toxic air that spread disease. Miasmas were feared as the principal agents of disease and epidemics for centuries, and were used to explain the spread of infection from the Middle Ages right through to the cholera outbreaks in London and Paris during the 1850s. Foul air, rather than germs, was believed to be the main driver of ‘hospital fever’, leading to disease and frequent death. The prosperous steered clear of hospitals.

While miasma theory has been long since disproved, Short has for the last 30 years advocated a return to some of the building design principles produced in its wake.

G Today, huge amounts of a building’s space and construction cost are given over to air conditioning. ‘But I have designed and built a series of buildings over the past three decades which have tried to reinvent some of these ideas and then measure what happens.

‘To go forward into our new low-energy, low-carbon future, we would be well advised to look back at design before our high-energy, high-carbon present appeared. What is surprising is what a rich legacy we have abandoned.’

H Successful examples of Short’s approach include the Queen’s Building at De Montfort University in Leicester. Containing as many as 2,000 staff and students, the entire building is naturally ventilated, passively cooled and naturally lit, including the two largest auditoria, each seating more than 150 people. The award-winning building uses a fraction of the electricity of comparable buildings in the UK.

Short contends that glass skyscrapers in London and around the world will become a liability over the next 20 or 30 years if climate modelling predictions and energy price rises come to pass as expected.

He is convinced that sufficiently cooled skyscrapers using the natural environment can be produced in almost any climate. He and his team have worked on hybrid buildings in the harsh climates of Beijing and Chicago – built with natural ventilation assisted by back-up air conditioning – which, surprisingly perhaps, can be switched off more than half the time on milder days and during the spring and autumn.

“My book is a recipe book which looks at the past, how we got to where we are now, and how we might reimagine the cities, offices and homes of the future. There are compelling reasons to do this. The Department of Health says new hospitals should be naturally ventilated, but they are not. Maybe it’s time we changed our outlook.”

Questions 14–18

Reading Passage 2 has nine sections, **A–I**.

Which section contains the following information?

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

14 why some people avoided hospitals in the 19th century

15 a suggestion that the popularity of tall buildings is linked to prestige

16 a comparison between the circulation of air in a 19th-century building and modern standards

17 how Short tested the circulation of air in a 19th-century building

18 an implication that advertising led to the large increase in the use of air conditioning

Questions 19–26

Complete the summary below.

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

Write your answers in boxes 19–26 on your answer sheet.

Ventilation in 19th-century hospital wards

Professor Alan Short examined the work of John Shaw Billings, who influenced the architectural **19** ..... of hospitals to ensure they had good ventilation. He calculated that **20** ..... in the air coming from patients suffering from **21** ..... would not have harmed other patients. He also found that the air in **22** ..... in hospitals could change as often as in a modern operating theatre. He suggests that energy use could be reduced by locating more patients in **23** ..... areas.

A major reason for improving ventilation in 19th-century hospitals was the demand from the **24** ..... for protection against bad air, known as **25** ..... . These were blamed for the spread of disease for hundreds of years, including epidemics of **26** ..... in London and Paris in the middle of the 19th century.

READING PASSAGE 2

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

Saving bugs to find new drugs

Zoologist Ross Piper looks at the potential of insects in pharmaceutical research

A More drugs than you might think are derived from, or inspired by, compounds found in living things. Looking to nature for the soothing and curing of our ailments is nothing new – we have been doing it for tens of thousands of years. You only have to look at other primates – such as the capuchin monkeys who rub themselves with toxin-oozing millipedes to deter mosquitoes, or the chimpanzees who use noxious forest plants to rid themselves of intestinal parasites – to realise that our ancient ancestors too probably had a basic grasp of medicine.

B Pharmaceutical science and chemistry built on these ancient foundations and perfected the extraction, characterisation, modification and testing of these natural products. Then, for a while, modern pharmaceutical science moved its focus away from nature and into the laboratory, designing chemical compounds from scratch. The main cause of this shift is that although there are plenty of promising chemical compounds in nature, finding them is far from easy. Securing sufficient numbers of the organism in question, isolating and characterising the compounds of interest, and producing large quantities of these compounds are all significant hurdles.

C Laboratory-based drug discovery has achieved varying levels of success, something which has now prompted the development of new approaches focusing once again on natural products. With the ability to mine genomes for useful compounds, it is now evident that we have barely scratched the surface of nature's molecular diversity. This realisation, together with several looming health crises, such as antibiotic resistance, has put bioprospecting – the search for useful compounds in nature – firmly back on the map.

D Insects are the undisputed masters of the terrestrial domain, where they occupy every possible niche. Consequently, they have a bewildering array of interactions with other organisms, something which has driven the evolution of an enormous range of very interesting compounds for defensive and offensive purposes. Their remarkable diversity exceeds that of every other group of animals on the planet combined. Yet even though insects are far and away the most diverse animals in existence, their potential as sources of therapeutic compounds is yet to be realised.

E From the tiny proportion of insects that have been investigated, several promising compounds have been identified. For example, alloferon, an antimicrobial compound produced by blow fly larvae, is used as an antiviral and antitumor agent in South Korea and Russia. The larvae of a few other insect species are being investigated for the potent antimicrobial compounds they produce. Meanwhile, a compound from the venom of the wasp *Polybia paulista* has potential in cancer treatment.

F Why is it that insects have received relatively little attention in bioprospecting? Firstly, there are so many insects that, without some manner of targeted approach, investigating this huge variety of species is a daunting task. Secondly, insects are generally very small, and the glands inside them that secrete potentially useful compounds are smaller still. This can make it difficult to obtain sufficient quantities of the compound for subsequent testing. Thirdly, although we consider insects to be everywhere, the reality of this ubiquity is vast numbers of a few extremely common species. Many insect species are infrequently encountered and very difficult to rear in captivity, which, again, can leave us with insufficient material to work with.

G My colleagues and I at Aberystwyth University in the UK have developed an approach in which we use our knowledge of ecology as a guide to target our efforts. The creatures that particularly interest us are the many insects that secrete powerful poison for subduing prey and keeping it fresh for future consumption. There are even more insects that are masters of exploiting filthy habitats, such as faeces and carcasses, where they are regularly challenged by thousands of micro-organisms. These insects have many antimicrobial compounds for dealing with pathogenic bacteria and fungi, suggesting that there is certainly potential to find many compounds that can serve as or inspire new antibiotics.

H Although natural history knowledge points us in the right direction, it doesn't solve the problems associated with obtaining useful compounds from insects. Fortunately, it is now possible to snip out the stretches of the insect's DNA that carry the codes for the interesting compounds and insert them into cell lines that allow larger quantities to be produced. And although the road from isolating and characterising compounds with desirable qualities to developing a commercial product is very long and full of pitfalls, the variety of successful animal-derived pharmaceuticals on the market demonstrates there is a precedent here that is worth exploring.

With every bit of wilderness that disappears, we deprive ourselves of potential medicines. As much as I'd love to help develop a groundbreaking insect-derived medicine, my main motivation for looking at insects in this way is conservation. I sincerely believe that all species, however small and seemingly insignificant, have a right to exist for their own sake. If we can shine a light on the darker recesses of nature's medicine cabinet, exploring the useful chemistry of the most diverse animals on the planet, I believe we can make people think differently about the value of nature.

Questions 14–20

Reading Passage 2 has nine paragraphs, **A–I**.

Which paragraph contains the following information?

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

14 mention of factors driving a renewed interest in natural medicinal compounds

15 how recent technological advances have made insect research easier

16 examples of animals which use medicinal substances from nature

17 reasons why it is challenging to use insects in drug research

18 reference to how interest in drug research may benefit wildlife

19 a reason why nature-based medicines fell out of favour for a period

20 an example of an insect-derived medicine in use at the moment

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 make insects interesting for drug research?

A the huge number of individual insects in the world
B the variety of substances insects have developed to protect themselves
C the potential to extract and make use of insects' genetic codes
D the similarities between different species of insect
E the manageable size of most insects

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.

Research at Aberystwyth University

Ross Piper and fellow zoologists at Aberystwyth University are using their expertise in **23** ..... when undertaking bioprospecting with insects. They are especially interested in the compounds that insects produce to overpower and preserve their **24** ..... . They are also interested in compounds which insects use to protect themselves from pathogenic bacteria and fungi found in their **25** ..... . Piper hopes that these substances will be useful in the development of drugs such as **26** ..... .

READING PASSAGE 2

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

Why zoos are good

Scientist David Hone makes the case for zoos

A In my view, it is perfectly possible for many species of animals living in zoos or wildlife parks to have a quality of life as high as, or higher than, in the wild. Animals in good zoos get a varied and high-quality diet with all the supplements required, and any illnesses they might have will be treated. Their movement might be somewhat restricted, but they have a safe environment in which to live, and they are spared bullying and social ostracism by others of their kind. They do not suffer from the threat or stress of predators, or the irritation and pain of parasites or injuries. The average captive animal will have a greater life expectancy compared with its wild counterpart, and will not die of drought, of starvation or in the jaws of a predator. A lot of very nasty things happen to truly 'wild' animals that simply don't happen in good zoos, and to view a life that is 'free' as one that is automatically 'good' is, I think, an error. Furthermore, zoos serve several key purposes.

B Firstly, zoos aid conservation. Colossal numbers of species are becoming extinct across the world, and many more are increasingly threatened and therefore risk extinction. Moreover, some of these collapses have been sudden, dramatic and unexpected, or were simply discovered very late in the day. A species protected in captivity can be bred up to provide a reservoir population against a population crash or extinction in the wild. A good number of species only exist in captivity, with many of these living in zoos. Still more only exist in the wild because they have been reintroduced from zoos, or have wild populations that have been boosted by captive bred animals. Without these efforts there would be fewer species alive today. Although reintroduction successes are few and far between, the numbers are increasing, and the very fact that species have been saved or reintroduced as a result of captive breeding proves the value of such initiatives.

C Zoos also provide education. Many children and adults, especially those in cities, will never see a wild animal beyond a fox or pigeon. While it is true that television documentaries are becoming ever more detailed and impressive, and many natural history specimens are on display in museums, there really is nothing to compare with seeing a living creature in the flesh, hearing it, smelling it, watching what it does and having the time to absorb details. That alone will bring a greater understanding and perspective to many, and hopefully give them a greater appreciation for wildlife, conservation efforts and how they can contribute.

D In addition to this, there is also the education that can take place in zoos through signs, talks and presentations which directly communicate information to visitors about the animals they are seeing and their place in the world. This was an area where zoos used to be lacking, but they are now increasingly sophisticated in their communication and outreach work. Many zoos also work directly to educate conservation workers in other countries, or send their animal keepers abroad to contribute their knowledge and skills to those working in zoos and reserves, thereby helping to improve conditions and reintroductions all over the world.

E Zoos also play a key role in research. If we are to save wild species and restore and repair ecosystems we need to know about how key species live, act and react. Being able to undertake research on animals in zoos where there is less risk and fewer variables means real changes can be effected on wild populations. Finding out about, for example, the oestrus cycle of an animal or its breeding rate helps us manage wild populations. Procedures such as capturing and moving at-risk or dangerous individuals are bolstered by knowledge gained in zoos about doses for anaesthetics, and by experience in handling and transporting animals. This can make a real difference to conservation efforts and to the reduction of human–animal conflicts, and can provide a knowledge base for helping with the increasing threats of habitat destruction and other problems.

F In conclusion, considering the many ongoing global threats to the environment, it is hard for me to see zoos as anything other than essential to the long-term survival of numerous species. They are vital not just in terms of protecting animals, but as a means of learning about them to aid those still in the wild, as well as educating and informing the general population about these animals and their world so that they can assist or at least accept the need to be more environmentally conscious. Without them, the world would be, and would increasingly become, a much poorer place.

Questions 14–17

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

Which paragraph contains the following information?

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

14 a reference to how quickly animal species can die out

15 reasons why it is preferable to study animals in captivity rather than in the wild

16 mention of two ways of learning about animals other than visiting them in zoos

17 reasons why animals in zoos may be healthier than those in the wild

Questions 18–22

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

In boxes 18–22 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*

18 An animal is likely to live longer in a zoo than in the wild.

19 There are some species in zoos which can no longer be found in the wild.

20 Improvements in the quality of TV wildlife documentaries have resulted in increased numbers of zoo visitors.

21 Zoos have always excelled at transmitting information about animals to the public.

22 Studying animals in zoos is less stressful for the animals than studying them in the wild.

Questions 23 and 24

*Choose **TWO** letters, **A–E**.*

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

Which **TWO** of the following are stated about zoo staff in the text?

A Some take part in television documentaries about animals.
B Some travel to overseas locations to join teams in zoos.
C Some get experience with species in the wild before taking up zoo jobs.
D Some teach people who are involved with conservation projects.
E Some specialise in caring for species which are under threat.

Questions 25 and 26

*Choose **TWO** letters, **A–E**.*

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

Which **TWO** of these beliefs about zoos does the writer mention in the text?

A They can help children overcome their fears of wild animals.
B They can increase public awareness of environmental issues.
C They can provide employment for a range of professional people.
D They can generate income to support wildlife conservation projects.
E They can raise animals which can later be released into the wild.

ACADEMIC READING

Reading Passage 1, Questions 1–13

1–3 *IN ANY ORDER*
D
E
G

4 clerks / copying clerks
5 library
6 stability
7 pension
8 TRUE
9 FALSE
10 NOT GIVEN
11 FALSE
12 FALSE
13 TRUE

Reading Passage 2, Questions 14–26

14 F
15 A
16 B
17 D
18 I
19 C
20 B
21 D
22 C
23 NOT GIVEN
24 TRUE
25 FALSE
26 FALSE

Reading Passage 3, Questions 27–40

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

If you score . . .

0–11	12–29	30–40
you are highly unlikely to get an acceptable score under examination conditions and we recommend that you spend a lot of time improving your English before you take IELTS.	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.

TEST 2

ACADEMIC READING

Reading Passage 1, Questions 1–13

1 candlewax
2 synthetic
3 chemistry
4 Novalak
5 fillers
6 hexa
7 raw
8 pressure
9 B
10 C
11 TRUE
12 FALSE
13 FALSE

Reading Passage 2, Questions 14–27

14 FALSE
15 NOT GIVEN
16 TRUE
17 FALSE
18 TRUE
19 NOT GIVEN
20 TRUE
21 problem solving
22 temporal lobes
23 evaluating information
24 C
25 A
26 F
27 D

Reading Passage 3, Questions 28–40

28 Latin
29 doctors
30 & 31 *IN EITHER ORDER*
technical vocabulary
grammatical resources
32 Royal Society
33 German
34 industrial revolution
35 NOT GIVEN
36 FALSE
37 TRUE
38 popular
39 Principia / the Principia / Newton's Principia / mathematical treatise
40 local / more local / local audience

If you score . . .

0–12	13–29	30–40
you are highly unlikely to get an acceptable score under examination conditions and we recommend that you spend a lot of time improving your English before you take IELTS.	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.

TEST 3

ACADEMIC READING

Reading Passage 1, Questions 1–13

1 D
2 B
3 C
4 E
5 B
6 D
7 A
8 B
9 D
10 C
11 TRUE
12 FALSE
13 NOT GIVEN

Reading Passage 2, Questions 14–26

14 iv
15 i
16 v
17 viii
18 YES
19 NOT GIVEN
20 NO
21 YES
22 NOT GIVEN
23 YES
24 F
25 A
26 B

Reading Passage 3, Questions 27–40

27 E
28 B
29 A
30 F
31 B
32 NOT GIVEN
33 FALSE
34 NOT GIVEN
35 TRUE
36 FALSE
37 TRUE
38 B
39 A
40 D

If you score . . .

0–11	12 28	29–40
you are highly unlikely to get an acceptable score under examination conditions and we recommend that you spend a lot of time improving your English before you take IELTS.	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.

TEST 4

ACADEMIC READING

Reading Passage 1, Questions 1–13

1 iii
2 v
3 ii
4 YES
5 YES
6 NO
7 YES
8 NO
9 NOT GIVEN
10 cheese
11 tourism/tourist/tour
12 pottery
13 jewellery/jewelry

Reading Passage 2, Questions 14–26

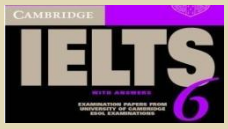
14 G
15 A
16 H
17 C
18 F
19 I
20 C
21 K
22 E
23 L
24 TRUE
25 NOT GIVEN
26 FALSE

Reading Passage 3, Questions 27–40

27 TRUE
28 TRUE
29 NOT GIVEN
30 FALSE
31 FALSE
32 TRUE
33 FALSE
34 temperatures
35 day-neutral / day-neutral plants
36 food / food resources / adequate food / adequate food resources
37 insects / fertilization by insects
38 rainfall / suitable rainfall
39 sugarcane
40 classification

If you score . . .

0–12	13–28	29–40
you are highly unlikely to get an acceptable score under examination conditions and we recommend that you spend a lot of time improving your English before you take IELTS.	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.



BRITISH COUNCIL IELTS AUSTRALIA UNIVERSITY of CAMBRIDGE ESOL Examinations

Answers

TEST1

LESTENING

1 (a) keep-fit (studio)
2 swimming
3 yoga (classes)
4 (a) salad bar
5 500
6 1
7 10(am) 4.30(pm)
8 180
9 assessment
10 Kynchley

11-16 B G C A E D
17 (OOctober (the)) 19th
18 7
19 Monday Thursday
20 18

21 A
22 in advance
23 nursery
24 annual fee
25 tutor
26 27 laptops printers
28 report writting
29 marketing
30 Individual

31 feed
32 metal / leather
33 restricions
34 ships
35 England
36 built
37 property
38-40 C E F

READING

1-11 B C B F D A E A B A C
12 (a) competition model
13 (by) 20 percent

14-17 I F E D
18-22 T F NG T NG
23-26 G B C A

27-32 1 6 3 7 4 2
33 farming
34 35 fish sea mammals
36 Thule
37 islands
38 nomadic
39 nature
40 Imported

TEST2

LISTENING

1 8
2 （in/ on） Tamer
3 green button
4 library
5 educational department
6 castles
7 old clothes
8 bottle tops
9 Undersea Worlds
10 Silver paper

11 King Street
12 central
13 half hours / 30 minutes
14 refreshments
15 10.15
16 Advance
17 (seat) reservations

18-20 C D G
22 catalog(ue)s
23 computer center /centre
24 checklist
25 teaching experience
26 classroom
27 review
28 schools
29 ((the) year) 200
30 end of term

31 research
31-37 A B C A A C A
38 Great Train Robbery
39 Sound effects
40 poor sound quality

READING

1-5 2 7 4 1 3
6 FALSE
7 TRUE
8 NOT GIVEN
9 FALSE
10 TRUE

11-13 F D C
14-15 B I
16-20 F M J N K
21-25 G A G E H
26-30 C B E A C
31 G
32-35 T F T F
36-40 NG T F T NG

TEST3

LISTENING

1 Select
2 27.01.1973
3 15 Riverside
4 2 weeks\
5 616295
6 engineer
7 month
8 2,000
9 month
10 internet

11-15 C A C H F
16-17 B D
18 field
19 footbridge
20 viewpoint

21 entertainment industry
22 telephone interviews
23 30/thirty
24 male and female
25 jazz
26 classical
27 concerts
28 department stores
29 club
30 opera house

31-34 C A A B
35 people
36 water sand
37 Scotland
38 outside
39 local
40 tops

READING

1-5 A I J E G
6-9 Y NG NG N
10-13 B C D D

14-18 7 3 2 4 1
19-22 N NG N Y
23-24 NG Y
25-27 B C A

28-32 N Y Y N G
33-37 A B C A B
38 glucose
39 free radicals
40 preservation

TEST4

LISTENING

1 75
2 check / cheque
3 15
4 25
5 10 minute(s') / min(s')
6 conference pack
7 South
8 library
9 5
10 21A

11-14 D A C
14 tax
15 security
16 ground floor
17 lecture room 311
18 Safety at Work
19 Main Hall
20 team leaders

21 reference
22 textbooks
23 secondary
24 primary
25 back
26 overdue books/ ones
27 7 working days
28-30 C E F

31-34 B A B
35 1,450
36 disease
37 (wealthy) prince
38 diet
39 attack humans
40 leadership

READING

1-7 5 6 3 9 1 7 10
8-13 N Y N Y NG Y
14-18 B F C J F
19-24 NG N Y Y N NG
25-26 C E

27-30 4 6 5 7
31-34 B D D A
35 policy
36 (explicit) guidelines
37 (school) curriculum
38 victims
39 playful fighting
40 D

TEST 5 TEST 6 TEST 7 TEST 8

ACADEMIC READING

Reading Passage 1, Questions 1–13

1 B
2 A
3 A
4 E
5 D
6 phantom
7 echoes/obstacles
8 depth
9 submarines
10 natural selection
11 radio waves/echoes
12 mathematical theories
13 zoologist

Reading Passage 2, Questions 14–26

14 xi
15 vii
16 v
17 i
18 ix
19 ii
20 x
21 NO
22 YES
23 NOT GIVEN
24 NO
25 YES
26 NOT GIVEN

Reading Passage 3, Questions 27–40

27 D
28 A
29 B
30 C
31 FALSE
32 FALSE
33 TRUE
34 NOT GIVEN
35 NOT GIVEN
36 TRUE
37 F
38 H
39 K
40 G

If you score . . .

0–11	12–27	28–40
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.

ACADEMIC READING

Reading Passage 1, Questions 1–13

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

Reading Passage 2, Questions 14–26

14 E
15 B
16 C
17 B
18 YES
19 NOT GIVEN
20 NO
21 YES
22 food bills/costs
23 (modern) intensive farming
24 organic farming
25 Greener Food Standard
26 ***IN EITHER ORDER***
farmers (and)
consumers

Reading Passage 3, Questions 27–40

27 ii
28 v
29 x
30 i
31 NO
32 YES
33 NO
34 YES
35 NOT GIVEN
36 D
37 I
38 G
39 E
40 B

If you score . . .

0–13	14–29	30–40
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.

ACADEMIC READING

Reading Passage 1, Questions 1–13

1 FALSE
2 TRUE
3 NOT GIVEN
4 TRUE
5 FALSE
6 NOT GIVEN
7 C
8 M
9 F
10 D
11 N
12 O
13 E

Reading Passage 2, Questions 14–26

14 iv
15 vii
16 x
17 i
18 vi
19 ii
20 E
21 D
22 C
23 B
24 A
25 A
26 A

Reading Passage 3, Questions 27–40

27 NOT GIVEN
28 FALSE
29 TRUE
30 FALSE
31 FALSE
32 FALSE
33 TRUE
34 J
35 A
36 E
37 B
38 G
39 D
40 B

If you score . . .

0–13	14–30	31–40
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.

ACADEMIC READING

Reading Passage 1, Questions 1–13

1 TRUE
2 FALSE
3 NOT GIVEN
4 TRUE
5 FALSE
6 NOT GIVEN
7 TRUE
8 (wooden) pulleys
9 stone
10 (accomplished) sailors
11 (modern) glider
12 flight
13 messages

Reading Passage 2, Questions 14–26

14 FALSE
15 NOT GIVEN
16 TRUE
17 NOT GIVEN
18 TRUE
19 TRUE
20 FALSE
21 G
22 E
23 B
24 A
25 K
26 F

Reading Passage 3, Questions 27–40

27 D
28 C
29 A
30 B
31 D
32 F
33 I
34 B
35 A
36 D
37 A
38 E
39 B
40 C

If you score . . .

0–11	12–27	28–40
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.

TEST 13

ACADEMIC READING

Reading Passage 1, Questions 1–13

1 D
2 B
3 F
4 E
5 B
6 F
7 D
8 A
9 (ship's) anchor/(an/the) anchor
10 (escape) wheel
11 tooth
12 (long) pendulum
13 second

Reading Passage 2, Questions 14–26

14 ii
15 iii
16 v
17 iv
18 viii
19 vii
20 FALSE
21 FALSE
22 NOT GIVEN
23 TRUE
24 TRUE
25 FALSE
26 TRUE

Reading Passage 3, Questions 27–40

27 E
28 B
29 A
30 F
31 sender
32 picture/image
33 receiver
34&35 ***IN EITHER ORDER***
sensory leakage (or)
(outright) fraud
36 computers
37 human involvement
38 meta-analysis
39 lack of consistency
40 big/large enough

If you score . . .

0–12	13–29	30–40
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.

ACADEMIC READING

Reading Passage 1, Questions 1–13

1 spinning
2 (perfectly) unblemished
3 labour/labor-intensive
4 thickness
5 marked
6 (molten) glass
7 (molten) tin/metal
8 rollers
9 TRUE
10 NOT GIVEN
11 FALSE
12 TRUE
13 TRUE

Reading Passage 2, Questions 14–26

14 ii
15 vii
16 ix
17 iv
18&19 ***IN EITHER ORDER***
C
B
20 A
21 H
22 G
23 C
24 C
25 A
26 B

Reading Passage 3, Questions 27–40

27 viii
28 ii
29 vi
30 i
31 iii
32 v
33 C
34 A
35 C
36 D
37 clothing
38 vocabulary
39 chemicals
40 cultures

If you score . . .

0–11	12–28	29–40
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.

TEST 15

ACADEMIC READING

Reading Passage 1, Questions 1–13

1 D
2 A
3 A
4 power companies
5 safely
6 size
7 B
8 C
9 G
10 D
11 NO
12 YES
13 NOT GIVEN

Reading Passage 2, Questions 14–26

14–18 ***IN ANY ORDER***
B
C
F
H
J
19 TRUE
20 TRUE
21 FALSE
22 TRUE
23 TRUE
24 NOT GIVEN
25 TRUE
26 NOT GIVEN

Reading Passage 3, Questions 27–40

27 ix
28 ii
29 vii
30 i
31 viii
32 iv
33&34 ***IN EITHER ORDER***
physical chemistry (and)
thermodynamics
35 adapt
36 immortality
37 NO
38 YES
39 NOT GIVEN
40 YES

If you score . . .

0–11	12–28	29–40
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.

TEST 16

ACADEMIC READING

Reading Passage 1, Questions 1–13

1 vii
2 i
3 v
4 ii
5 viii
6 YES
7 NO
8 NOT GIVEN
9 NO
10 B
11 C
12 A
13 C

Reading Passage 2, Questions 14–26

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

Reading Passage 3, Questions 27–40

27 TRUE
28 NOT GIVEN
29 TRUE
30 FALSE
31 A
32 C
33 B
34 D
35 A
36 D
37 heat
38 leaf litter
39 screen
40 alcohol

If you score . . .

0–11	12–28	29–40
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.

ACADEMIC READING

Reading Passage 1, Questions 1–13

1 FALSE
2 NOT GIVEN
3 FALSE
4 TRUE
5 NOT GIVEN
6 TRUE
7 NOT GIVEN
8 (the / only) rich
9 commercial (possibilities)
10 mauve (was/is)
11 (Robert) Pullar
12 (in) France
13 malaria (is)

Reading Passage 2, Questions 14–26

14 iv
15 vii
16 i
17 ii
18 several billion years
19 radio (waves/signals)
20 1000 (stars)
21 YES
22 YES
23 NOT GIVEN
24 NO
25 NOT GIVEN
26 NO

Reading Passage 3, Questions 27–40

27 plants
28 ***IN EITHER ORDER; BOTH REQUIRED FOR ONE MARK***
breathing
reproduction
29 gills
30 dolphins
31 NOT GIVEN
32 FALSE
33 TRUE
34 3 measurements
35 (triangular) graph
36 cluster
37 amphibious
38 half way
39 dry-land tortoises
40 D

If you score…

0–11	12–27	28–40
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.

ACADEMIC READING

Reading Passage 1, Questions 1–13

1 H
2 C
3 B
4 I
5 D
6 A
7 two decades
8 crowd (noise)
9 invisible (disabilities/disability)
10 Objective 3
11&12 ***IN EITHER ORDER***
A
C
13 C

Reading Passage 2, Questions 14–26

14 F
15 D
16 G
17 E
18 D
19 A
20 B
21 C
22 FALSE
23 FALSE
24 TRUE
25 NOT GIVEN
26 TRUE

Reading Passage 3, Questions 27–40

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

If you score…

0–11	12–28	29–40
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.

ACADEMIC READING

Reading Passage 1, Questions 1–13

1 YES
2 NO
3 YES
4 NOT GIVEN
5 YES
6 YES
7 NO
8 YES
9 H
10 F
11 A
12 C
13 B

Reading Passage 2, Questions 14–26

14 C
15 E
16 A
17 C
18–22 ***IN ANY ORDER***
A
D
E
F
J
23 maintenance
24 slow (turning)
25 low pressure
26 cavitation

Reading Passage 3, Questions 27–40

27 D
28 F
29 B
30 E
31 A
32 C
33 ***IN EITHER ORDER; BOTH REQUIRED FOR ONE MARK***
Jupiter
Saturn
34 Solar System
35 ***IN EITHER ORDER; BOTH REQUIRED FOR ONE MARK***
sensors
circuits
36 spares
37 radio dish
38 TRUE
39 TRUE
40 FALSE

If you score…

0–12	13–29	30–40
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.

ACADEMIC READING

Reading Passage 1, Questions 1–13

1 FALSE
2 NOT GIVEN
3 TRUE
4 FALSE
5 TRUE
6 NOT GIVEN
7 thorium
8 pitchblende
9 radium
10 soldiers
11 illness
12 neutron
13 leukaemia/leukemia

Reading Passage 2, Questions 14–26

14 G
15 C
16 G
17 D
18 H
19 E
20 D
21 B
22 E
23 C
24 mirror
25 communication
26 ownership

Reading Passage 3, Questions 27–40

27 ii
28 vi
29 i
30 iii
31 B
32 A
33 D
34 D
35 C
36 B
37 FALSE
38 NOT GIVEN
39 FALSE
40 TRUE

If you score…

0–11	12–28	29–40
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.

TEST 21

ACADEMIC READING

Reading Passage 1, Questions 1–13

1 FALSE
2 TRUE
3 NOT GIVEN
4 NOT GIVEN
5 TRUE
6 pavilions
7 drought
8 tourists
9 earthquake
10 4/four sides
11 tank
12 verandas/verandahs
13 underwater

Reading Passage 2, Questions 14–26

14 viii
15 iii
16 xi
17 i
18 v
19 x
20 ii
21 iv
22 TRUE
23 FALSE
24 NOT GIVEN
25 NOT GIVEN
26 FALSE

Reading Passage 3, Questions 27–40

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

If you score...

0–11	12–27	28–40
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.

ACADEMIC READING

Reading Passage 1, Questions 1–13

1 iv
2 viii
3 vii
4 i
5 vi
6 ix
7 ii
8 NOT GIVEN
9 TRUE
10 FALSE
11 FALSE
12 NOT GIVEN
13 TRUE

Reading Passage 2, Questions 14–26

14 A
15 D
16 F
17 D
18 B
19 D
20 E
21 A
22 C
23 ***IN EITHER ORDER; BOTH REQUIRED FOR ONE MARK***
books (and)
activities
24 internal regulation / self-regulation
25 emotional awareness
26 spoon-feeding

Reading Passage 3, Questions 27–40

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

If you score...

0–12	13–28	29–40
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.

TEST 23

ACADEMIC READING

Reading Passage 1, Questions 1–13

1 ii
2 i
3 v
4 vii
5 TRUE
6 NOT GIVEN
7 NOT GIVEN
8 TRUE
9 NOT GIVEN
10 FALSE
11 source of income / industry
12 employer
13 domestic tourism

Reading Passage 2, Questions 14–26

14 C
15 B
16 H
17 B
18 E
19 sun(light)
20 upper
21 dry
22 north
23 FALSE
24 TRUE
25 NOT GIVEN
26 B

Reading Passage 3, Questions 27–40

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

If you score...

0–11	12–27	28–40
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.

TEST 24

ACADEMIC READING

Reading Passage 1, Questions 1–13

1 spread
2 10/ten times
3 below
4 fuel
5 seasons
6 homes/housing
7 TRUE
8 FALSE
9 TRUE
10 TRUE
11 NOT GIVEN
12 FALSE
13 FALSE

Reading Passage 2, Questions 14–26

14 transformation/change
15 young age
16 optimism
17 skills/techniques
18 negative emotions / feelings
19 E
20 C
21 G
22 A
23 E
24 C
25 G
26 H

Reading Passage 3, Questions 27–40

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

If you score...

0–11	12–28	29–40
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.

TEST 25

READING

Reading Passage 1, Questions 1–13

1 tomatoes
2 urban centres/centers
3 energy
4 fossil fuel
5 artificial
6 (stacked) trays
7 (urban) rooftops
8 NOT GIVEN
9 TRUE
10 FALSE
11 TRUE
12 FALSE
13 TRUE

Reading Passage 2, Questions 14–26

14 FALSE
15 NOT GIVEN
16 TRUE
17 NOT GIVEN
18 FALSE
19 TRUE
20 gates
21 clamp
22 axle
23 cogs
24 aqueduct
25 wall
26 locks

Reading Passage 3, Questions 27–40

27 D
28 B
29 A
30 sunshade
31 iron
32 algae
33 clouds
34 cables
35 snow
36 rivers
37 B
38 D
39 C
40 A

If you score ...

0–11	12–24	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.

READING

Reading Passage 1, Questions 1–13

1 TRUE
2 NOT GIVEN
3 TRUE
4 FALSE
5 C
6 B
7 G
8 A
9 (lifting) frame
10 hydraulic jacks
11 stabbing guides
12 (lifting) cradle
13 air bags

Reading Passage 2, Questions 14–26

14 ii
15 ix
16 viii
17 i
18 iv
19 vii
20 vi
21 farming
22 canoes
23 birds
24 wood
25&26 ***IN EITHER ORDER***
B
C

Reading Passage 3, Questions 27–40

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

If you score …

0–11	12–24	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.

TEST 27

READING

Reading Passage 1, Questions 1–13

1 tea
2 reel
3 women
4 royalty
5 currency
6 paper
7 wool
8 monks
9 nylon
10 FALSE
11 TRUE
12 FALSE
13 NOT GIVEN

Reading Passage 2, Questions 14–26

14 FALSE
15 TRUE
16 NOT GIVEN
17 TRUE
18 FALSE
19 G
20 C
21 A
22 E
23 speed
24 plains
25 bottlenecks
26 corridor/passageway

Reading Passage 3, Questions 27–40

27
28
29 G
30 C
31 B
32 E
33 A
34 F
35 beginner
36 arithmetic
37 intuitive
38 scientists
39 experiments
40 theorems

If you score …

0–12	13–25	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.

TEST 28

READING

Reading Passage 1, Questions 1–13

1 FALSE
2 NOT GIVEN
3 NOT GIVEN
4 TRUE
5 A
6 C
7 B
8 A
9 A
10 D
11 B
12 E
13 F

Reading Passage 2, Questions 14–26

14 B
15 A
16 B
17 D
18 C
19 D
20 TRUE
21 TRUE
22 NOT GIVEN
23 TRUE
24 FALSE
25 C
26 A

Reading Passage 3, Questions 27–40

27 vi
28 iv
29 ii
30 vii
31 i
32 v
33 E
34 G
35 B
36 F
37 NO
38 YES
39 NOT GIVEN
40 YES

If you score …

0–12	13–25	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.

TEST 29

READING

Reading Passage 1, Questions 1–13

1 NOT GIVEN
2 FALSE
3 FALSE
4 TRUE
5 TRUE
6 taste
7 cheaper
8 convenient
9 image
10 sustainable
11 recycled
12 biodiversity
13 desertification

Reading Passage 2, Questions 14–26

14 antiques
15 triumph
16 information
17 contact/meetings
18 hunt/desire
19 aimless/empty
20 educational
21 Trainspotting
22 NOT GIVEN
23 FALSE
24 NOT GIVEN
25 TRUE
26 TRUE

Reading Passage 3, Questions 27–40

27 vi
28 viii
29 ii
30 iv
31 iii
32 vii
33 fire science
34 investigators
35 evidence
36 prosecution
37 NOT GIVEN
38 YES
39 NO
40 NO

If you score ...

0–15	16–25	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, Questions 1–13

1 A
2 B
3 H
4 D
5 B
6 C
7 G
8 B
9 A
10&11 ***IN EITHER ORDER***
D
E
12&13 ***IN EITHER ORDER***
C
D

Reading Passage 2, Questions 14–26

14 iv
15 vi
16 viii
17 v
18 i
19 vii
20 iii
21 TRUE
22 FALSE
23 FALSE
24 NOT GIVEN
25 rubber
26 farmer

Reading Passage 3, Questions 27–40

27 eye movements
28 language co-activation
29 Stroop Task
30 conflict management
31 cognitive control
32 YES
33 NOT GIVEN
34 NO
35 NO
36 NOT GIVEN
37 D
38 G
39 B
40 C

If you score ...

0–15	16–25	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, Questions 1–13

1 v
2 iii
3 viii
4 i
5 iv
6 vi
7 ii
8 pirates
9 food
10 oil
11 settlers
12 species
13 eggs

Reading Passage 2, Questions 14–26

14 D
15 C
16 F
17 G
18 D
19 B
20 vaccinations
21 antibiotics
22 mosquito(e)s
23 factories
24 forests
25 Polio
26 mountain

Reading Passage 3, Questions 27–40

27 dopamine
28 pleasure
29 caudate
30 anticipatory phase
31 food
32 B
33 C
34 A
35 B
36 D
37 F
38 B
39 E
40 C

If you score ...

0–14	15–24	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.

READING

Reading Passage 1, Questions 1–13

1 obsidian
2 spears
3 beads
4 impurities
5 Romans
6 lead
7 clouding
8 taxes
9 TRUE
10 FALSE
11 NOT GIVEN
12 TRUE
13 FALSE

Reading Passage 2, Questions 14–26

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

Reading Passage 3, Questions 27–40

27 iv
28 ii
29 vi
30 viii
31 vii
32 i
33 iii
34 YES
35 NOT GIVEN
36 NO
37 NO
38 information
39 financial
40 shareholders/investors

If you score ...

0–14	15–24	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.

TEST 1

READING

Reading Passage 1, Questions 1–13

1 update
2 environment
3 captain
4 films
5 season
6 accommodation
7 blog
8 FALSE
9 NOT GIVEN
10 FALSE
11 TRUE
12 NOT GIVEN
13 TRUE

Reading Passage 2, Questions 14–26

14 iv
15 vi
16 i
17 v
18 viii
19 iii
20 E
21 B
22 D
23 A
24 focus
25 pleasure
26 curiosity

Reading Passage 3, Questions 27–40

27 B
28 C
29 C
30 D
31 A
32 D
33 A
34 E
35 C
36 G
37 B
38 YES
39 NOT GIVEN
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.

TEST 2

READING

Reading Passage 1, Questions 1–13

1 oils
2 friendship
3 funerals
4 wealth
5 indigestion
6 India
7 camels
8 Alexandria
9 Venice
10 TRUE
11 FALSE
12 NOT GIVEN
13 FALSE

Reading Passage 2, Questions 14–26

14 B
15 F
16 B
17 E
18 A
19 B
20 C
21 animals
22 childbirth
23 placebo
24 game
25 strangers
26 names

Reading Passage 3, Questions 27–40

27 D
28 C
29 A
30 D
31 D
32 D
33 C
34 B
35 A
36 C
37 A
38 B
39 C
40 D

If you score ...

0–15	16–23	24–40
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.

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.

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.

TEST 1

TEST 37

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.

TEST 2

TEST 38

READING

Reading Passage 1, Questions 1–13

1 FALSE
2 TRUE
3 NOT GIVEN
4 FALSE
5 NOT GIVEN
6 TRUE
7 FALSE
8 TRUE
9 merchant
10 equipment
11 gifts
12 canoe
13 mountains

Reading Passage 2, Questions 14–26

14 F
15 C
16 E
17 D
18 B
19 design(s)
20 pathogens
21 tuberculosis
22 wards
23 communal
24 public
25 miasmas
26 cholera

Reading Passage 3, Questions 27–40

27 vi
28 i
29 iii
30 ii
31 ix
32 vii
33 iv
34 viii
35 productive
36 perfectionists
37 dissatisfied
38 TRUE
39 FALSE
40 NOT GIVEN

If you score …

0–18	19–27	28–40
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.

TEST 39

TEST 3

READING

Reading Passage 1, Questions 1–13

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

Reading Passage 2, Questions 14–26

14 C
15 H
16 A
17 F
18 I
19 B
20 E

21&22 ***IN EITHER ORDER***
B
C
23 ecology
24 prey
25 habitats
26 antibiotics

Reading Passage 3, Questions 27–40

27 B
28 G
29 F
30 E
31 C
32 NO
33 YES
34 NOT GIVEN
35 NO
36 YES
37 encouraging
38 desire
39 autonomy
40 targeted

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.

TEST 4

TEST 40

READING

Reading Passage 1, Questions 1–13

1 four / 4
2 young
3 food
4 light
5 aggressively
6 location
7 neurons
8 chemicals
9 FALSE
10 TRUE
11 FALSE
12 NOT GIVEN
13 TRUE

Reading Passage 2, Questions 14–26

14 B
15 E
16 C
17 A
18 TRUE
19 TRUE
20 NOT GIVEN
21 FALSE
22 NOT GIVEN
23&24 *IN EITHER ORDER*
B
D
25&26 *IN EITHER ORDER*
B
E

Reading Passage 3, Questions 27–40

27 FALSE
28 NOT GIVEN
29 FALSE
30 TRUE
31 FALSE
32 TRUE
33 NOT GIVEN
34 large
35 microplastic
36 populations
37 concentrations
38 predators
39 disasters
40 A

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.