

Test 1

READING PASSAGE 1-- Caves

1. Caves are natural underground spaces commonly those into which man can enter. There are three major types: the most widespread and extensive are those developed in soluble rocks, usually limestone or marble, by underground movement of water; on the coast are those formed in cliffs generally by the concentrated pounding of waves along joints and zones of crushed rock; and a few caves are formed in lava flows, where the solidified outer crust is left after the molten core has drained away to form rough tunnels, like those on the small basalt volcanoes of Auckland.

2. Limestone of all ages, ranging from geologically recent times to more than 450 million years ago, is found in many parts of New Zealand, although it is not all cavernous. Many caves have been discovered, but hundreds still remain to be explored. The most notable limestone areas for caves are the many hundreds of square kilometres of TeKuiti Group (Oligocene) rocks from Port Waikato south to Mokau and from the coast inland to the Waipa Valley – especially in the Waitomo district; and the Mount Arthur Marble (Upper Ordovician) of the mountains of northwest Nelson (fringed by thin bands of Oligocene limestone in the valleys and near the coast).

3. Sedimentary rocks (including limestone) are usually laid down in almost horizontal layers or beds which may be of any thickness, but most commonly of 5-7.5 cm. These beds may accumulate to a total thickness of about a hundred meters. Pure limestone is brittle, and folding due to earth movements causes cracks along the partings, and joints at angles to them. Rainwater percolates down through the soil and the fractures in the underlying rocks to the water table, below which all cavities and pores are filled with water. This water, which is usually acidic, dissolves the limestone along the joints and, once a passage is opened, it is enlarged by the abrasive action of sand and pebbles carried by streams. The extensive solution takes place between the seasonal limits of the water table. Erosion may continue to cut down into the floor, or silt and pebbles may build up floors and divert stream courses. Most caves still carry the stream that formed them.

4. Caves in the softer, well-bedded Oligocene limestones are typically horizontal in development, often with passages on several levels, and frequently of considerable length. Gardner's Gut, Waitomo, has two main levels and more than seven kilometers of passages. Plans of caves show prominent features, such as long, narrow, straight passages following joint patterns as in Ruakuri, Waitomo, or a number of parallel straights oriented in one or more directions like TeAnaroa, Rockville. Vertical cross sections of cave passages may be tall and narrow following joints, as in Burr Cave, Waitomo; large and ragged in collapse chambers, like Hollow Hill, Waitomo (233m long, 59.4m wide, and 30.48m high); low and wide along bedding planes, as in Luckie Strike, Waitomo; or high vertical water-worn shafts, like Rangitaawa Shaft (91 m). Waitomo Caves in the harder, massive Mount Arthur Marble (a metamorphosed limestone) are mainly vertical in development, many reaching several hundred meters, the deepest known being Harwood Hole, Takaka (370m).

5. The unique beauty of caves lies in the variety of mineral encrustations which are found sometimes completely covering walls, ceiling, and floor. Stalactites (Gk. stalaktos, dripping) are pendent growths of crystalline calcium carbonate (calcite)

formed from solution by the deposition of minute quantities of calcite from percolating groundwater. They are usually white to yellow in color, but occasionally are brown or red. Where water evaporates faster than it drips, long thin straws are formed which may reach the floor or thicken into columns. If the source of water moves across the ceiling, a thin drape, very like a stage curtain, is formed. Helictites are stalactites that branch or curl. Stalagmites (Gk. stalagmites, that which dripped) are conical or gnarled floor growths formed by splashing if the water drips faster than it evaporates. These may grow toward the ceiling to form columns of massive proportions. Where calcite is deposited by water spreading thinly over the walls or floor, flowstone is formed and pools of water may build up their edges to form narrow walls of brimstone. Gypsum (calcium sulfate) is a white cave deposit of many crystal habits which are probably dependent on humidity. The most beautiful form is the gypsum flower which extrudes from a point on the cave wall in curling and diverging bundles of fibers like a lily or orchid.

Questions 1-3

Complete the summary.
Choose ONE WORD ONLY from the passage for each answer.

There are several 1.....of caves with the most common and largest being located in limestone or marble. Coastal caves are created in cliffs usually by waves. In lava flows, the solidified outer crusts that remain once the molten core has drained away also form 2.....Limestone is to be found all over New Zealand, but not all of it contains caves. While many caves are known, there are large numbers that have yet to be uncovered. The main 3.....for limestone caves are TeKuiti Group rocks.

Questions 4-8

Complete the flow-chart.
Choose ONE WORD ONLY from the passage for each answer.

The Creation of Limestone Caves
limestone forms thick layers
earth moves creating
4.....at partings
rainwater trickling down through the soil and
5.....in rocksto the water table acidic water
dissolves limestone along joints
once 6.....opened
extended by sand/pebbles taken along by
7.....8.....or silt and pebble accumulation changes stream course

Questions 9 and 10

Choose TWO letters A-E.

Which TWO of the following features of caves in the softer limestones are mentioned in the text?

- A. they are often long
- B. they are all at least 7.2km long
- C. most of them are vertical
- D. they only ever have one passage
- E. they are characteristically horizontal

Questions 11-13

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

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information about the statement

11. The limestone found in New Zealand is more than 450 million years old.
12. Stalactites are more often white to yellow than brown or red.
13. Stalagmites never grow very large.

READING PASSAGE 2

Being Left-handed in a Right-handed World

The world is designed for right-handed people. Why does a tenth of the population prefer the left?

A The probability that two right-handed people would have a left-handed child is only about 9.5 percent. The chance rises to 19.5 percent if one parent is a lefty and 26 percent if both parents are left-handed. The preference, however, could also stem from an infant's imitation of his parents. To test genetic influence, starting in the 1970s British biologist Marian Annett of the University of Leicester hypothesized that no single gene determines handedness. Rather, during fetal development, a certain molecular factor helps to strengthen the brain's left hemisphere, which increases the probability that the right hand will be dominant, because the left side of the brain controls the right side of the body, and vice versa. Among the minority of people who lack this factor, handedness develops entirely by chance. Research conducted on twins complicates the theory, however. One in five sets of identical twins involves one right-handed and one left-handed person, despite the fact that their genetic material is the same. Genes, therefore, are not solely responsible for handedness.

B Genetic theory is also undermined by results from Peter Hepper and his team at Queen's University in Belfast, Ireland. In 2004 the psychologists used ultrasound to show that by the 15th week of pregnancy, fetuses already have a preference as to which thumb they suck. In most cases, the preference continued after birth. At 15 weeks, though, the brain does not yet have control over the body's limbs. Hepper speculates that fetuses tend to prefer whichever side of the body is developing quicker and that their movements, in turn, influence the brain's development. Whether this early preference is temporary or holds up throughout development and infancy is unknown. Genetic predetermination is also contradicted by the widespread observation that children do not settle on either their right or left hand until they are two or three years old.

C But even if these correlations were true, they did not explain what actually causes left-handedness. Furthermore, specialization on either side of the body is common among animals. Cats will favor one paw over another when fishing toys

out from under the couch. Horses stomp more frequently with one hoof than the other. Certain crabs motion predominantly with the left or right claw. In evolutionary terms, focusing power and dexterity in one limb is more efficient than having to train two, four or even eight limbs equally. Yet for most animals, the preference for one side or the other is seemingly random. The overwhelming dominance of the right hand is associated only with humans. That fact directs attention toward the brain's two hemispheres and perhaps toward language.

D Interest in hemispheres dates back to at least 1836. That year, at a medical conference, French physician Marc Dax reported on an unusual commonality among his patients. During his many years as a country doctor, Dax had encountered more than 40 men and women for whom speech was difficult, the result of some kind of brain damage. What was unique was that every individual suffered damage to the left side of the brain. At the conference, Dax elaborated on his theory, stating that each half of the brain was responsible for certain functions and that the left hemisphere controlled speech. Other experts showed little interest in the Frenchman's ideas. Over time, however, scientists found more and more evidence of people experiencing speech difficulties following injury to the left brain. Patients with damage to the right hemisphere most often displayed disruptions in perception or concentration. Major advancements in understanding the brain's asymmetry were made in the 1960s as a result of so-called split-brain surgery, developed to help patients with epilepsy. During this operation, doctors severed the corpus callosum—the nerve bundle that connects the two hemispheres. The surgical cut also stopped almost all normal communication between the two hemispheres, which offered researchers the opportunity to investigate each side's activity.

E In 1949 neurosurgeon Juhn Wada devised the first test to provide access to the brain's functional organization of language. By injecting an anesthetic into the right or left carotid artery, Wada temporarily paralyzed one side of a healthy brain, enabling him to more closely study the other side's capabilities. Based on this approach, Brenda Milner and the late Theodore Rasmussen of the Montreal Neurological Institute published a major study in 1975 that confirmed the theory that country doctor Dax had formulated nearly 140 years earlier: in 96 percent of right-handed people, language is processed much more intensely in the left hemisphere. The correlation is not as clear in lefties, however. For two thirds of them, the left hemisphere is still the most active language processor. But for the remaining third, either the right side is dominant or both sides work equally, controlling different language functions. That last statistic has slowed acceptance of the notion that the predominance of right-handedness is driven by left-hemisphere dominance in language processing. It is not at all clear why language control should somehow have dragged the control of body movement with it. Some experts think one reason the left hemisphere reigns over language is because the organs of speech processing—the larynx and tongue—are positioned on the body's symmetry axis. Because these structures were centered, it may have been unclear, in evolutionary terms, which side of the brain should control them, and it seems unlikely that shared operation would result in smooth motor activity. Language and handedness could have developed preferentially for very different reasons as well. For example, some researchers, including evolutionary psychologist Michael C. Corballis of the University of Auckland in

New Zealand, think that the origin of human speech lies in gestures. Gestures predated words and helped language emerge. If the left hemisphere began to dominate speech, it would have dominated gestures, too, and because the left brain controls the right side of the body, the right hand developed more strongly.

F Perhaps we will know more soon. In the meantime, we can revel in what, if any, differences handedness brings to our human talents. Popular wisdom says right-handed, left-brained people excel at logical, analytical thinking. Lefthanded, right-brained individuals are thought to possess more creative skills and may be better at combining the functional features emergent in both sides of the brain. Yet some neuroscientists see such claims as pure speculation. Fewer scientists are ready to claim that left-handedness means greater creative potential. Yet lefties are prevalent among artists, composers and the generally acknowledged great political thinkers. Possibly if these individuals are among the lefties whose language abilities are evenly distributed between hemispheres, the intense interplay required could lead to unusual mental capabilities.

G Or perhaps some lefties become highly creative simply because they must be more clever to get by in our right-handed world. This battle, which begins during the very early stages of childhood, may lay the groundwork for exceptional achievements.

Questions 14-18

Reading Passage has seven sections A-G.

Which section contains the following information?

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

- 14 Preference of using one side of the body in animal species.
- 15 How likely one-handedness is born.
- 16 The age when the preference of using one hand is settled.
- 17 Occupations usually found in left-handed population.
- 18 A reference to an early discovery of each hemisphere's function.

Questions 19-22

*Look at the following researchers (Questions 19-22) and the list of findings below.
Match each researcher with the correct finding.*

Write the correct letter A-G in boxes 19-22 on your answer sheet.

List of Findings

- A Early language evolution is correlated to body movement and thus affecting the preference of use of one hand.
- B No single biological component determines the handedness of a child.
- C Each hemisphere of the brain is in charge of different body functions.
- D Language process is mainly centered in the left-hemisphere of the brain.

E Speech difficulties are often caused by brain damage.

F The rate of development of one side of the body has influence on hemisphere preference in fetus.

G Brain function already matures by the end of the fetal stage.

19 Marian Annett

20 Peter Hepper

21 Brenda Milner & Theodore Rasmussen

22 Michael Corballis

Questions 23-26

*Do the following statements agree with the information given in Reading Passage?
In boxes 23-26 on your answer sheet write*

YES if the statement agrees with the information

NO if the statement contradicts the information

NOT GIVEN if there is no information on this

23 The study of twins shows that genetic determination is not the only factor for left-handedness.

24 Marc Dax's report was widely accepted in his time.

25 Juhn Wada based his findings on his research of people with language problems.

26 There tend to be more men with left-handedness than women.

Question 27

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

Write your answer in box 27 on your answer sheet

Which of the following is the most suitable title for reading passage 2?

A Left-handedness and primates

B A defence of right-handedness

C A defence of left-handedness

D Left-handedness and good luck

E Left-handedness and bad luck

READING PASSAGE 3

Physician, Rule Thyself! Professions and Self Regulation

Professions and self-regulation

A. When is an occupation a profession? There appears to be no absolute definition, but only different ways of looking at the issue, from historical, cultural, sociological, moral, political, ethical or philosophical viewpoints. It is often said that professions are elites who undertake specialized, selfless work, in accordance with ethical codes, and that their work is guaranteed by examination and a license to practice. In return, however, they request exclusive control over a body of knowledge, freedom to practice, special rewards and higher financial and economic status.

B. The public needs experts to offer them specialist advice, but because this advice is specialized they are not in a position to know what advice they need: this has to be defined in conversation with the professional. Professional judgement could be at odds with client satisfaction since the latter cannot then be "the chief measure of whether the professional has acted in a trustworthy fashion." Professional elites have negative potential: to exploit their power and prestige for economic goals; to allow the search for the necessary theoretical or scientific knowledge to become an end in itself; to lose sight of client well-being in the continuing fragmentation of specialist knowledge.

C. Professions in different cultures are subject to different levels of state intervention, and are shaped by this. In England, our relatively weak state and the organic growth of professional groups, many of them licensed by Royal Charter, means that regulation became an arrangement among elites. Similarly, in the US, where liberal market principles have had a free rein, academic institutions have had more influence than the state in the development of the professions. By contrast, in many European countries, the state has defined and controlled the market for the professions since the late eighteenth and early nineteenth centuries. In all cases, the activities of the professions affect the public interest, and so the state has a legitimate interest in them.

D. In general, the higher the social status of a profession the greater the degree of public trust in it, and the more freedom to operate it enjoys. There are, however, certain features which appear to be common to most, if not all, professions. In addition to a specialized knowledge base, it appears that there is an agreed set of qualifications and experience which constitutes a license to practice. There is also frequently an agreed title or form of address, coupled with a particular, often conservative, public image, and an accepted mode of dress. Standards are maintained mainly through self-regulatory bodies. Also, financial rewards may be increased through private practice.

E. Within different cultures, and at different times, the relative status of different professions may vary. For example, in Western Europe, the status of politicians has been in long-term decline since the middle of the twentieth century. Teachers would appear to have the higher status in France and Italy than in the UK, where medicine and the law have traditionally been the 'elite professions'.

F. The higher a profession's social status the more freedom it enjoys. Therefore, an occupation wanting to maintain or improve its status will try to retain as much control as possible over its own affairs. As in so many other areas, socio-cultural change has affected the professions considerably in recent years. Market forces and social pressures have forced professionals to be more open about their modes of practice. In addition, information technology has enabled the public to become much better informed, and therefore more demanding. Moreover, developments in professional knowledge itself have forced a greater degree of specialization on experts, who constantly have to retrain and do research to maintain their position.

G. Self-regulation then becomes an even more important thing for a profession to maintain or extend. But in whose interests? Is self-regulation used to enable a profession to properly practice without undue interference, or is it used to maintain the status of the profession for its own ends? Is it used to enable those with appropriate education and training to join the profession? Another question that needs to be answered is whether self-regulation restricts access so that the profession retains its social and economic privileges? Or again is it used to protect clients by appropriately disciplining those who have transgressed professional norms or to protect the public image of the profession by concealing allegations that would damage it?

H. These are all questions which the medical profession in the UK has recently had to address, and which remain the subject of continuing debate. One thing is clear, however: the higher a profession's status, the better equipped it is to meet these challenges.

Questions 28-32

Reading Passage has eight paragraphs A-H. Which paragraph contains the following information?

- 28. how professionals have adjusted to socio-cultural developments
- 29. the typical characteristics that a profession has
- 30. the role that is played by governments in different countries
- 31. a description of the relationship between professionals and their clients
- 32. the fact that there is no clear definition of what a profession is

Questions 33-37

Complete the sentences.

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

- 33. Professionals cannot always ensure that the.....given will satisfy the client.
- 34. Liberal market principles in the US have meant that the state has had less impact on the development of the professions than.....
- 35. An agreed set of qualifications and experience give professionals a.....
- 36. Over the past 50 years or so, the status of politicians has been in.....
- 37. There is a doubt as to whether.....is a mechanism to safeguard a profession's social and economic privileges.

Questions 38-40*Complete the table.**Choose NO MORE THAN TWO WORDS from the passage for each answer. Write your answers in boxes 37-40 on your answer sheet.*

Impact of socio-cultural change on professions

Factors	Implications
Various public influences	professionals 38 about work.
Modern technology	people more knowledgeable and so more 39
Progress in professional knowledge	a greater degree of 40 needed

READING ANSWERS-TEST ONE**Reading Passage 1****Qus 1-13**

Question number	Answer	Keywords
1	types	There are three major types
2	tunnels	a few caves are formed in lava flows, where the solidified outer crust is left after the molten core has drained away to form rough tunnels
3	areas	The most notable limestone areas for caves are the many hundreds of square kilometres of TeKuiti Group (Oligocene) rocks
4	cracks	Pure limestone is brittle, and folding due to earth movements causes cracks along the partings, and joints at angles to them.
5	fractures	Rainwater percolates down through the soil and the fractures in the underlying rocks
6	passages	This water, which is usually acidic, dissolves the limestone along the joints and, once a passage is opened, it is enlarged

7	streams	it is enlarged by the abrasive action of sand and pebbles carried by streams.
8	erosion	Erosion may continue to cut down into the floor, or silt and pebbles may build up floors and divert stream courses.
9	A	Sedimentary rocks (including limestone) are usually laid down in almost horizontal layers or beds which may be of any thickness, but most commonly of 5-7.5 cm.
10	E	Sedimentary rocks (including limestone) are usually laid down in almost horizontal layers or beds which may be of any thickness, but most commonly of 5-7.5 cm.
11	TRUE	Limestone of all ages, ranging from geologically recent times to more than 450 million years ago, is found in many parts of New Zealand,
12	TRUE	They are usually white to yellow in colour, but occasionally are brown or red.
13	FALSE	These may grow toward the ceiling to form columns of massive proportions

Reading Passage 2

Qus 14-26

14. C-- specialization on either side of the body is common among animals
15. A--that two right-handed people would have a left-handed child is only about 9.5 percent
16. B-- children do not settle on either their right or left hand until they are two or three years old.
17. F-- lefties are prevalent among artists, composers and the generally acknowledged great political thinkers.
18. D-- each half of the brain was responsible for certain functions and that the left hemisphere controlled speech
19. B--Marian Annett of the University of Leicester hypothesized that no single gene determines handedness
20. F--during fetal development, a certain molecular factor helps to strengthen the brain's left hemisphere, which increases the probability that the right hand will be dominant, because the left side of the brain controls the right side of the body, and vice versa.
21. D--language is processed much more intensely in the left hemisphere.
22. A--If the left hemisphere began to dominate speech, it would have dominated gestures, too, and because the left brain controls the right side of the body, the right hand developed more strongly.
23. Yes--Genes, therefore, are not solely responsible for handedness.

24. No-- Other experts showed little interest in the Frenchman's ideas.(Marc Dax's report was widely accepted in his time.)
25. **NOT GIVEN--** Juhn Wada based his findings on his research of people with language problems.
26. **NOT GIVEN--**There tend to be more men with left-handedness than women.
27. C

Reading Passage 3 Qus 28-40

Question Number	Answer	Keywords
28	F	Market forces, social pressures, forced professionals, more open, modes of practice
29	D	certain features, common to most, if not all, professions
30	C	Professions, cultures, different levels, state intervention
31	B	The public needs experts to offer them specialist advice
32	A	appears, no absolute definition
33	advice	Professional judgement could be at odds with client satisfaction
34	academic institutions	academic institutions, more influence, state
35	license to practise	agreed set of qualifications, license to practice
36	long-term decline	status of politicians, long-term decline, middle, twentieth century
37	self regulation	self-regulation, enable, profession, properly practice without, interference, used to maintain, status, for, own ends

38	more open	forced professionals, more open, modes of practice
39	demanding	information technology, enabled, public, much better informed, more demanding
40	specialisation	forced, greater degree, specialization on experts

Test 2

You should spend about 20 minutes on Questions 1-15, which are based on Passage 1 below.

A rose by any other name would smell as sweet

In the past few years, the trend has been away from hybrid tea and floribunda roses towards shrub and species roses. While this change has, in part, been driven by recent fashions in garden design coupled with adroit marketing, there is no doubt that shrub and species roses offer a number of cultural advantages. Of course, there are aesthetic considerations too: some growers preferring the wide colour range and high-centred blooms of the hybrid teas, while others choose shrub roses, because they integrate more easily into an overall garden design. This is largely a question of taste and lies beyond the scope of the present article.

Before examining the cultural advantages of shrub roses, mention should be made of their diversity and antiquity. There are three distinct races of rose, which can be traced back to the Middle Ages: the gallicas, the albas, and the damasks. Gallica roses were first recorded in the 13th century, and probably the most famous of all, *Gallica officinalis*, is among the

flowers depicted on the famous Ghent Altarpiece, painted by the Flemish artist Jan Van Eyck in the 14th century. Another gallica, *Rosa mundi*, with its characteristic red and white petals has been cultivated for at least six centuries. Albas too have a long history. *Alba x semiplena* is the world's oldest 'working' rose and is still grown in the Kazanluk region of Bulgaria for its highly scented petals, which are harvested each June to make the perfume, attar of roses. Damasks, as the name implies, were thought to have come from Damascus. Their origin is more obscure, but they are certainly related to wild roses still growing in parts of the Middle East and Iran. There are in cultivation more recently introduced varieties of roses too, such as Bourbons, hybrid musks, and hybrid perpetuas as well as rugosas, which originate in the Far East.

As a result of this genetic diversity, shrub roses have two major cultural advantages for the horticulturalist, and the amateur gardener: resistance to disease and tolerance of a wide variety climate and soil types. Many shrub roses show resistance to fungal diseases such as black spot and rust, to which hybrid teas are highly susceptible. Rugosas are particularly disease-free. In poor soil conditions, shrub roses, having deep vigorous root systems, are

more tolerant of drought and do not suffer to the same extent from nutrient deficiency diseases. For the horticulturalist, this means that less time and money need be spent on applying fertilisers or spraying for disease. Similarly, there are some shrub roses which will grow well in shady or windy conditions, or even against a north-facing wall. Large specimen shrubs may be found growing happily in the most unpromising situations.

However, there are other practical issues to consider. Where space is at a premium, it is **important**

to remember that the majority of shrub roses, which do not require regular hard pruning in order to encourage them to flower, will eventually grow into large bushes up to two metres high, with a spread of two to three metres. For small gardens, hybrid teas, rarely growing more than one metre tall, are more practical. The size and density of shrub roses can, however, be an advantage where a large permanent bush is required. Some varieties are sufficiently dense as to be suitable for hedging.

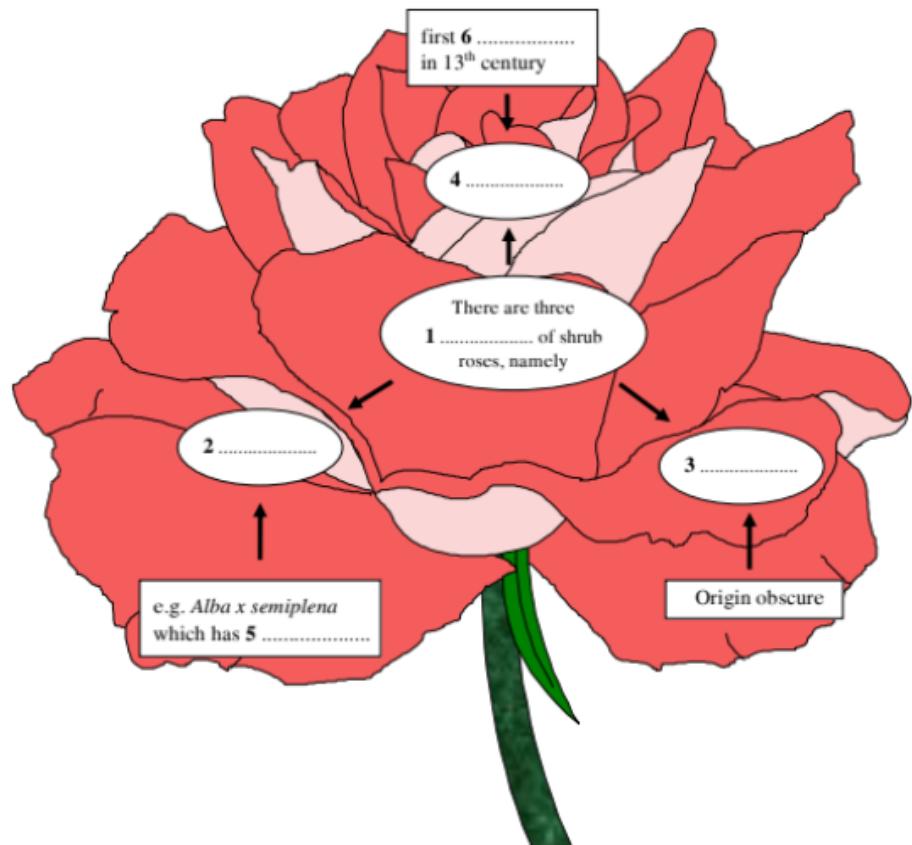
Another factor is length of flowering period. Many shrub roses have a short, but spectacular flowering season. The famous old rose *Cuisse de Nymphe*, for example, is covered in succulent pink blossom for

about a month in midsummer, but does not bloom again. There are, however, other varieties, which are repeat or perpetual flowering, including *Madame Isaac Pereire*, probably the most intensely fragrant rose of all. Moreover, there are a number of varieties with attractive ferny foliage and graceful, arching habit. This contrasts with the upright stance and coarse leathery leaves of hybrid teas. Species roses also produce bright red fruits (hips) in September-October, and their leaves often acquire attractive autumn tints.

All these factors need to be taken into consideration when choosing a rose for a particular site. Shrub roses are long-lived, easy to propagate, and require less pruning and maintenance than a hybrid tea. A detailed catalogue of varieties will give details of colour, flowering period, size, preferences of soil and aspect, optimum planting times, and general cultural requirements.

QUESTIONS 1-6

Use **NO MORE THAN THREE WORDS** from the passage to complete each blank in the diagram below.



QUESTIONS 7-13

Complete the text below, which is a summary of paragraphs 3, 4 and 5. Choose your answers from the Word List below the summary and write them in Boxes 7-13 on your **answer** sheet.

There are more words or phrases than spaces, so you will not be able to use them all. You may use each word or phrase only once.

Factors governing the choice of rose

Example:

The _____
_(Example)_of shrub roses can be an large permanent bush is
require

Answer: size

There are different types of shrub roses, some of which are able to resist disease and others which suit diverse climates and soils, features that are of (7)____ to both horticulturalists and gardeners, as, in the long run, such adaptability saves both time and money. The (8)____ *is another factor that needs to be taken into account when choosing a rose.* __(9)____ *shrub roses*__ (10)____ *without having to be cut back regularly. In fact, they can*__ (11)____ *grow to a height of nearly two metres and up to three metres*__ (12). So for small gardens

hybrid teas are more practical, because they rarely grow more than one metre tall. The length of the flowering season also_____ (13)_____ the choice of rose, as does the shape of the plant.

Word List

gives, across, spread, most, beneficial, spacing, majority, slowly, over, in the **end**, also, circumference, area, available, dictates, blossom, benefit, always, advantage, size

QUESTIONS 14 & 15

Choose the appropriate letters **A-D** and write them in Boxes **14 & 15** on your answer sheet.

14. Which of the statements below is true about Madame Isaac Pereire?

- A It is one of the most fragrant roses of all roses.
- B It is impossible to say whether the writer is talking about shrub roses or all roses when he says it is probably the most intensely fragrant rose of all.
- C It is probably the most intensely fragrant shrub rose.
- D It flowers only once per year

15. The flowering season of shrub roses ...

- A is short but spectacular.
- B is repetitive.
- C is perpetual.
- D varies.

READING PASSAGE 2

You should spend about 20 minutes on **Questions 16-29**, which are based on **Passage 2** below.

Road rage all the rage!

To many people the term 'Road Rage' describes a relatively modern concept of drivers 'getting worked up due to some incident whilst on the road and resorting to physical violence or damage to property. Most people would say that this has only really become a problem in the last five years or so. It has certainly attracted **great** media interest in recent times, but it has, in fact, been part of motoring for quite some time now.

A psychologist, employed by the Royal Automobile Club (RAC), defines 'Road Rage', thus: 'unchecked behaviour designed to cause harm to another road user; behavior which is not normally in the behavioural repertoire of the person. 'Road Rage' is an altering of an individual's personality whilst driving caused by a process of dehumanisation. This dehumanisation is caused by road use frustrations and an artificial sense of insulation, protection and empowerment provided by the car. This leads the person to behave in a way designed to cause harm or endanger other road users.

Most motorists can remember an occasion at some time in their motoring career when an impatient, or short-tempered, driver has 'cut them or someone else up' with an aggressive display of driving, forcing the victim to take evasive action to avoid a collision. At the time, they probably thought: what a Dreadful piece of driving; and mentally clapped themselves on the back for being such controlled, **calm** drivers. Media attention, focused on particularly gruesome incidents, has bestowed a certain notoriety on this sort of driving. As a professional driver in inner London and a motorcycle instructor, I **have** witnessed such driving all too often over the years.

The 1996 Lex Report on motoring, published by Lex Service PLC, the UK's leading vehicle retailing and leasing group, provides us with some startling statistics. In the last 12 months, there have been: 1.8 million instances of people who have been forced to pull over or off the road; 800,000 instances of people being physically threatened; 500,000 people in their cars being deliberately driven into; 250,000 people attacked by other drivers; and 250,000 people having their cars deliberately damaged by another driver. A survey also carried out by Lex confirms that up to 80% of motorists have been the victims of 'Road Rage' and that driver confrontation is on the increase.

The RAC has also much to say on the topic. One of their surveys reveals that as many as 90% of motorists have suffered at the hands of seriously anti-social drivers and that the effects upon them have in many cases been wholly disproportionate to the level of threat or actual violence inflicted.

The examples are both chilling and legion: a driver had his nose bitten off following a row with another motorist; a 78 year-old man was killed after being punched by a man half his age; an RAC patrolman, flagged down on the motorway by a motorist, was violently assaulted and verbally abused by the motorist. The list goes on and on ...

The 1991 Road Traffic Act takes a very dim view indeed of dangerous and careless driving and, as with assaults, provides stiff custodial sentences for those guilty of such crimes. To date, however, there is no such offence in the statute books known as 'Road Rage'. There can be assaults or criminal damage, followed or preceded by dangerous driving, but no offence that incorporates both – a change in the law which the public are clamouring for in the face of increasing anarchy on the roads.

Conversely, the Association of Chief Police Officers denies that 'Road Rage' exists; or, indeed, that there is a trend. There have been suggestions from the same quarter that 'media interest and reporting are, in fact, creating the problem by causing unnecessary anxiety in the minds of the motoring public in a direct analogy with fear of crime'.

Most of us probably imagine violence on the road to be an entirely male preserve, as men are naturally more competitive and aggressive, especially when it comes to driving. Melanie Flowers of Oxford Brookes University, however, has the following to say: 'Women can be more aggressive in cars than they ever would be when they are walking along the street. In fact, you could even argue that smaller or weaker people, who might be victims when they are out of their cars, often feel they can even things up a bit when they are behind the wheel. When you are driving you're judged by your car rather than your physical attributes. It makes some women feel stronger than they really are'. An **interesting** study, but how often do you see women fighting at the roadside or kicking in body panels?

If all this is a general reflection of the driver of the 90s, then the professionals have an uphill struggle. But they are tackling the problem head on. The RAC and Auto Express, a motoring journal, have joined forces in a Campaign Against Rage (CAR). They aim to promote driver courtesy, offer advice on avoiding 'Road Rage', and even Rage Rehabilitation for violent offenders in an attempt to avoid re-offence.

The courts are looking at stiffer penalties. And the RAC is suggesting that sign-posting be improved to try and stop city drivers losing their way, a constant source of annoyance and aggression, and they **have** also proposed the introduction of variable message signs that can **help** improve driver behaviour. Some police traffic control cars are now equipped with these message signs on the roof or rear of their vehicles.

And the future? The Auto class survey, published in 1997, shows that parents are creating the next generation of road-ragers. The research among 10-16 year-olds found that 62 per cent of fathers and 55 per cent of mothers **get** angry while driving.

One thing is a certainty: the Road Rage phenomenon is not going to disappear overnight, even after stiffer sentencing or improved driver training.

QUESTIONS 16 & 17

Using the information in the passage, complete the table below. Write your answers in Boxes 16 & 17 on your **answer** sheet.

Percentage of motorists affected by Road Rage

The Lex Report – up to **16** _____ %

RAC Survey – up to **17** _____ %

QUESTIONS 18-23

The information in Reading Passage 2? In Boxes 18-23, write:

TRUE, if the statement agrees with the information in the passage

False, if the statement contradicts the information in the passage

Not Given, if there is no information about the statement in the passage

Example: The Lex Report was published in 1997.

Answer: No

- Road Rage is not in itself a violation of the law.
- According to a psychologist employed by the RAC, cars give their drivers an unreal feeling of being safe.
- Motorcycling is an exciting, but safe mode of transport.
- The Lex Report states that the incidence of conflicts between drivers is rising rapidly.
- The survey on Road Rage carried out by the RAC is very thorough.
- According to the writer, Road Rage is a relatively modern phenomenon.

QUESTIONS 24-27

Using **NO MORE THAN THREE WORDS** from the passage, complete the sentences below.

- Professionals face a n _____ in their fight against Road Rage.
 - _____ are being considered by the law courts.
 - Violent behaviour by motorists is, in all probability, considered by many to be exclusively a
-
- The Association of Chief Police Officers attributes the problem of Road Rage to media

QUESTIONS 28 & 29

Choose the appropriate letters A-D and write them in Boxes 27 & 28 on your answer sheet.

28. Melanie Flowers of Oxford Brookes University states that ...

- A cars **make** women stronger.
- B cars frequently make women more combative than usual.
- C cars sometimes make women less meek than they would be on the street.
- D small women feel as meek in cars as they do outside.

29. The writer's view of the eradication of 'Road Rage' can be summarised as follows:

- A optimistic.
- B pessimistic.
- C depressed.
- D too pessimistic.

READING PASSAGE 3

You should spend about 20 minutes on Questions 30-40, which are based on Passage 3 below.

900 YEARS: THE RESTORATIONS OF WESTMINSTER ABBEY

- A.** The exhibition in the summer of 1995 illustrated how Westminster Abbey has been transformed over the past nine centuries. Both its structure and its contents **have** been changed and changed about but the identity of the building has never been lost. This process of change deserves chronicling as a subject in its own right, not as an apologetic footnote explaining why certain original features have been modified. For those of the Gothic Revival, such as William

Morris, even by the 1890s the exterior of the Abbey had been 'damaged so vitally... that we have nothing left us but a mere outline, a ghost'. The 'ghost' has proved remarkably robust, the latest century of its history encompassing both aerial attack and painstaking restoration. This is a story worth telling.

B. Restoration, according to the meaning we give it today as a self-conscious process of repair and reinstatement of earlier features, only came to the Abbey at the **end** of the seventeenth century, with the campaign of comprehensive repair devised and carried out by Christopher Wren and his successors. This programme of work, covering the entire building both inside and out and setting out deliberately to respect the style of the original structure, was exceptional for its date, not only in England but anywhere in Europe.

C. Restoration can also be used in a wider sense to cover a process of renovation whereby the original fabric is replaced to a different design and in a different style, but respecting the meaning and ethos of the building. A **famous** example was the replacement by Bramante of the Early Christian basilica of St Peter's in Rome with his Renaissance design, not regarded then as an act of vandalism, but as a restatement of the significance of the building for a new **age**. The continuing vitality of an institution can be said to be expressed better by refashioning its buildings in a fresh style, rather than by patching up the old. It is in this way that the replacement of Edward the Confessor's Romanesque abbey church (Nth century) by Henry III (13th century) in the up-to-date Gothic style can be considered as a work of restoration, not as a new building.

D. The meaning of restoration at Westminster can be vividly illustrated by an unexpected example: the history of the effigy of Queen Elizabeth I. This figure was dismissed for years as a second-rate eighteenth-century copy of the original. Indeed, the exterior of the Abbey has been regarded in a similar way. However, in the effigy as in the building, not only is the eighteenth-century interpretation of the earlier period **important** in its own right, but the early fabric turns out to remain at the heart. The effigy acquired a new head and new clothes in 1760, not through insensitive vandalism, but to show off Elizabeth's central role in the Abbey's history more effectively, just as Wren and Nicholas Hawksmoor had refaced the fabric of the building a few decades before. To try to strip away the contribution of later generations in order to reveal some mythical prime original is a profound misunderstanding of Westminster's rich complexity.

E. The relationship between the historical overview depicted in the exhibition and the restoration work in progress seen in the adjacent Mason's Yard was vital to the exhibition. The two parts gave meaning to each other, the historical context gave validity to the current works, showing how this process of organic renewal has been present at the Abbey from the start while the display of work in progress brought vividly to life the physical reality of the works exhibited.

QUESTIONS 30-33

Choose one phrase (**i-x**) from the List of phrases to complete each key point below. Write the

appropriate letters (**i-x**) in Boxes 30-33 on your **answer** sheet.

The information in the completed sentences should be an accurate summary of the points made by the writer.

NB. There are more phrases (i-x) than sentences, so you will not need to use them all. You may use each phrase once only.

30. The effigy of Queen Elizabeth I was ...
31. The Renaissance design for St Peter's was ...
32. A comprehensive assessment of the past was ...
33. A narrow, modern meaning of restoration states that it is ...

List of Phrases

- i regarded as an act of vandalism.
- ii completely restored in 1760.
- iii retaining the original design.
- iv at the time considered appropriate.
- V a method of repairing and reintroducing characteristics from earlier times.
- vi a poor replica of the original.
- vii as important as the work exhibits in the Mason's yard.
- viii the validity of the current works.
- ix respecting the original structure and ethos of a building.
- X for a long time considered a poor replica of the original.

QUESTIONS 34-36

Choose the appropriate letter A-D and write them in Boxes 34-36 on your answer sheet.

- 34. At the end of the seventeenth century the Abbey was ...**
- A thoroughly repaired.
 - B conscientiously repaired.
 - C designed by Sir Christopher Wren.
 - D unusual for buildings of the time.

35. Which of the following has the Abbey retained through centuries of change?

- A structure and contents.
- B original features.
- C identity.
- D outline.

36. The writer believes that it is better ...

- A to remove the work of later generations to expose the original features of a building.
- B not to remove the work of later generations to expose the original features of a building.
- C to reveal the mythical original **architecture** of a building.
- D to enhance the rich complexity of a building.

QUESTIONS 37-40

Reading Passage 3 has 5 paragraphs (A-E). Choose the most suitable heading for each paragraph from the List of Headings below. Write the appropriate numbers (i-xi) in Boxes 37-40 on your answer sheet.

One of the headings has been done for you as an example.

NB. There are more headings than paragraphs, so you will not use all of them.

Paragraph A

Paragraph B

Paragraph C

Paragraph D

Example: Paragraph E

Answer: vii

List of Headings

- i Bramante's artistic and architectural skills
- ii A royal example
- iii Restoration in Europe
- iv The importance of recording change
- V An extensive and unusual scheme,
- vi Keeping the meaning
- vii History alongside progress
- viii Hawksmoor's effect on the Abbey
- ix Wren and Hawksmoor at the Abbey
- X A summer exhibition
- xi An organic renewal

READING ANSWERS-Test TWO

Reading Passage 1

Questions 1-15

1. Answer: **distinct races**. It is better to have both words, but it would also be possible to have the word races on its own.
2. Answer: **albas**. The clue is in the example, Alba x semiplena, For Questions 2 ,3 & 4, you need to be careful. The temptation is to put the names of the roses in the order that they occur in the second paragraph, i.e. gallicas, albas and damasks. Doing that would not test whether you can find your way round the text! In fact, you need to use the other information given at 5 and 6 to help you work out the names in Questions 2-4.
3. Answer: **damasks**. The clue lies in the phrase Origin obscure.
4. Answer: **gallicas**. The marker here is 13th Century.
5. Answer: **(highly) scented petals**. You can have two words here and leave out the words in the brackets.
6. Answer: **recorded**.
7. Answer: **benefit**. You need a noun here; beneficial (adjective) does not work. The word advantage does not work here either. The word advantage appears in the original text, but you cannot use it. If the text read '...and soils, features which are an advantage to...', it would be acceptable.
8. Answer: **area available**. You need to be careful here. The answer is a paraphrase of the word space in the original text. Spacing is to do with the arranging of the layout of the plants.
9. Answer: **Most**. This is a translation of the majority of in the passage, but the word majority alone does not fit here. If you use the word majority, the text should read: The majority of.

10. Answer: **blossom**. The word is a paraphrase of the word flower in the text. A difficult one. If you read the sentence, you can see that a verb is needed here for the text to make sense. This sentence is a paraphrase of the first part of the second sentence in the fourth paragraph. The word spread fits grammatically in the sentence itself, but the sentence is not then a paraphrase of the original text: the passage does not say that the roses spread. The word spread in the passage refers to the extent, diameter, circumference of the rose bush, as it grows.

11. Answer: **in the end**. This phrase paraphrases the word eventually in the original text. The word also does not work here. The sentence does not give additional information (also). The sentence states a fact (In fact) about what happens when shrub roses are not cut back regularly. It is, therefore, also a development of the phrase without having to be cut back. Compare the original text.

12. Answer: **across**. The phrase up to three metres across paraphrases with a spread of two to three metres. The word circumference would not work here as you would need to say 'in circumference'. The same would apply to the word 'diameter', if it were in the list.

13. Answer: **dictates**. This sentence summarises the penultimate paragraph.

QUESTIONS 14 and 15

14. Answer: **B**. If you look at the penultimate paragraph, you can see that the writer is talking about shrub roses. It is not clear whether the phrase of all in probably the most intensely fragrant rose of all refers to shrub roses or all roses. The writer of the article didn't know when he was asked!

15. Answer: **D**. The first reaction for many students is to give A as the answer. The sentence then would mean that 'all shrub roses have a short but spectacular flowering season'. The word many in the text shows you that there are other flowering seasons. Like A, alternatives B and C, each only covers one group of shrub roses.

Reading Passage 2
Questions 16-29

- 16. 80
- 17. 90
- 18. Yes
- 19. Yes
- 20. NOT GIVEN
- 21. NOT GIVEN
- 22. NOT GIVEN
- 23. NO
- 24. Uphill struggle
- 25. Stiffer penalties/stiffer sentencing
- 26. male preserve
- 27. interest and reporting
- 28. C
- 29. B

Reading Passage 3

Questions 30-40

Question number	Answer	Keywords
30	x	The meaning of restoration at Westminster can be vividly illustrated by an unexpected example: the history of the effigy of Queen Elizabeth I. This figure was dismissed for years as a second-rate eighteenth-century copy of the original.
31	iv	A famous example was the replacement by Bramante of the Early Christian basilica of St. Peter's in Rome with his Renaissance design, not regarded then as an act of vandalism, but as a restatement of the significance of the building for a new age.
32	vii	The two pare gave meaning to each other the historical context gave validity to the current works, showing how this process of organic renewal has been present at the Abbey from the start, while the display of work in progress brought vividly to life the physical reality of the works exhibited.
33	v	Restoration, according to the meaning we give it today as a self-conscious process of repair and reinstatement of earlier features & Restoration can also be used in a wider sense to cover a process of renovation whereby the original fabric is replaced to a different design and in a different style, but respecting the meaning and ethos of the building.

	B	Restoration, according to the meaning we give it today as a self-conscious process of repair and reinstatement of earlier features, only came to the Abbey at the end of the seventeenth century, with the campaign of comprehensive repair devised and carried out by Christopher Wren and his successors.
34	C	Both its structure and its contents have been changed and changed about, but the identity of the building has never been lost.
35	B	It is in this way that the replacement of Edward the Confessor's Romanesque abbey church (11th century) by Henry III (13th century) in the up-to-date Gothic style can be considered as a work of restoration, not as a new building.
36	iv	This process of change deserves chronicling as a subject in its own right,
37	v	This programme of work, covering the entire building both inside and out and setting out deliberately to respect the style of the original structure, was exceptional for its date, not only in England but anywhere in Europe.
38	vi	Restoration can also be used in a wider sense to cover a process of renovation whereby the original fabric is replaced to a different design and in a different style, but respecting the meaning and ethos of the building.
39	ii	It is in this way that the replacement of Edward the Confessor's Romanesque abbey church (11th century) by Henry III (13th century) in the up-to-date Gothic style can be considered as a work of restoration, not as a new building.
40		

Reading

Test 3

You should spend about 20 minutes on **Questions 1–15**, which are based on **Passage 1** below.

THE ALEXANDER TECHNIQUE AND DISABILITY

- A. The Alexander Technique is a method of psychophysical re-education developed by F. Matthias Alexander more than a century ago, initially as a result of trying to solve a vocal problem. It is a technique for the elimination of ingrained habits of 'misuse' that interfere with the healthy and harmonious functioning of ourselves as a whole, often the underlying cause of many conditions, such as back pain, neck and shoulder tension, fatigue, breathing disorders and other stress-related illnesses.
- B. Our natural reflex mechanisms for balance and posture are largely dependent on the co-ordination of the head, neck and back. The Technique addresses the causes of 'misuse' and lack of poise that may be interfering with this relationship. When these mechanisms are allowed to work in harmony, 'good use' spontaneously returns, resulting in easier breathing, freer, lighter movement and a greater ability to control our reactions and our movements. In other words, the Technique enables us to 'use' ourselves better, and, in that sense, is concerned with helping anybody – the so called 'able bodied' as well as disabled people to overcome their disabilities. Hence, the Alexander teacher's approach when working with the disabled is, in essence, the same as with any pupil of the Technique.
- C. For example, if we take a violinist with a 'misuse' problem of the upper limbs causing technical limitations to his or her playing, the Alexander teacher will work on improving the pupil's overall 'use' by encouraging the inhibition of the habitual muscular tension pattern that interferes with the co-ordination of the head/neck/back relationship in order to enable him/her to play with more ease. Similarly, when working with a pupil who has lost mobility in the left arm from a stroke, the teacher will first of all address the head/neck/back relationship, and the inhibition of extraneous tension that prevents maximum use of the affected limb. In this way, it is possible to enable the stroke patient to retrain mobility of the paralysed part of the body.
- D. The approach and what results can be expected vary greatly depending on the disability. For the stroke patient, especially if lessons are commenced early after the stroke, the Alexander Technique can play an important role in rehabilitation and mobility retraining. With a blind person, the work is likely to focus instead more directly on eliminating tension habits that have developed to compensate for the loss of sight, e.g. insecurity leading to stiff and overcautious walking, balancing difficulties and poor head poise.
- E. Working with the disabled pupil, the Alexander teacher can offer help with everyday activities, things that the average person takes for granted, such as the ability to brush one's teeth, shave, tie one's shoelaces or cut a slice of bread. By looking at compensatory tension patterns, the teacher can, in many instances, help the disabled person find a new means whereby they can perform these everyday tasks.
- F. In this respect, the lessons may extend to include the disabled person's carer, for example the person who regularly has to help someone in and out of a wheelchair. Using the Alexander Technique, the carer learns not only to lift and give support in the most efficient way to avoid damaging his/her own back, but, as the two learn together, they also become better skilled at working out strategies enabling the disabled person to become more independent.
- G. There are, of course, several factors which have to be taken into consideration when working with disabled pupils. They may suffer intense pain and discomfort, loss of Kinaesthetic awareness (sometimes with total loss of sensitivity in parts of the body), severe lack of co-ordination, loss of mobility, memory loss, blindness, deafness, and speech impairment. The effect this has on the person's emotional and psychological state also has to be taken into account. Some disabled pupils may need longer lessons, because of the time required to move them from the wheelchair, take off casts, slings and other movement aids, etc. Others may only be able to concentrate for short periods of time and, therefore, require shorter lessons more frequently. It often requires a certain amount of inventiveness on the part of the Alexander teacher, both as far as practical arrangements and the approach to teaching are concerned, a challenge that, in most cases, is greatly rewarded by the positive results.

QUESTIONS 1–5

Reading Passage 1 has seven paragraphs (A–G).

Choose the most suitable heading from the **List of Headings** below. Write the appropriate numbers (i–xii) in **Boxes 1–5** on your answer sheet. Paragraphs C and G have been done for you.

List of Headings

1. Paragraph A
2. Paragraph B
- Paragraph C **Answer: (xi)**
3. Paragraph D
4. Paragraph E
5. Paragraph F

- Paragraph G **Answer: (v)**

- | | |
|------|--|
| i | Co-ordination – important for all |
| ii | Tension and daily routine |
| iii | Brushing one's teeth and slicing bread |
| iv | Fitting the technique to the disability |
| v | Challenges for the Alexander teacher |
| vi | Musical solutions |
| vii | Potential drawbacks |
| viii | Helping the disabled through their helpers |
| ix | Pain problems |
| x | Better body 'use' for all |
| xi | Retraining limbs |
| xii | Breaking bad habits |

QUESTIONS 6–14

Complete the summary below using information from the passage. You may use no more than two words from the passage for each blank. Write your answers in **Boxes 6–14** on your answer sheet.

Example: Alexander Matthias _____ (Example) _____ the technique named after him
more than a hundred years ago.
Answer: developed.

With the Alexander Technique, people are _____ 6 _____ in a psychophysical way. The Technique works on the body's _____ 7 _____ so that they all operate _____ 8 _____. As a result, bad habits are _____ 9 _____ and the individual is able to live a healthy life. Alexander's technique can help any of us to _____ 10 _____ ourselves better. As regards _____ 11 _____ person, the expected results and exact method used vary, according to the _____ 12 _____ of the individual, e.g. shorter and more regular sessions in the case of clients who find it difficult to concentrate. With disabled clients, in fact, a number of _____ 13 _____ have to be considered, and for the teacher, who often needs to be very inventive, this is _____ 14 _____.

QUESTION 15

Does the statement below agree with the information given in **Reading Passage 1**?

- Yes** if the statement agrees with the information in the text
No if the statement contradicts the information in the text
Not Given if there is no information about the statement in the text

15. The success rate of the Alexander Technique in working with stroke victims is high.

You should spend about 20 minutes on **Questions 16–28**, which are based on **Passage 2** below.

Science, Technology and the third Millennium: Change, Progress, Fear & Complacency

The 20th Century is drawing to a close, merging rapidly and imperceptibly with its successor – the first 100 years of the Third Millennium. It will deliver an awesome inheritance: a world propelled by science and technology; a world where incredible and accelerating discovery will create changes beyond the scope of our wildest speculations; a world where science and technology have placed *What Is Possible* beyond *What We Can Imagine*.

History may well dub the 1900s *The Century of Change* – the era when science and technology forged a permanent partnership and unleashed the first products of their unique alliance on a largely illiterate, earthbound civilisation. The Industrial Revolution provided the impetus for action and cast the die for the future; two world wars, fought only a generation apart and before 1950, accelerated the process. Life changed quickly and irreversibly – like a moth shedding its cocoon.

Within one life span, top-hatted physicians, gas lamps and horse-drawn transport gave way to transplant surgery, laser beams and space travel. The speed of change and the volume of knowledge defied measurement. Early attempts to do so reflected growing concerns about possible adverse effects on established social values and systems. One widely circulated document estimated that mankind's total knowledge doubled first between the years 1 AD and 1900; again by 1950; and again by 1960. After that, even the best would-be assessors gave up, many of them becoming management consultants. The new profession flourished as modern business faced rampant stress caused by inexorable change, and cut-throat competition in the global marketplace. *Change* and *Progress* became popular themes for training workshops.

Change is often presented as progress. To act on this misconception (as too frequently happens!) is to court disaster. Progress implies change with benefit. It reflects action taken only after management has considered relevant past experiences, current priorities and future objectives. Change for change's sake may reflect the response of a novice manager, or of one more senior who wishes to impress an advisory committee. Technology can convincingly disguise poor drafting styles or a proposal's lack of substance, but its healing influence does not extend to the application of a plan itself. Delays, increased costs, confusion and low staff morale often follow change without benefit. Sadly, solutions offered to such problems are inevitably, further change!

The age of push-button miracles has not eradicated boredom. In the 1960s, the world held its breath as live television and radio transmitted the first lunar landing. Many in the worldwide audience viewed and listened from the comfort of their homes. Technology had deftly demonstrated passive participation and predicted couch potatoes. Local cinemas and sports grounds would close. As the astronauts bounced across the ghostly moonscape and joked with each other and Earth, they demolished a primeval barrier: science fiction became fact. And *anything imaginable* became *possible* – perhaps worse, *inevitable*. For many participants, the mystery and magic of fantasy vanished forever – like a child's perception of Christmas. Technology had become commonplace, its wonders explicable and predictable.

The second moon expedition raised little public excitement. It was, after all, a repeat performance, sure of success. In the 1970s and 80s, repeated success itself bred complacency. But ...! Nearly 30 years later, a space shuttle exploded during the launch and the crew perished. Their deaths provoked intense, but short-term, shock. Commentators soon reflected a popular view: that such accidents, although unfortunate, were also inevitable. The astronauts had known and had accepted the risks; NASA could be proud of its record and rest on its laurels – until the next catastrophe.

Today, as we face a new Millennium, technology and science are simultaneously feared, admired and taken for granted. Enthusiasts and critics alike, increasingly depend on them. In education, for example, computer-based programmes are replacing textbooks, blackboards and tutors; the Internet bridges time and distance and provides access to specialist resources. Factors such as the need for skilled and costly support services are rarely discussed. The principles of learning are established: the way they may be best used in different settings and the results evaluated will vary with client needs. But, no matter how good, no one method can satisfy all the needs of any one client. Books, theatre and technology go well together.

The Third Millennium will open the door to a future filled with a kaleidoscope of scientific and technical wizardry. We have, without resistance, grown very dependent on such attractions. Few of us differentiate between simple and complex uses of technology. The former used routinely (e.g. simple mental arithmetic) may deskill us and increase our dependency - without our being aware of any danger. Artificial intelligence, human cloning and the unimaginable are no longer science fiction.

The time has come to reassess our relationship with science and technology to review the first 100 years and plan ahead. We must reaffirm our roles as creators and directors of that future and help realise its human potential. Without such effort, we may find ourselves victims of our inherent intelligence, curiosity and imagination – and a rather curious complacency.

QUESTIONS 16–19

Using **NO MORE THAN THREE WORDS** from the text, answer the following questions:

16. According to the author, who or what became partners in the 1900s?
17. Something about the speed of change and the volume of knowledge was elusive. What was it?
18. What was the main contributory factor to the growth of the management consultancy profession, as world markets changed?
19. What does progress have that change does not?

QUESTIONS 20–23

Choose the most appropriate letters **A–D** and write them in **Boxes 20–23** on your answer sheet.

20. Progress can be seen as action taken after consideration of ...
A company priorities for the future.
B the past, the present and the future.
C mistakes made in the past.
D experiences and objectives.
21. Some types of manager ...
A are always changing things.
B make changes for no apparent reason.
C try to increase staff morale.
D try to impress their colleagues.
22. When the first lunar landing happened, ...
A many people were watching it at home.
B fact became fiction.
C a lot of people thought it was a joke.
D science fiction became like Christmas.
23. The space shuttle explosion showed that ...
A nothing is exciting anymore.
B TV can show shocking things as well as exciting ones.
C accidents are bound to happen.
D the astronauts were to blame.

QUESTIONS 24–28

The text mentions a number of current and future developments. State whether the developments in Questions **24–28** below are:

C	current, as mentioned in the text.
F	future, as mentioned in the text.
NG	not mentioned as current or future in the text.

24. machines taking the place of teachers.
25. a life filled with a variety of magical gadgetry.
26. recognition of the need for expensive, yet necessary support services.
27. an adaptation of learning principles to fit different situations.
28. a re-evaluation of our relationship with the world of science.

You should spend about 20 minutes on Questions 29–42, which are based on **Passage 3** below.

A note on the national minimum wage debate

- A. Much of the literature on the minimum wage has as its main theme the question of whether or not the introduction of a national minimum wage reduces employment. The empirical evidence on this point comes mainly from America and is contradictory and inconclusive. This does not, however, prevent the political debate from using the economic evidence. Advocates from both sides do so, with some rhetorical force, despite its contentious nature.
- B. The proposition that jobs might be destroyed by higher wages follows directly from neo-classical economic theory. However, the empirical studies display findings that are rather milder than theory would expect. A review of such studies by Card and Krueger (1995) concluded that minimum wages had no effect on employment; this despite the evidence of Neumark and Wascher (1992) that the negative effect comes through strongly when teenagers are isolated in the sample. This notion was supported by a later study which showed that teenagers were more likely to be enticed away from education by the higher wages ensuing from statutory minimum wage legislation (Neumark and Wascher 1995).
- C. Critics of neutral and slightly positive evidence claim that studies cannot, by definition, take account of companies driven out of business by minimum wages. Whilst this is true, a more substantial criticism of the literature would be the dearth of studies based on local labour markets and on those of specific industries. Such studies as exist show a clearer picture – which could be summarised as demonstrating a small negative effect on jobs, but, more importantly, showing the strategic processes which managers use to cope with an imposed rise in the price of labour. Certain types of service industry, for example, can show positive employment effects (Alpert 1986).
- D. The irony here is that the best evidence is furthest away from the political debate, which, by its very nature, uses a national perspective. Unfortunately, the contentious nature of the evidential base, which is so unhelpful to the jobs argument, permeates into other areas. For example, if the jobs argument is unresolved, then those arguments surrounding the saving to be made on the payment of social benefits to low paid workers hardly get off the ground, because, if jobs are destroyed, unemployment benefit costs rise and offset the savings on income support. Critics of the minimum wage would, of course, argue that it only benefits people who have a job and, therefore, does nothing for unemployment. Advocates, on the other hand, would contend that income support benefits are a wasteful subsidy to 'bad' employers who are, in effect, gaining a competitive advantage over 'more responsible' employers. In this argument, the minimum wage would encourage better market functioning and more competitive conditions than the subsidies that prop-up bad employers. They would go even further and point to continental Europe, where minimum wage statutes abound, to suggest that minimum wages are an incentive to develop training. Exactly why this should be so escapes British management, who appear to need a better translation of the text of this argument. However, one point that is well understood is that a national minimum wage could cause a run of differential-maintaining pay claims. The fact that the beneficiaries of a minimum wage usually lack bargaining power (Lucas 1995) and that they are unlikely to be a 'reference group' for any sector of organised labour, takes the edge off this argument.
- E. The EEC has recently tossed a new coin into the ring: the notion of maximum working hours per week. So far this has not touched the minimum wage debate, but the connection is inevitable. A new set of arguments about overtime and shorter hours is about to break through. Whether the poor can best be helped by a minimum wage, or a maximum working week, is a matter for empirical evidence. Whatever the evidence is, it will not stop the political debate from maintaining a national perspective. This is a pity, because an increment for the poor does not go on luxury items and foreign holidays. It is spent on the home and on small scale leisure activities in the local market. Furthermore, if adjustments in taxation to help small business through a sudden rise in labour costs are contemplated, they are best executed through local rather than national government. To paraphrase an American political slogan: it's the 'local' economy stupid.

QUESTIONS 29–32

Use the information in the text to match the authors (A–D) with the **Findings** (29–32) below. Write the appropriate letters (A–D) in **Boxes 29–32** on your answer sheet.

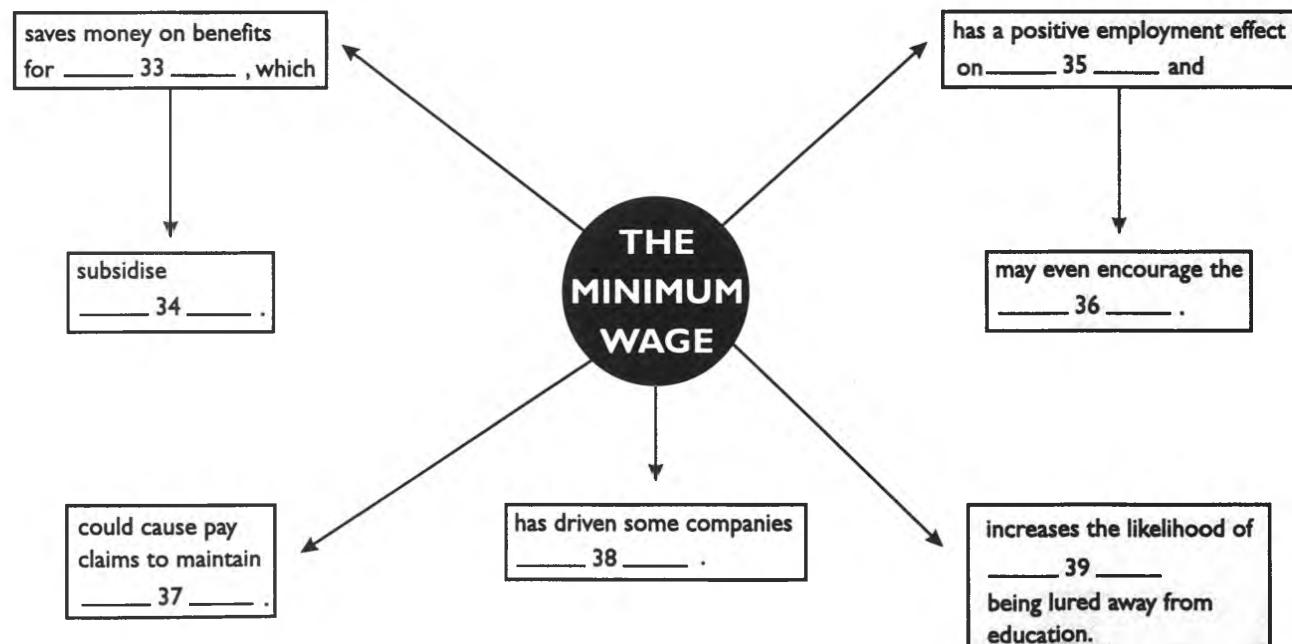
- A Neumark & Wascher
- B Alpert
- C Lucas
- D Card & Krueger

Findings

29. The economic influence of those who would benefit most from a minimum wage is not great enough to affect wage differentials.
30. A minimum wage does not influence the number of people who find employment.
31. The beneficial effects of a minimum wage have been observed in some service industries.
32. A minimum wage appears not to have a positive impact as regards teenagers.

QUESTIONS 33–39

The diagram below summarises some of the main points on the minimum wage provided in paragraphs B–D. Complete the diagram with information from the passage. You may use **NO MORE THAN THREE**



WORDS to fill each blank space. Write your answers in **Boxes 33–39** on your answer sheet.

QUESTIONS 40–42

Choose the appropriate letters A–D and write them in **Boxes 40–42** on your answer sheet.

40. Critics of the minimum wage argue that ...

- A *it makes services more expensive.*
- B *it only helps those already in work.*
- C *it causes inflation.*
- D *it affects exports.*

41. According to the writer, the fiscal counterbalance to increased costs should be ...

- A *at national level.*
- B *through Income Tax.*
- C *through VAT.*
- D *at local level.*

42. There is a lack of studies based ...

- A *on international industries.*
- B *on the national economy.*
- C *on local labour markets.*
- D *on specific locations.*

Test 3**Passage 1****Questions 1–5**

1. **Answer:** xii. Remember to ask yourself why the writer wrote this paragraph. The paragraph explains what the Alexander technique is about. The key words here are: **It is a technique for the elimination of ... habits of 'misuse'**, which are described as having negative effects.
2. **Answer:** x. Again, why did the author write the paragraph? She wrote it to show how the Alexander Technique teaches people how to '**use' themselves better**'. This applies to everyone (all), both able-bodied and disabled people alike.
3. **Answer:** iv. The author wrote the paragraph to show how the Alexander Technique is adapted to suit different disabilities. The text gives two examples of how the approach varies according to the particular problem:

The approach and what results can be expected to **vary greatly depending** directly on eliminating tension habits that have developed to compensate for the loss of **disability**. For the **stroke patient**, especially if lessons are commenced early after the stroke, the Alexander Technique can play an important role in rehabilitation and mobility retraining. With a **blind person**, the work is likely to focus on eliminating insecurity leading to stiff and overcautious walking, balancing difficulties and poor head poise.

4. **Answer:** ii. The author wrote this paragraph to show the connection between tension and **everyday activities** (daily routine):

Working with the disabled pupil, the Alexander teacher can offer help with **everyday activities**, things that the average person takes for granted, such as the ability to brush one's teeth, shave, tie one's shoelaces or cut a slice of bread. By looking at **compensatory tension** patterns, the teacher can, in many instances, help the disabled person find a new means whereby they can perform these everyday tasks.

5. **Answer:** viii. The paragraph is about helping carers to help the people they are looking after:

In this respect, the lessons may extend to include the disabled person's carer

The rest of the paragraph then deals with this point.

Question type. The questions in this section test:

- whether you are able to scan a text and knit together the information.
- whether you can summarise information or an idea.
- whether you can recognise a paraphrase.
- whether you are able to analyse a small part of a text and not allow the information around it to interfere with your analysis.

For more details about this type of exercise look at **Questions 37–40 in Reading Test 1**. Compare the differences in the paragraphs in this text and the exercise in **Test 1**. Can you see any difference in the type of paragraph? Look at **Reading Exercises 10–13**.

Questions 6–14

In this type of exercise, you should always check that the form of the words fit the sentence structure of the summary.

6. **Answer:** **re-educated**. This is the only word which fits the blank space here. The word **re-education** occurs in the first sentence of the text, but to fit the grammar you need to change the form of the word.
7. **Answer:** **reflex mechanisms/ reflexes**. The words occur in the first sentence of paragraph **B**. The first answer given is the better of the two.
8. **Answer:** **in harmony/harmoniously**. The answer is in the second paragraph, the third sentence. The adjective **harmonious** (paragraph **A**) does not work here, because you need an adverb (**harmoniously**) or an adverbial phrase.
9. **Answer:** **eliminated**. The word **elimination** occurs in paragraph **A** and **eliminating** in paragraph **D**. You need to change the form of the word here to fit the grammar of the summary.
10. **Answer:** **use**. The Alexander technique is about better '**use**' of ourselves. See paragraph **B**.
11. **Answer:** **the disabled**. See the title of the article and throughout the text.
12. **Answer:** **requirements/disability**. For the answer, you need to jump to the latter part of paragraph **G**. Again you need to change the form of the word here to fit the grammar of the text. The verb **require** needs to be changed to make it into a noun. You may put **disability** here as well, but it is repetitive.

13. **Answer: factors.** The text mentions the word **factors** in paragraph G, the first sentence. The word **effects** is not suitable, because it would not summarise the text in paragraph G.
14. **Answer: a challenge/challenging.** The answer is in the last sentence of paragraph G. Note that this exercise tests your understanding of the whole text. It checks whether you are able to understand a paraphrase and again tests if you can dip into the organisation for detail. The exercise is basically organised around the main points covered by the writer.

In **Reading Passage 1 Practice Test 1**, you had a similar summary with a **Word List**. In the exam, you may have either. It is better, therefore, to practise both types of exercise.

Question type. The questions in this section test:

- whether you can summarise a text.
- whether you are able to scan a text for specific information.
- whether you can recognise a paraphrase of words and ideas.
- whether you are able to scan a text to recognise the organisation.

Question 15

15. **Answer: Not Given.** In paragraph D, it says:

For the stroke patient, especially if lessons are commenced early after the stroke, the Alexander Technique can play an important role in rehabilitation and mobility retraining.

The text tells you the Technique **can play an important role**, but it does not give information about the success rate of the Technique with stroke patients.

Question type. The question in this section tests:

- whether you are able to scan for specific information.
- whether you can recognise an idea which is expressed in another way or a paraphrase.
- whether you are able to analyse a small part of a text and not allow the information around it to interfere with your analysis.

Test 3

Passage 2

Questions 16–19

In these short answer questions, the answers do not need to be full sentences. All you have to do is find the necessary information, usually a short phrase, in the text.

16. **Answer: science and technology.** The answer is in the first sentence of the second paragraph:
History may well dub the 1900s *The Century of Change – the era when science and technology forged a permanent partnership* and unleashed the first products of their unique alliance on a largely illiterate, earthbound civilisation.
17. **Answer: measurement.** The answer is in the second sentence of the third paragraph.
Even if you do not know the word **elusive**, all you have to do is scan the text for the phrase **speed of change and the volume of knowledge**. What the two things have in common is the fact that they could **not** be measured, i.e. measurement was elusive: **they defied measurement**.
18. **Answer: rampant stress.** The answer is in the penultimate sentence of the third paragraph.
Note that **inexorable change** and **cut-throat competition** are not the main contributory factors here. They cause the stress which management consultants are then called in to address. Hence, the growth in their business.
19. **Answer: benefit.** The answer is in the third sentence of the fourth paragraph. The text reads: **Progress implies change with benefit.** This means that change does not have benefit. Note that you do not have to write **change with benefit** as the word **change** is already in the question.

Question type. The questions in this section test:

- whether you are able to scan for specific information.
- whether you can recognise an idea which is expressed in another way or recognise a paraphrase.

- whether you are able to analyse a small part of a text and not allow the information around it to interfere with your analysis.

Questions 20–23

20. **Answer: B.** The answer is in paragraph 4, the fourth sentence:

It reflects action taken only after management has considered relevant past experiences, current priorities and future objectives.

A and **C** are too limited in their reference to only one time. **D** is not specific enough, as it does not include **current priorities**.

21. **Answer: B.** The answer is in paragraph 4, the fifth sentence:

Change for change's sake may reflect the response of a novice manager

The phrase **Change for change's sake** shows that the novice manager carries out change without having any particular reason for doing so. **A** is not the right answer, as **change for change's sake** does not mean **always changing**. There is no reference in the text to how often changes are made. **C** is not correct, as the text says that change without benefit leads to low staff morale, not that the latter is something that managers want to increase. **D** is not the right answer, because **an advisory committee** are not colleagues, i.e. people you work with.

22. **Answer: A.** The answer is in paragraph 5, the third sentence:

Many in the worldwide audience viewed and listened from the comfort of their homes.

B is not correct, because it is the other way round! **C** is not correct, because it was the astronauts that joked, not people in general. **D** is not correct, because the text does not compare science fiction and Christmas in the sense that one became like the other. The text means that they had similar characteristics.

23. **Answer: C.** The answer is in paragraph 6:

that such accidents, although unfortunate, were also inevitable.

A is not correct, because the text says that it was the second moon expedition that showed that nothing is exciting anymore, not the space shuttle explosion. **B** is not correct, because there is no reference in the text to TV. **D** is not correct, because the text says that the astronauts knew the risks, but this does not mean that they were to blame.

Question type. The questions in this section test:

- whether you are able to scan a text for specific information.
- whether you can recognise a paraphrase of words and ideas.
- whether you are able to understand specific points in the text.

Questions 24–28

These questions are a variation on the **Yes/ No/ Not Given** format. In the exam, it is very important that you read the instructions carefully and that you write the appropriate letter on your answer sheet.

24. **Answer: C.** The answer is in paragraph 7:

... computer-based programmes are replacing textbooks, blackboards and tutors.

Note that the exercise is only asking about teachers (tutors); it is not asking about textbooks and blackboards as well.

25. **Answer: F.** The answer is in paragraph 8:

... will open the door to a future filled with a kaleidoscope of scientific and technical wizardry.

The vocabulary here may be a problem, but the tense is clear.

26. **Answer: NG.** The answer is in paragraph 7:

Factors such as the need for skilled and costly support services are rarely discussed.

In the text, there is no time reference regarding this development, even when it is discussed.

27. **Answer: C.** The answer is in paragraph 7:

The principles of learning are established: the way they may be best used in different settings and the results evaluated will vary with client needs.

The answer here is tricky. The **will** here is not the **will** of the future, but has basically the same meaning as the Present Simple i.e. every time it happens.

28. **Answer: C.** The answer is in paragraph 9: The time has come to . . . (i.e. now).

Question type. The questions in this section test:

- whether you are able to scan for specific information.
- whether you can recognise an idea which is expressed in another way or a paraphrase.
- whether you are able to analyse a small part of a text and not allow the information around it to interfere with your analysis.

Test 3

Passage 3

Questions 29–32

When matching opinions, statements or topics to people it is important to scan the text to find the name of the person. The answer you are looking for will then be easy to locate.

29. **Answer: C.** The answer is in paragraph D. The sentence in the exercise is a paraphrase of the information in the last two sentences of the paragraph:

However, one point that is well understood is that a national minimum wage could cause a run of differential-maintaining pay claims. The fact that the beneficiaries of a minimum wage usually lack bargaining power (Lucas 1995) and that they are unlikely to be a 'reference group' for any sector of organised labour, takes the edge off this argument.

30. **Answer: D.** The answer is in paragraph B. The sentence is a paraphrase of the findings of Card & Krueger in the third sentence:

A review of such studies by Card and Krueger (1995) concluded that minimum wages had no effect on employment.

31. **Answer: B.** The answer is in paragraph C. The sentence in the exercise is a paraphrase of the information in the last sentence of the paragraph:

Certain types of service industry, for example, can show positive employment effects (Alpert 1986).

32. **Answer: A.** The answer is in paragraph B. Note the sentence in the exercise uses a negative to paraphrase the information in the text. Remember here that you are scanning for an idea rather than just specific words: you are not scanning for the words **does not have a positive effect as regards teenagers**, but the idea that the minimum wage has a negative effect as regards teenagers. So be careful about just scanning for specific words.

Question type. The questions in this section test:

- whether you are able to scan a text for specific information.
- whether you can recognise a paraphrase of words and ideas.

Questions 33–39

33. **Answer: low paid workers.** The answer is in paragraph D. You can scan the text here for the words **save/ saving** and **benefits**.
34. **Answer: 'bad' employers.** The answer is in paragraph D. You can scan the text here for the word **subsidise/ subsidy**.
35. **Answer: certain/ some service industries.** The answer is in paragraph C. Note how this answer is connected with 31 above. In 31, your ability to find the source of the information was being checked. Here it is your ability to see how this information fits into the summary that is being tested.
36. **Answer: development of training.** The answer is in paragraph D. Note you have to change the form of the words: **develop** to **development** and add the preposition **of**. Note that you cannot use the phrases **better market functioning/ more competitive conditions** (in the same paragraph), as they do not fit the grammar of the text; you would have to leave out the word **the** in the diagram. Note also the word **even** in the diagram and where it occurs in the text.

Note the division here in the organisation of the information. In 33 to 36 above, the information relates basically to the positive aspects of a minimum wage. The details that you are looking for in 37 to 39 are about the negative effects.

37. **Answer: differentials.** The answer is in paragraph **D**.
38. **Answer: out of business.** The answer is in paragraph **C**.
39. **Answer: teenagers.** The answer is in paragraph **B**. Note how this particular question is testing different details re teenagers to that tested in number 32 above.

The specific references within each paragraph have been omitted on purpose. This will give you extra practice in scanning a text for information.

When completing diagrams it is important first to look carefully at the diagram so that you understand what kind of information is missing in each case. It is also important to look carefully at the diagram itself, particularly the directions of arrows and other connections between the various parts or boxes. As in questions 29 to 32 you will need to scan the text to find the information given in the diagram, and then look around this to locate the answer required.

Remember also to pay attention to the word limit set.

Question type. The questions in this section test:

- whether you can summarise a text.
- whether you are able to scan a text for specific information.
- whether you can recognise a paraphrase of words and ideas.
- whether you are able to scan a text to recognise the organisation.

Questions 40–42

40. **Answer: B.** The answer is in paragraph **D**:

Critics of the minimum wage would, of course, argue that it only benefits people who have a job.

A is not correct, because the cost of services is not referred to directly, although service industries are (paragraph **C**):

... but, more importantly, showing the strategic processes which managers use to cope with an imposed rise in the price of labour.

C and **D** are not mentioned as being effects of the minimum wage.

41. **Answer: D.** The answer is in paragraph **E**: *... they are best executed through local rather than national government.* (fiscal counterbalance = adjustments in taxation). **A** is obviously then not correct. **B** and **C** are not correct, because the type of taxation is not specified in the text.

42. **Answer: C.** The answer is again in paragraph **C**:

the dearth of studies based on local labour markets and on those of specific industries.

Even if you do not know the meaning of the word **dearth**, you can work out that it has a negative meaning by the reference to a **criticism**. **A**, **B** and **D** are all obviously incorrect.

Question type. The questions in this section test:

- whether you are able to scan a text for specific information.
- whether you can recognise a paraphrase of words and ideas.
- whether you are able to understand specific points in the text.

Reading

Test 4

You should spend about 20 minutes on Questions 1–14, which are based on **Passage 1** below.

HOW THE PAULI EXCLUSION PRINCIPLE REGULATES THE EVOLUTION OF STARS

All stars (like plants and animals) evolve, with each one following the same general pattern of evolution. Their journey along the evolutionary path, and ultimate fate at stellar death, is determined by their initial mass, which is measured in multiples of the solar mass of our own Sun.

Perturbations of nebulous interstellar clouds in space result in gravitational interaction, with the consequent contraction of gaseous matter to create protostars, which are much larger than the stars they will finally become. As the temperature increases, the gas becomes completely ionised to form plasma and gravitational contraction of the core then takes place. The onset of hydrogen-burning happens at a core temperature of several million degrees, and converts hydrogen to helium through nuclear fusion. The greater part of a star's evolutionary lifetime is spent hydrogen-burning and, during this period, it is said to be on the Main Sequence. The end of hydrogen-burning is marked by the evolution of a star into a red giant, when it is said to leave the Main Sequence. Burning ceases completely in the core, which undergoes gravitational contraction to maintain mechanical equilibrium.

Now, the Pauli Exclusion Principle states that 'no two identical particles can occupy the same quantum state' (Kaufmann, 1994): that is, loosely, they cannot have the same spatial location and momentum. This principle is important in determining the ultimate fate of stars. Consider low Main Sequence mass stars (that is, stars of less than three solar masses) which have passed through the hydrogen-burning phase to helium-burning. Such bodies require extreme compression of the core to raise their temperature sufficiently for the onset of helium-burning. Increasing density of electrons occurs, so that they are squashed into close proximity with each other, until a limit is reached when they resist any further compression. This phenomenon is called degeneracy, and is a manifestation of the Pauli Exclusion Principle. Resistance to further compression results in degenerate-electron pressure which supports the core, preventing its contraction. However, this pressure is independent of temperature, and remains constant while the temperature continues to increase. Helium ignition takes place and the thermonuclear reaction proceeds at an increasing rate until a helium-flash occurs. The temperature is so great that degeneracy cannot be maintained: the core suddenly expands with a corresponding decrease in temperature that abruptly

ends the helium-flash. This cycle may be repeated until all the core helium is converted to carbon.

More massive stars do not undergo a helium-flash. Moreover, their cores are sufficiently massive for further element-burning to occur, until they, too, reach a limit imposed by degeneracy. That is, as the product of each phase of element-burning is always nuclei of greater mass, it requires even greater compression of the core remnant in order to raise the temperature sufficiently high enough to initiate the next phase. Such compression can only occur until the degenerate condition is achieved.

Stellar death comes about when the core cannot carry out further element-burning, because of its degenerate nature. Stars of Main Sequence mass less than seven solar masses become white dwarfs. The stability of a white dwarf is only maintained if its final (post-Main Sequence) mass does not exceed the Chandrasekhar Limit of 1.4 solar masses. Degenerate-electron pressure supports the core against collapse, thereby conforming to the Principle.

Neutron stars are the stellar corpses of stars whose Main Sequence mass is between seven and twenty solar masses. Before death, these stars have undergone some further element-burning and the final core mass exceeds the Chandrasekhar Limit. This is too great for degenerate-electron pressure to prevent collapse of the core: electrons and protons are crushed together to form neutrons and neutrinos. Gravitational collapse continues until degeneracy equilibrium is achieved once more. It is degenerate-neutron pressure that halts the collapse, and, thereby, upholds the Principle.

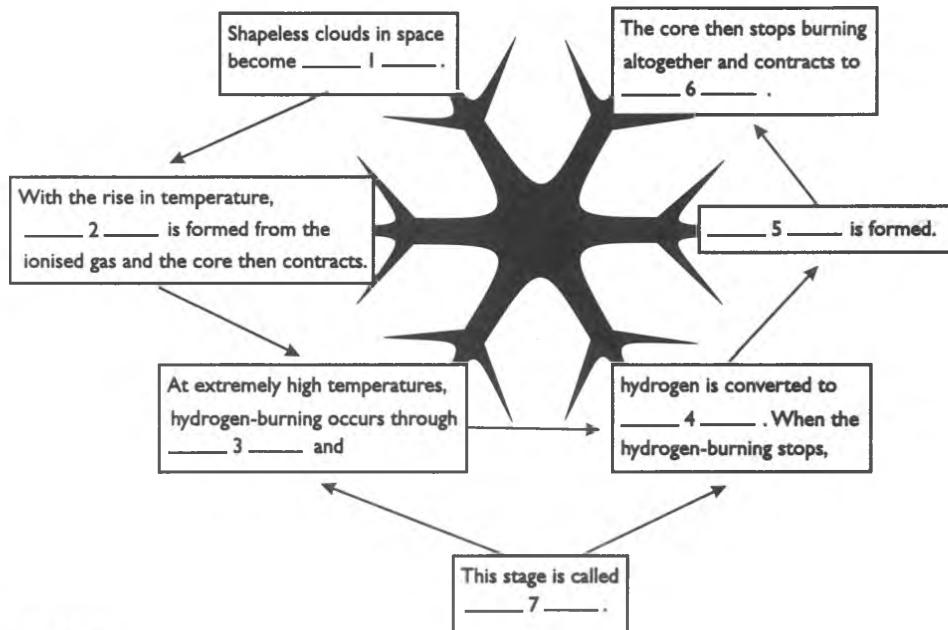
The most massive stars have completed burning to obtain an iron core, and have a Main Sequence mass exceeding twenty solar masses. This is so great that degenerate-neutron pressure cannot support it, and rapid collapse ensues. Since density is inversely proportional to volume and the mass is vast, then, as the volume dwindles, the density tends to infinity and a Black Hole is formed.

Black Holes are a violation of Pauli's Exclusion Principle. If the Principle did not regulate the evolution of stars, nothing would prevent the inexorable collapse of an interstellar cloud from its initial disturbance into a massive Black Hole.

QUESTIONS 1–7

The flow chart below summarises Paragraph 2. Complete the chart with information from the passage and write your answers in Boxes 1–7 on your answer sheet.

You may use **NO MORE THAN THREE WORDS** to complete each space.

**QUESTIONS 8–11**

Choose the appropriate letters **A–D** and write them in **Boxes 8–11** on your answer sheet.

8. What can be said about degeneracy?
- A *It violates the Pauli Exclusion Principle.*
 - B *It is not dependent upon temperature.*
 - C *It is the point where the core of a star withstands further compression.*
 - D *It happens to most, but not all stars.*
9. According to the Pauli Exclusion Principle, ...
- A *no two stars are the same.*
 - B *low mass stars do not degenerate.*
 - C *it is not possible for two identical particles to be in the same space at the same time.*
 - D *when a star is compressed, the temperature and the pressure rise.*
10. Which of the following is true of the largest stars, but not of smaller ones?
- A *Compression of their core is halted by degeneracy.*
 - B *Their core becomes iron.*
 - C *Their fate is stellar death.*
 - D *They undergo a helium flash.*
11. What affects the development of all stars?
- A *Their stellar death.*
 - B *Their evolutionary path.*
 - C *Their mass when they are first formed.*
 - D *Their size when compared to our own Sun.*

QUESTIONS 12–14

Use information from the passage to complete the table below. Use **No More Than Two Words** for each space.

Stars with main sequence mass of	turn into
Less than 7	12
Between 7–20	13
20+	14

You should spend about 20 minutes on **Questions 15 - 28**, which are based on **Passage 2**

ENVY WITHOUT REASON?

- A Do you come from a culture which places emphasis on the emotion of envy? Without a doubt, envy is something that we all feel at some time in our lives. The *Concise Oxford Dictionary* lists envy as ‘resentful or admiring contemplation of more fortunate person’. Instead of sharing in the joy of a new job, car or party dress, a friend either pretends she or he has not noticed the fantastic new BMW or says ‘Mercedes are better’. But does it matter? In many parts of the world, the personal satisfaction felt by those who prosper is tinged with concerns about the ill-will which success provokes in friends, and even family members. Envy becomes something to be feared, for it may have the power to cause harm.
- B The Swahili people of Coastal East Africa take envy very seriously. They frequently feel the need to hide or minimise personal success. Hence, boasting can be a dangerous pastime. Envy emanates from neighbours, friends and family. After all, a stranger does not care if you have managed to replace your thatched roof with corrugated iron. But those Swahili who have struggled to build houses which are a little better than their neighbours often paint on the front of their houses the slogan, *hasidi hana sababu*: this means ‘envy without reason’. The slogan seems to be a forlorn attempt to remind neighbours and any envious passers-by that the apparent good fortune indicated by a superior house has been earned. The message is that there is no reason for envy, and that those harbouring ill-will should control their feelings. The successful are pleading to be allowed to succeed.
- C In Swahili culture, and many others, envy emanates from the eye of the beholder. The Evil Eye, as a source of harm to those who fall under its gaze, is reported throughout much of the world. Indeed, according to Brian Spooner, an expert on the various ways used to keep envy at bay, the idea of the Evil Eye is so widespread that it can be regarded as a universal phenomenon. In the parts of Europe that border the Mediterranean, in the Middle East and North Africa, the wearing of pendants depicting one large eye is a popular way of repelling envy.
- D Ideas about the Evil Eye moved from the Mediterranean to the New World of America. Atwood Gaines has traced the origin of beliefs about the Evil Eye as a cause of sickness from Spain to Mexico, Haiti and Puerto Rico. The illnesses caused by the Evil Eye are given specific names such as *susto*. In such cases, the Evil Eye is suspected after an illness or misfortune has already occurred.
- E Marcia Inhorn has written about the Evil Eye in Egypt. There, women may attribute infertility and other health problems to the envy of neighbours or friends. But in the Middle East, as elsewhere, envy can occur in many settings. Hence, at the end of an important meeting to discuss a research study, the head of the project noticed that her best silk suit had white marks on both the jacket and skirt. It was ruined. She worked out that after the sumptuous lunch, which had preceded the meeting, the table had been cleaned with bleach. She had then brushed against the table. Nobody else’s clothes were damaged. Her Palestinian colleague suggested that envy, harboured by an unknown acquaintance, had ruined her suit. The grounds for envy were either her beautiful clothes or her powerful position within the research team.
- F Some social scientists argue that envy is widespread in societies where resources are scarce and one person’s gain is considered another’s loss. The reasoning behind this theory of envy is that, when people are poor and in competition with each other, they believe that there is not enough good food, good fortune or good jobs to go around. G M Foster studied peasant society in Latin America and propounded ‘the image of limited good’. According to his theory, when somebody from a family or village prospers, they use up part of a stock of limited good and reduce the chances of the success of others. Foster sees the ‘image of limited good’ as operating in peasant societies where people know and compete with each other in adverse economic conditions. However, the theory may hold good for many other social and economic contexts. Take

scholarships, for example. There are only so many to go round. If your best friend gets the scholarship, your chances of getting one too may be greatly reduced.

G Western psychoanalysts have also studied envy. Melanie Klein sees envy as an emotion felt by the breastfeeding infant towards its mother's breast. Although the infant feels love and gratitude towards its mother, it also wants the goodness of the milk for itself. Some of these scholars, unlike everyday speakers of English, are careful to distinguish between envy and jealousy. Swahili people make the same distinction. Jealousy is a triangular relationship. For example, two friends spend all their free time together until one takes a lover. The neglected friend grows jealous of the affection lavished on the new lover. When there is jealousy, three people are involved. Envy, on the other hand, is more straightforward: one person envies another's achievement, quality or possession. While most English people do not take envy seriously, it remains a matter of concern to people worldwide. It makes ambition and the pursuit of success more difficult, and some would say, dangerous. Many seek ways to avoid falling victim to envy. How do you deal with it?

QUESTIONS 15–20

Reading Passage 2 below has seven paragraphs (A–G).

Choose the most suitable heading for each paragraph from the **List of Headings** below. Write the appropriate numbers (i–xv) in **Boxes 15–20** on your answer sheet.

Paragraph D has been done for you as an example.

Please note that you may use each heading only once.

- | | |
|--------------------------|--------------|
| 15. Paragraph A | |
| 16. Paragraph B | |
| 17. Paragraph C | |
| Example Paragraph D | Answer: viii |
| 18. Paragraph E | |
| 19. Paragraph F | |
| 20. Paragraph G | |

List of Headings

- i Breastfeeding and envy
- ii A victim of envy
- iii A global remedy for envy
- iv What is envy?
- v The Evil Eye in Europe
- vi Sharing success
- vii No grounds for envy
- viii Envy and illness
- ix Envy where resources are limited
- x The Swahili in Africa
- xi The work of social scientists
- xii Envy in relation to other emotions
- xiii A dictionary definition of envy
- xiv A universal phenomenon
- xv Envy in poor societies

QUESTIONS 21–24

Use the information in the text to match the people listed (21–24) with the Concepts (i–vii).

Write the appropriate letter in Boxes 21–24 on your answer sheet. Note that there are more concepts than names, so you will not use all of them.

- 21. Brian Spooner
- 22. GM Foster
- 23. Melanie Klein
- 24. Atwood Gaines

CONCEPTS

- i the idea that there is only so much good to go round in any one community
- ii that there is a relationship between the Evil Eye and illness
- iii the theory that the Evil Eye influences infertility
- iv keeping envy at bay
- v the concept of the Evil Eye being a universal phenomenon
- vi the distinction between jealousy and envy
- vii that babies envy their mothers' milk

QUESTIONS 25–28

Complete the following sentences with information from the passage. Use **NO MORE THAN THREE WORDS** to fill each blank space.

- 25. _____ people in society are often the victims of envy.
- 26. The Evil Eye is a _____ to those who come within its range.
- 27. Among the Swahili, boasting is a _____.
- 28. The Swahili on the East African coast often feel they have to conceal or _____.

You should spend about 20 minutes on **Questions 29–42**, which are based on **Passage 3** below.

Have you a tea-room?

We have all walked through modern office blocks where the workers are busily tapping away at keyboards. They have their mugs of tea, or coffee, as they work. Some have a packet of something to nibble in the drawer; but how do they manage to make one packet of chocolate digestives last one whole week? There is an area by the wall somewhere with a water geyser perpetually on the boil, and a stack of mugs. There is a palpable air of activity. Productivity must be booming, one thinks. But is it?

How many of these people work late of their own volition, want to obtain a result before going home, and will beaver away happily until well after dark to achieve it? Damned few! Yes! It may seem wonderful to have a constant flow of liquid refreshment at the desk, not to need a tea, or coffee, break – because the whole working day *is* a tea break. Yet, who wants the tea when the ambience, all too often, is that of a concentration camp?

Why not escape from the desk with a cup of tea from time to time? Perhaps, take your break in a comfortable chair, talk about last night's football results or discuss work, seek or offer advice, arrange a game of squash, play bridge. Or, network and enjoy some refreshment at the same time!

What will the Boss say, however? If he has any sense, he will also come and join you. Perhaps, he supports another team? You can discuss the merits of the players and show him how competently you can present a case. He will realise that the tea-room is an ideal place for informal meetings with his staff, where any number of day-to-day problems can be sorted out over a cup of tea, and where anyone who needs a tender warning about something can be quietly given it without the march to *The Office*. If, as a consequence, the communication process improves, the boss may even dispense with a layer of middle management 'twixt you and himself. He will then no longer need to have expensive *Off-site Meetings*, where his middle managers experience *Free Expression*. He can spend some of the savings on light refreshments for his staff to enjoy!

If you, or a colleague, have a problem with some aspect of work, share it with everyone in the tea-room. One of your colleagues will, doubtless, have had similar difficulties in the past and will have discovered a ridiculously simple solution. To your surprise, you will find he is more than happy to share his experience and answers with you over a cup of tea. Both of you will then go back to your desks with added commitment and make a positive contribution to the work of the group.

Every team has its 'specialists'. They are normal people in their everyday lives, but there are those special situations where they seem to excel all the time. It may be that they format new documentation with consummate ease. Maybe, they can bake excellent butter sponge cakes decorated as fax machines The true specialist can train anyone to fulfil his role.

Who will be trained? Keen, eager, people: the raw recruits. Released from the inhibitions of the office environment in the relaxed atmosphere of a tea-room, they have the confidence to ask dumb questions. This is, in fact, the best place to find solutions to problems; and conduct training. In the tea-room, old-hands, freed temporarily from the modern technologies they often do not fully understand, will invariably offer advice. These people, who know all about the way things happen and what the final product should look like, will give free information communicated with an honest confidence. Why have lots of knowledge, if you cannot share it effectively with others? The Boss should observe the information flow between these people.

Situations like these occur in tea-rooms worldwide every day. These are all natural human interactions. There is much that can be said for the idea of fixed tea times during the working day away from one's precise place of work. Suggesting this will make Asset Managers cringe. This room is only being used 4 hours a day!

But let us say we allow staff to enjoy staggered breaks. The morning coffee is between 10.00 and 11.00. Lunch is sometime between 12.00 and 2.00. Afternoon tea is between 3.00 and 4.00. The tea-room can then be used by time-conscious executives to have their meetings. And, since the room is required for refreshment, these meetings must never over-run, unless they are scheduled after afternoon tea Who wants to work late anyway?

QUESTIONS 29–33

Reading Passage 3 describes a number of **Implications** for the working environment provided certain **Conditions** are met. Match each **Condition (29–33)** in **List A** with its **Implication (A–I)** in **List B**.

There are more **Implications** in **List B** than you will need, so you will not use all of them.

List A: Conditions	List B: Implications
29. Provided people share and solve problems together,	A the tendency for meetings to over-run is avoided. B the employer will recognise the positive contribution to team-work.
30. If the atmosphere in the tea-room is totally relaxed,	C they will work harder as part of a team. D a layer of management will perhaps be removed. E some executives will be able to work later.
31. Should bosses relax with their employees,	F more experienced staff will have an opportunity to train the more inexperienced staff. G they will see tea-rooms as an informal opportunity to meet staff and solve problems.
32. When tea-rooms are used as a multi-purpose venue,	H there will be more off-site meetings for middle managers.
33. If communication between boss and staff is improved,	I the boss will see how information is exchanged between staff members.

QUESTIONS 34–38

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

In Boxes 34–38 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 |

34. A variety of snacks should be provided in tea-rooms.
35. It is surprising that office workers make a packet of chocolate digestives last for a week.
36. The writer suggests workers could, at times, change the setting for their tea breaks.
37. Specialists excel in their everyday lives.
38. Tea-rooms are the best places to ask facile questions.

QUESTIONS 39–42

Using **NO MORE THAN TWO WORDS** from the passage, answer the questions below. Write your answers in Boxes 39–42 on your answer sheet.

39. How many people voluntarily work late?
40. On what can the money saved by avoiding off-site meetings be spent?
41. What would Asset Managers do if the tea-room were used only 4 hours per day?
42. What do older and experienced people not always understand?

Test 4**Passage 1****Questions 1–7**

The answers to the questions in this section relate only to paragraph 2.

1. Answer: protostars.
2. Answer: plasma.
3. Answer: nuclear fusion.
4. Answer: helium.
5. Answer: a red giant.
6. Answer: maintain (mechanical) equilibrium.
7. Answer: the Main Sequence.

Be careful about the numbers here!

Question type. The questions in this section test:

- whether you can summarise a text.
- whether you are able to scan a text for specific information.
- whether you can recognise a paraphrase of words and ideas.
- whether you are able to scan a text to recognise the organisation.

Questions 8–11

8. Answer: C. The answer to this question is in paragraph 3:

... , so that they are squashed into closer proximity with each other, until a limit is reached where they resist any further compression. This phenomenon is called degeneracy, and is a manifestation of the Pauli Exclusion Principle.

So A is incorrect. B is wrong, because:

The temperature is so great that degeneracy cannot then be maintained ...

(See the end of the third paragraph). D is wrong, because degeneracy happens to all stars.

9. Answer: C. The answer is in the first sentence of paragraph 3: *The Pauli Exclusion Principle states that no two identical particles can occupy the same quantum state.* A is obviously a distracter; the Principle does not say anything about stars being the same or different. Alternative B is not true. The author uses the example of low mass stars to illustrate the Principle and the phenomenon of degeneracy (See the third sentence in the third paragraph and the subsequent text). D is wrong, because:

... this pressure ... remains constant while the temperature continues to increase.

10. Answer: B. The answer is in the first sentence of the penultimate paragraph. Alternative A is not correct, because the statement applies to all stars. C is not correct, as it again happens to all stars. As regards D, only smaller stars undergo a helium flash (See the first sentence of paragraph 4).

11. Answer: C. The answer is in the first paragraph: *Their journey along the evolutionary path, and ultimate fate at stellar death, is determined by their initial mass, ... So it is their mass when they are first formed (their initial mass), which affects their development throughout their lives.*

Note the answers to the questions are not in the same order as the information occurs in the passage.

Question type. The questions in this section test:

- whether you are able to scan a text for specific information.
- whether you can recognise a paraphrase of words and ideas.
- whether you are able to understand and analyse specific points in the text.

Questions 12–14

You can answer the questions in this section simply by scanning the text to find the references to the different solar masses.

12. Answer: white dwarfs. See the beginning of the fifth paragraph.

13. **Answer: neutron stars.** See paragraph 6.
14. **Answer: Black Holes.** See the penultimate paragraph.

Question type. The questions in this section test:

- whether you are able to scan a text for specific information.
- whether you can recognise a paraphrase of words and ideas.
- whether you are able to understand and analyse specific points in the text.

Test 4

Passage 2

Questions 15–20

As you read the passage for the first time, you should try to write down beside the paragraph a quick heading of your own. You should try, however, not to spend a lot of time doing this. If you cannot think of a title immediately, you should continue reading. When you come to do the exercise, you will also find that some paragraphs are easier to do than others, so do them first.

For each of the paragraphs, ask yourself the same question: why did the writer write the paragraph? See also **Reading Passage 3, Practice Test 1** and **Reading Passage 1, Practice Test 3**. Please also see **Reading Exercises 10–13**.

If there is an example, cross it from the list before you do the exercise. You then reduce the number of alternatives you have to look at.

15. **Answer: iv.** The writer wrote this paragraph as an introduction. The purpose of the paragraph is to show what envy means. Note that **xiii** is not acceptable, because it refers to only part of the paragraph i.e. the second sentence, and not the whole paragraph.

Always remember that the title is a brief summary of the whole paragraph and reference to part of the paragraph is not acceptable. If you have problems with this look at **Reading Exercises 10–13**.

16. **Answer: vii.** The paragraph talks about (a) the Swahili in Coastal East Africa, (b) their views about envy and (c) how the Swahili deal with envy: they try to convince people that there is no reason to envy someone else's success. Note that (a) and (b) lead up to the focus of the paragraph.

This title is also a paraphrase of the title of the whole article. The distracter here is **(x)**.

17. **Answer: xiv.** Note that the paragraph is about the Evil Eye and the fact that it is a universal or global phenomenon. The paragraph mentions some parts of the world where pendants depicting the Evil Eye are worn to protect the wearer against Envy. It does not say that the wearing of the pendant is a global remedy. It says that the Evil Eye is universal, but the text only refers to parts of Europe where the wearing of a pendant is a way of repelling envy. So **iii** is not acceptable. Note also how **v** refers to only part of the text.

18. **Answer: ii.** This is an easy one as the paragraph is devoted to a particular example of envy. The first few sentences are only by way of introduction.

19. **Answer: ix.** Note that the paragraph is not limited to poor societies. The example given at the end of the paragraph could happen in rich as well as poor societies.

The writer is saying that the idea of limited good holds true for both poor and rich societies. It does not matter that the main part of the paragraph talks about poor societies. If you, therefore, choose **xv** as your answer, you are only summarising part of the paragraph, i.e. poor societies.

It is a common mistake for students to choose a title which covers part of a paragraph - you need to be able to hold all the parts of the paragraph together to arrive at the correct title. Compare number 15 above.

20. **Answer: xii.** It is tempting to put **i** as the answer, but again it is only a summary of part of the text, sentences 2 and 3. The paragraph also talks about what envy is and in this sense it is similar to paragraph A. However, the paragraph talks about something more than what envy is **iv**; it talks about envy as opposed to other feelings, namely: jealousy, love, and gratitude and ambition.

Question type. The questions in this section test:

- whether you are able to scan a text and knit together the information.
- whether you can summarise information or an idea.
- whether you can recognise a paraphrase.
- whether you are able to analyse a small part of a text and not allow the information around it to interfere with your analysis.

Questions 21–24

You can answer the questions in this section in two ways. You can look for the **Concepts**, or you can look for the names. In fact, when you look through the questions before you read through the passage for the first time, you should automatically notice that you are going to have to match names with theories and give titles to paragraphs. As you read, therefore, you should mark the names in some way. Our advice is to put a light box in pencil around each name as you read. Then it will be easy to identify the names and match them with the concepts.

Note that one of the people mentioned in the passage does not occur in the exercise.

- 21. Answer: v.** The answer is in paragraph **C**. You just have to scan the text for the name and then check the paraphrases against the concepts in the exercise. You can also scan the text for the idea, but this is more difficult, as you are trying to match an idea that is expressed in a different way, even if just slightly. Note how the previous exercise can help you with this particular answer. The heading for paragraph **C** tells you what is in that paragraph. It shows you the value of being able to summarise a chunk of text and see the organisation. You then know where to find it quickly.

As in all tests, if you can find the principles which govern the testing, then you have a greater chance of succeeding in that test.

- 22. Answer: i.** The answer is in paragraph **F**. The same methods apply here as for 21 above. Notice again how the previous exercise helps you around the text. Read the paragraph heading, then the first sentence of the paragraph and then the name attached to the **Concept**. Did you do this exercise without reference to the information you gathered as you did the previous exercise?
- 23. Answer: vii.** The answer is in paragraph **G**. Note here how the information you gathered in the previous exercise is still able to help you. While you were looking for a heading for paragraph **G**, did you consider the heading (i) as a possibility? If you looked at it, you then might have remembered it, when you came to do this exercise.

This exercise gives you a clear example of how information is organised in an extended piece of text. You should, as you read generally, always look for markers that help you organise your reading of a text: here it is themes, which are more difficult, as they require you to collect together larger chunks of information (See **Reading Exercises 10–13**); and names which act like pegs to hang information on. Look at the other passages in this book and read them for the organisation. Do you remember **Reading Exercises 1–5**? Also look back at the Key to **Questions 1–6 in Practice Test 1 Reading Passage 1**.

- 24. Answer: ii.** The answer is in paragraph **D**. Notice the inter-relationship between the spread of envy and illness.

Question type. The questions in this section test:

- whether you are able to scan a text for specific information.
- whether you can recognise a paraphrase of words and ideas.

Questions 25–28

- 25. Answer: More fortunate/ Successful/ Powerful/ Prosperous.** For the first answer see the dictionary definition in paragraph **A**. Compare this with the distracter heading for this paragraph in the first set of questions for this text. For the second, see the last sentence of paragraph **B**. For the word **Powerful** see the last sentence of paragraph **E**. For **Prosperous** see the word **prosper** Paragraph **A**.
- 26. Answer: source of harm.** See the second sentence of paragraph **C**.
- 27. Answer: dangerous pastime.** The answer is at the beginning of paragraph **B**.
- 28. Answer: minimise personal success.** The answer is again at the beginning of paragraph **B**.

Question type. The questions in this section test:

- whether you are able to scan a text for specific information.
- whether you can recognise information or an idea which is expressed in another way.
- whether you are able to analyse a small part of a text and not allow the information around it to interfere with your analysis.

Test 4

Passage 3

Questions 29–33

29. **Answer:** C. The answer is in paragraph 5. The condition that needs to be met is in the first sentence and the result or implication is in the last sentence of the paragraph:

If you, or a colleague, have a problem with some aspect of work share it with everyone in the tea-room. One of your colleagues will, doubtless, have had similar difficulties in the past and will have found a ridiculously simple solution. To your surprise, you will discover he is more than happy to share his experience and answers with you over a cup of tea. **Both of you will then go back to your desks with added commitment and make a positive contribution to the work of the group.**

Note how the sentence in the exercise summarises the two parts of the text, and the paragraph. Notice the clues: **Provided... / If ...** both give you a condition, which is followed by a result/implication: ... will work harder ... / ... will then go back

30. **Answer:** F. The answer is in paragraph 7.

Who will be trained? Keen, eager, people: **the raw recruits. Released from the inhibitions of the office environment in the relaxed atmosphere of a tea-room, they have the confidence to ask dumb questions. This is, in fact, the best place to find solutions to problems; and conduct training. In the tearoom, old hands, freed temporarily from the modern technologies they often do not fully understand, will invariably offer advice.**

Note again how the exercise sentence summarises the text. The sentence paraphrases the information to show you the underlying meaning/ organisation of the text in bold: a **condition** followed by an **implication**.

31. **Answer:** G. The answer is in paragraph 4.

What will the Boss say, however? If he has any sense, he will also come and join you. Perhaps, he supports another team? You can discuss the merits of the players and show him how competently you can present a case. **He will realise that the tearoom is an ideal place for informal meetings with his staff, where any number of day-to-day problems can be sorted out over a cup of tea, and where anyone who needs a tender warning about something can be quietly given it without the march to 'The Office'.**

Again the meaning is made clearer/ summarised by the sentence in the exercise.

32. **Answer:** A. The answer is in the last paragraph.

But let us say we allow staff to enjoy staggered breaks. The morning coffee is between 10.00 and 11.00. Lunch is sometime between 12.00 and 2.00. Afternoon tea is between 3.00 and 4.00. **The tea-room can then be used by time-conscious executives to have their meetings. And since the room is required for refreshment, these meetings must never overrun, unless they are scheduled after afternoon tea... Who wants to work late anyway?**

Note the phrase **let us say we allow staff to enjoy** = **If we allow** . Note also the implication in the text is expressed by: ... can then be used by ... ; ... must never over-run ...

33. **Answer:** D. The answer is in paragraph 4:

... can be quietly given it without the march to 'The Office'. If, as a consequence, the communication process improves, the boss may even dispense with a layer of middle management 'twixt you and himself. He will then no longer need to have expensive 'Off Site Meetings' where his middle managers experience 'Free Expression'. He can spend some of the savings on light refreshments for his staff to enjoy!

Note how the **conditions** and **implications** summarise the main points in the text. The writer is trying to convince the reader of the merits of having a **tea-room**. He sets out to show that, if certain **conditions** are met, there will be a number of **implications** for the workplace.

Note that the **conditions** are in a different order to what they are in the text.

Note how the text lends itself to this kind of summary rather than a gap-fill exercise.

Question type. The questions in this section test:

- whether you can summarise a text.
- whether you are able to scan a text for specific information.

- whether you can recognise a paraphrase of words and ideas.
- whether you are able to scan a text to recognise the organisation.

Questions 34–38

34. Answer: Not Given. The text says at the end of paragraph 4:

He can spend some of the savings on light refreshments for his staff to enjoy!

However, nowhere in the text does the writer say that **a variety of snacks should be provided in tea-rooms**. The statement in the exercise is stating an opinion about all tea-rooms, whereas the text is giving an implication, if the boss gets rid of a layer of management. They are not talking about the same thing, even though the ideas are similar!

35. Answer: Yes. The answer is in paragraph 1:

but how do they manage to make one packet of chocolate digestives last one whole week?

36. Answer: Yes. The answer is in paragraph 3, in the first sentence.

37. Answer: No. The answer is in paragraph 6 in the second sentence:

They are normal people in their everyday lives, but there are

38. Answer: Yes. The answer is in paragraph 7:

in the relaxed atmosphere of a tea-room, they have the confidence to ask dumb questions.

Look at **Reading Exercises 17–22** and the **Key to Practice Test 1 Reading Passage 2**.

Question type. The questions in this section test:

- whether you are able to scan for specific information and ideas.
- whether you can recognise an idea which is expressed in another way.
- whether you can recognise a paraphrase.

Questions 39–42

39. Answer: damned few. The answer is in paragraph 2

40. Answer: light refreshments. The answer is in paragraph 4 in the last sentence. See number 34 above.

41. Answer: cringe. The answer is in the penultimate sentence of paragraph 8.

42. Answer: modern technologies. The answer is in paragraph 7.

Question type. The questions in this section test:

- whether you are able to scan for specific information.
- whether you can recognise information or an idea which is expressed in another way.
- whether you can recognise a paraphrase.
- whether you are able to analyse a small part of a text and not allow the information around it to interfere with your analysis.

Reading

Test 5

You should spend about 20 minutes on Questions 1–14, which are based on Passage 1 below.

Translation: from the sublime to the ridiculous?

According to the *Oxford Dictionary*, ‘to translate’ is ‘to express the sense in or into another language’. But what is ‘the sense’ really? Translating a piece of writing is not just a question of picking up the foreign language dictionary and substituting one set of words for another. Although it represents the substitution of a set of words from one lexicon for those from another, it is ultimately a form of communication, concerned, as Peter Newmark says, with transmitting culture and truth. For this reason, a translation should only be attempted after the translator has carefully studied the whole text, and asked herself a number of questions.

Firstly, it is important that she considers the purpose of the said text. Insofar as all writing is a form of communication, does this particular text aim – user instructions for a household appliance, for example – simply to transmit information to a would-be user? Or does it strive – an advertisement or hotel brochure or any other piece of publicity material – to arouse interest so that the reader will want to buy the product, or stay in the hotel? Or is its purpose – like that of a piece of literature, or a film – to stimulate the imagination, to inspire and to entertain – as well as, perhaps, to instruct?

Once she has ascertained the purpose of the text, the translator needs to consider who the readers of the translated text will be. The readers of the translation will, of necessity, comprise a different group from the readers of the original – but they are likely to share certain characteristics. If the original text was aimed at a wide audience – the ‘man in the street’ anxious to get to grips with his new coffee-maker, for example – then the reader of the translated text is likely to fall into the same category and have the same expectations. But perhaps the original was aimed at a more discrete and well-defined group, perhaps by its style and content it has defined its readership.

Will the reader of the translation be someone with a good knowledge of the culture from which the original has sprung, or will he be someone with a very sparse knowledge of it? It has been said that everything is translatable ‘on condition that the two languages belong to cultures that have reached a comparable degree of development’; how up-to-date will he be with the requisite technical knowledge? Balancing the expectations of the potential readers with those of the writer is, in this way, part of the tightrope which the translator treads; it will dictate, for example, the extent to which annotations and footnotes will be needed in the translation, and the way in which culturally-specific references and items of specialist vocabulary are (or are not) translated.

The *style and register* of the translated text should, for reasons of integrity and coherence, mirror that of the original. It would be misleading if the translator of a text written in a discursive and amusing style were to render it ponderous in translation; just as it would be wrong for a translator to over-simplify what was originally an erudite piece of prose. However, this is not to ignore the fact that there might well be instances in which a text – awkwardly written in the original – could be made more accessible by the translator. It is a question of judgement.

The style in which something is written often represents a large part of what the writer is trying to convey, and this is particularly likely to be the case with a work of literature, such as a poem or novel: it is not only what the writer is saying, but how she says it which is important. Allusions, deliberate ambiguity, humour, parody, and language which contains alliteration and assonance, are likely to be features of such a text, and to represent problems which the translator needs to solve appropriately. To that extent, translating is rather like doing a jigsaw puzzle. Other kinds of writing – a piece of advertising, for example – may well contain subliminal messages to which the translator will need to be alert – as to any kind of ‘sub-text’.

Much translation is, by default, given to those with an inadequate grasp of either the source or target language – and often of both. It is frequently overlooked that the successful translator needs an excellent knowledge of the source language and a perfect mastery of the target language in its technical and colloquial aspects. The target language, for the best results, should be her mother-tongue but, as Peter Newmark says, many translators who translate out of their own language ‘contribute greatly to many people’s hilarity in the process.’ So, for example, it once happened that ‘la sagesse normande’ became, in English, ‘Norman wisdom’.

QUESTIONS 1–3

Complete the sentences below with information from the reading passage. You may use **NO MORE THAN THREE WORDS** for each answer.

1. Translating a text is more than merely _____ for others.
2. Each text whether informative, stimulating or instructive has _____ that the translator needs to take into account.
3. The reader of the translation may have only a _____ knowledge of the culture from which the original comes.

QUESTIONS 4–6

Choose the appropriate letters **A–D** and write them in **Boxes 4–6** on your answer sheet.

4. Anything can be translated, provided that ...
 - A the two languages are equally developed.
 - B the two languages have similar levels of cultural development.
 - C the translator is up-to-date.
 - D the translator has the same expectations as the reader.
5. According to the writer, it is sometimes possible to make a translation ...
 - A clearer than the original.
 - B overly simple.
 - C humorous.
 - D ponderous.
6. When translating a literary text, which one of the following is important for the translator?
 - A The way in which a writer says something as much as the content.
 - B Subliminal messages.
 - C Allusions.
 - D Jigsaw puzzles in texts.

QUESTIONS 7–10

The writer mentions a number of **Judgements** that need to be made by the translator. Which **Four** of the **Judgements** below are mentioned? Write your answers (**A–H**) in **Boxes 7–10** on your answer sheet.

7. _____

8. _____

9. _____

10. _____

List of Judgements

- A** Weighing up why a writer says what she says.
- B** Determining the importance of poetry.
- C** Making a decision as to how far to stick to the original.
- D** Judging who the target audience of a translation will be.
- E** Whether translating is best done from the mother tongue.
- F** Deciding how many explanations, footnotes and comments on vocabulary to include.
- G** Deciding on which information to use from dictionaries.
- H** Whether to oversimplify a text.

QUESTIONS 11–14

Answer the questions below using information from the passage. You may use **NO MORE THAN THREE WORDS** from the passage for each answer. Write your answers in **Boxes 11–14** on your answer sheet.

11. Translation is a form of communication; what does it, in essence, transmit?
12. What do readers of a translation and readers of the original text often share?
13. Which aspects of the translated text should reflect the original?
14. What, according to the text, should a translator look at carefully before trying to do a translation?

You should spend about 20 minutes on **QUESTIONS 15–29**, which are based on **Passage 2** below.

A buzz in the world of chemistry

- A. For the past few years, one of the buzz terms in the pharmaceutical, agrochemical and biotechnology industries has been 'combinatorial chemistry'. Surf the net and find thousands of references to it. Read any of the general science weeklies, such as *Nature* or *New Scientist*, and every few issues, another worthy author is going to save the 21st century from everything nasty with this miraculous technology. Some of the more specialist journals have even devoted whole issues to reviewing combinatorial chemistry.
- B. These reviews all have the same format. First, there is a section from the Research and Development Director of a major chemical company, a person who has not worked at the bench for years, if not decades. This is filled with business-speak; the jargon keeps the shareholders happy and makes them proud to own a bit of something at the forefront of science. Section two is from a director of a venture capital funded synthetic chemistry company located on a green field site, probably in a portacabin, or, perhaps, in a new business park, rent free for the first five years from the local authority of a small town no one has heard of. He discusses the molecular modelling packages that they are using to build 'virtual' libraries containing millions of compounds. The third section is by someone who, in fact, practises combinatorial chemistry and who has developed automated systems to do the syntheses and to assay the products. They can probably synthesise a few thousand compounds per week.
- C. We know that organic chemistry is the chemistry of carbon, biochemistry the chemistry of life and physical chemistry the application of physics to chemical behaviour. What then is combinatorial chemistry?
- D. Combinatorial chemistry is a branch of synthetic organic chemistry. We all remember mathematics classes at school just before the end of term when we were given silly sums to do: How many ways can five differently coloured beads be arranged on a string? (120). Maths teachers call these permutation and combination problems; hence, combinatorial chemistry.
- E. After the development of solid phase peptide synthesis in the 1960s by Merrifield, soon synthetic peptide chemists were also doing permutation and combination sums. There are 20 naturally occurring amino acids, the building blocks of peptides and proteins, the workhorse molecules of life. How many ways can these be arranged, or chemically bonded, to synthesise novel peptides which might be put to any number of uses in the pharmacy? If we take just one molecule of each of the 20 amino acids and join them together to form a peptide, we find that we can arrange these in 20! or $2.432902008177 \times 10^{18}$ ways. Nature knows no such restraint; it can use multiple copies of each amino acid, and so can synthesise 20^{20} or 1.048576×10^{26} twenty amino acid peptides. Proteins contain hundreds of amino acids. The numbers of possible sequences are truly innumerable!
- F. They become even more so when one considers the other polymeric molecules of life: the lipids, carbohydrates and nucleic acids.
- G. Classically trained synthetic chemists strive for purity. One remembers twelve years ago a chemist synthesising a 20 residue peptide. He went off to the lab, was ever so busy, producing a different high performance liquid chromatography (HPLC) trace every few days to show his biologist customers how the reactions were progressing. A few months after the request was placed, the biologists were given a few milligrams of their desired peptide and half a rain forest worth of HPLC printout!
- H. That was fine when only one product was sought. Now the demand is for thousands of products to satisfy the automated high-through-put screening systems employed by the major pharmaceutical companies. How can this be achieved?
- I. Let us consider solid phase synthesis strategies. In these, the compound of interest is synthesised on a solid support, a resin bead. These beads are typically 100 microns in diameter and made from cross-linked polyvinyl benzene or polyethylene glycol polymers.
- J. Using the Tea-bag method, developed by Houghten in the 1980s, typically about 100 mg of the 100 micron beads are put into polypropylene mesh sacs which have a 75 micron mesh size. These are thermally sealed closed and the synthesis takes place on the resin beads within the sac. During the synthesis reaction cycles, the sacs are transferred from reagent pot to pot in sequence, and at the end of the synthesis, the product is cleaved off the bead, characterised and purified as need be. Using this strategy, one needs to use a separate sac for each compound to be synthesised and automated systems have now been developed for multiple sac manipulation.
- K. The sensitivity of compound analytical techniques has developed apace with the technology, and whereas, in the 1980s, one required several millimoles of product to characterise, now this can be done with femtmoles or in some cases attomoles (10^{-18} moles)! Therefore, one need only recover product from 1 bead, about 2–3 picomoles. Automated systems are now being developed to synthesise on single magnetic beads using only 2–3 nanolitres of reagent per cycle. When the 'classical' Tea-bag strategy was developed, 100 millilitres per cycle were considered to be a phenomenal solvent cost-cutting exercise.

- L. The development of high-through-put automated screening has demanded from synthetic chemistry large arrays or libraries of compounds to satisfy the investment made in installing these systems. Will combinatorial chemistry be able to meet this demand? Are the syntheses well enough developed to meet this? Peptide and oligonucleotide solid phase strategies have been well developed over the past 30 years. Will solution methods and other novel chemistries be able to keep apace? Can 'virtual' chemicals be used to remedy 'real' problems? After all, we are living in a real world.

QUESTIONS 15–20

Complete the text below, which is a summary of paragraphs A–E. Choose your answers from the Word List and write them in Boxes 15–20 on your answer sheet.

Example: There is a wealth of _____ (Example) _____ to
combinatorial chemistry on the Internet.

Answer: references

There are more words than spaces, so you will not be able to use them all. You may use each word only once.

How Combinatorial Chemistry began

Combinatorial chemistry as an _____ 15 _____ of synthetic organic chemistry has been very much _____ 16 _____ in recent years, _____ 17 _____ in a plethora of articles written by experts in the field. Moreover, all the reviews in specialist publications _____ 18 _____ the same formula. But what about the origin of combinatorial chemistry? It comes from permutation and combination problems in mathematics. _____ 19 _____ solid phase peptide synthesis was developed, synthetic peptide chemists started doing similar calculations as well. The 20 naturally occurring amino acids provided them with _____ 20 _____ possibilities.

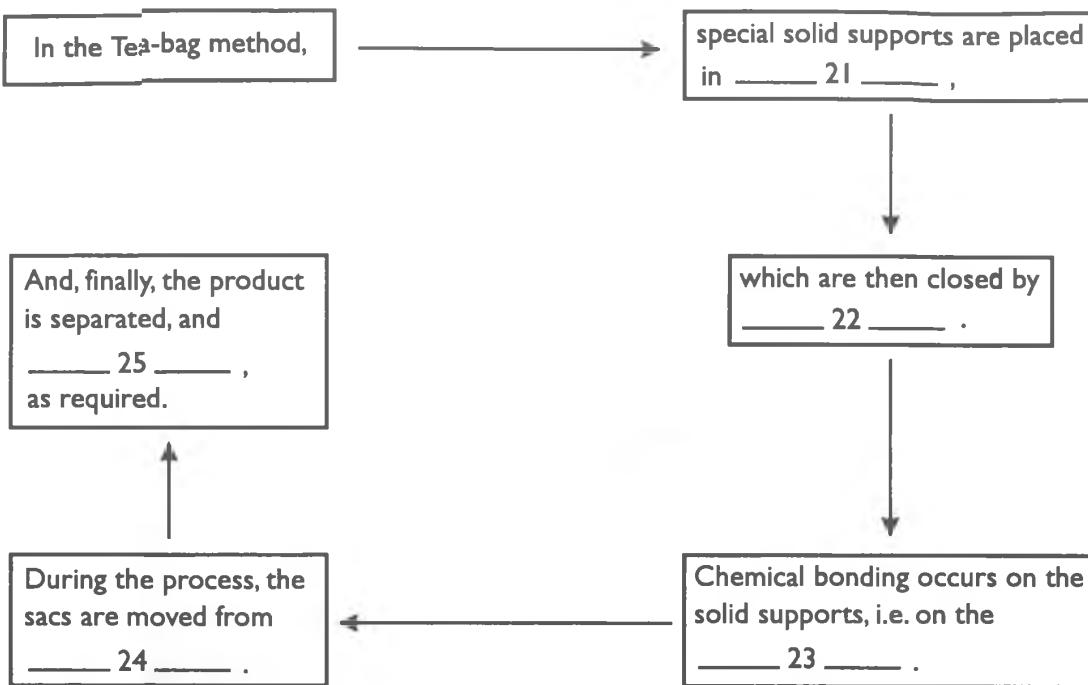
Word List

known	<i>in vogue</i>	<i>appearing</i>
limitless	<i>in the air</i>	<i>once</i>
offspring	<i>until</i>	<i>doubled</i>
usually follow	<i>offshoot</i>	<i>limited</i>
as	<i>follow religiously</i>	<i>references</i>

QUESTIONS 21–25

Look at paragraphs I and J which describe the Tea-bag method. Using the information in the passage, complete the flow chart below. Write your answers in Boxes 21– 25 on your answer sheet. Use NO MORE THAN THREE WORDS for each answer.

Reading Tests



QUESTIONS 26–28

Below is a list of the regular types of contributor to combinatorial chemistry reviews. Which **three** contributors are described by the writer? Write your answers **A–F** in the order they occur in the text in Boxes 26–28 on the answer sheet.

- A** A director of a technology business park.
- B** Someone who is from a major company and involved directly in research.
- C** Someone who is involved in the new technology of combinatorial chemistry.
- D** An amateur chemist who synthesises thousands of compounds per week.
- E** The director of a small, obscurely located and investment funded operation.
- F** An out-of-practice director of some major chemical enterprise.

QUESTION 29

Choose the appropriate letter (**A–D**) and write it in **Box 29** on your answer sheet.

29. Physical chemistry ...

- A** deals with the way physics is applied to chemical behaviour.
- B** is closely connected with organic chemistry.
- C** deals with the way chemistry is applied to physical behaviour.
- D** led to the development of combinatorial chemistry.

You should spend about 20 minutes on Questions 30–41, which are based on Passage 3 below.

Ice and Fire

The poet W.H. Auden once wrote: 'To me Iceland is sacred soil. Its memory is a constant background to what I am doing. It is a permanent part of my existence. I could say that Iceland is the sun colouring the mountains without being anywhere in sight, even sunk beyond the horizon ...'. The extraordinary and lasting effect that this small island of 270,000 inhabitants invariably has on its visitors is as enigmatic as the land itself. Those once intoxicated by it are likely to become addicts for life; those who recoil in horror at the bleak lava fields, which surround its airport, may never return.

Iceland is as distant in topographical character, modes of life and attitudes from its Nordic neighbours on the Scandinavian mainland as it is geographically. Isolated far north-west in the North Atlantic, its real neighbours are Greenland and the Arctic ice-cap. Far from the forested mountains of Norway or the flat lakes of Finland, its geologically young landscape is constantly being carved by the activity of ice and fire. Volcanoes, glaciers and 700 years of Danish colonial rule have impoverished the land, but enriched the human spirit.

In its cultural history, Iceland has enjoyed no heritage of court patronage, no interfertilisation with the European Renaissance, Baroque or Enlightenment. Yet, from the first murmurings of national affirmation in the latter half of the nineteenth century to full independence in 1944, cultural activity has sprung up like the geysers which shoot high from the country's geothermal energy sources just under the earth's crust.

Reykjavik can now boast as many as 60 musical events per month; it has two lively theatres, an opera company and a flourishing and internationally respected film industry. Much Icelandic art articulates the sense of danger felt in living in a country with at least 30 live volcanoes: when one erupted under a glacier in the autumn of 1996, the subsequent flooding swept away roads and bridges to the tune of six million pounds. And, despite a sophisticated system of damage limitation, maverick avalanches can destroy entire settlements.

Stubbornness, a superiority complex which can, in moments of crisis or loss of confidence, quietly veer towards its opposite, and a laconically oblique view of life characterises the typical Icelander, if such a creature exists. A determination to protect and develop a language basically unchanged since the time of the Sagas has led Iceland to coin its own new words for telephone, television, radio and computer. When gas pipes are laid, the homes of elves and trolls are respectfully by-passed.

One such detour is there for those who have eyes to see on the main route from the airport to Reykjavik city centre. Nobody, though, should feel intimidated. Regular buses connect all towns and settlements around the country's main ring-road: the central wilderness, stunning in its landscape of black volcanic desert and brown glacial moraines, can be traversed only for a few weeks in the summer, when the snow has melted but floods have abated. Few rivers there have bridges.

Four-wheel-drive vehicles, careful research, a good radio, and a sense of humour are essential travelling companions – unless, like the first travellers to Iceland, including William Morris and W.H. Auden, a convoy of sturdy Icelandic horses is preferred. And, as the old saying goes: 'If you get lost in an Icelandic forest, just stand up.'

QUESTION 30

Choose the appropriate letter A–D and write it in **Box 30** on your answer sheet.

30. Which of the following is true concerning transport on Iceland?

- A All the settlements and towns in Iceland are linked by four-wheel-drive vehicles.
- B Sturdy Icelandic horses are needed to get round all parts of Iceland.
- C All the settlements and towns on the main ring-road are linked by a bus service.
- D A fleet of coaches serves the entire island.

QUESTIONS 31–36

Do the statements below agree with the information given by the writer in **Reading Passage 3**?

In boxes 31–36, write:

- Yes** if the statement agrees with the information in the passage
- No** if the statement contradicts the information in the passage
- Not Given** if no information is given about the statement in the passage

- 31. The natural features of Iceland are in a state of continual transformation.
- 32. Iceland is a Danish colony.
- 33. Iceland is not dissimilar, from the topographical point of view, to Scandinavian countries on the continent.
- 34. Some people are horrified by the starkness of the landscape around the airport.
- 35. The majority of people who visit Iceland are intoxicated by it for life.
- 36. The author is intoxicated by Iceland.

QUESTIONS 37–39

Answer the questions below using **NO MORE THAN FOUR WORDS** from the passage.

- 37. What is the state of the Icelandic movie business?
- 38. To what is the growth of cultural activity in recent decades compared?
- 39. What does much Icelandic art reflect about life in Iceland?

QUESTIONS 40 & 41

Complete the sentences below. You may use **NO MORE THAN THREE WORDS** taken directly from the passage, or based on the information in the passage.

- 40. Avalanches can destroy entire settlements, although a system has been set up to _____.
- 41. Icelanders are intent on _____ their language.

Passage 1**Questions 1–3**

- 1. Answer: substituting (some) words.** The answer is in the third sentence of the first paragraph. The sentence in the exercise checks whether you understand what the writer means by translating, i.e. that it is not just a matter of replacing words in one language for words in another language. It is more than that: it is about translating **sense**.

Note that in the text, it says **substituting one set of words for another**. In the exercise, you can use only a maximum of three words, so the word **words** summarises **one set of words**.

Note that you cannot say 'substitution of words' here, because you would need to have the definite article, **the**. You would then have four words.

- 2. Answer: a purpose.** The answer is in the first sentence of the second paragraph. The sentence here is a summary or paraphrase of the paragraph. In that sense, it is like a paragraph heading. The phrase **whether ... or instructive** covers the different types of text, the purpose of which the translator must consider.

Note you cannot have 'its purpose' because of the latter half of the sentence: **that the translator ...** Nor can you have 'the purpose'.

- 3. Answer: (very) sparse.** The answer is in the first sentence of the fourth paragraph. Two types of reader are covered in the fourth paragraph: readers with good knowledge and sparse knowledge. If you remove the word **only** from the statement in the exercise, you could have both **good** and **(very) sparse**. With **only**, you can have only the latter.

Question type. The questions in this section test:

- whether you are able to scan for specific information.
- whether you can recognise information or an idea which is expressed in another way.
- whether you can recognise a paraphrase.
- whether you are able to analyse a small part of a text and not allow the information around it to interfere with your analysis.

Questions 4–6

- 4. Answer: B.** This is a paraphrase of the information in the second sentence of the fourth paragraph:

It has been said that everything is translatable 'on condition that the two languages belong to cultures that have reached a comparable degree of development'.

A is not correct, because the text talks about the development of cultures, not of languages. **C** is not correct, because the reference in the text is to the reader being **up-to-date with the requisite technical knowledge**. The reader being up-to-date in this way is incidental to the cultures being of the same level of development. The question posed by the writer here is an afterthought to the main part of the sentence. **D** is not correct, because the text mentions that the translator has to balance the writer's and the reader's expectations; it does not talk about the translator's.

- 5. Answer: A.** The answer is in the third sentence of the fifth paragraph:

However, this is not to ignore the fact that there might well be instances in which a text – awkwardly written in the original – could be made more accessible by the translator.

Answer **A** gives you a paraphrase of the text. **B** is not correct, because the writer says it would be **wrong to over-simplify an erudite piece of prose**. So, making something overly simple is not advised. **C** and **D** are not correct, because the writer advises against making an amusing text ponderous.

- 6. Answer: A.** The answer is in the first sentence of the sixth paragraph. Notice the writer's paraphrase of the word **style**: **how she says it**. Compare this with the paraphrase of the word **style** in the multiple choice i.e. **the way in which a writer says something**. Alternatives **B**, **C** and **D** are not correct, because they are not aspects which are stated as being important when translating. Allusions and subliminal messages (**B** and **C**) are examples of what makes up style. They provide information which is subordinate to **A**. Alternative **D** is wrong, because the text compares the translator's job to doing a jigsaw puzzle, because she has to **solve appropriately** the problems a text represents. The text does not say that it is important.

Question type. The questions in this section test:

- whether you are able to scan a text for specific information.
- whether you can recognise a paraphrase of words and ideas.
- whether you are able to understand and analyse specific points in the text.

Questions 7–10

7–10. Answer: A/C/D/F (in any order).

A is mentioned in paragraph 2, the first sentence of the paragraph: **considers the purpose of the said text**. C is mentioned in paragraph 5. A translation should . . . **mirror that of the original**, but the translator also has to make a judgement about making a text clearer, or more accessible . . . **It is a question of judgement**. (See number 5 above and 13 below). D is mentioned in the first sentence of paragraph 3: . . . **needs to consider who the readers of the translated text will be**. F is mentioned in paragraph 4 in the last sentence.

If you look at the last few words in the first paragraph you can see how the writer organised the text: ‘**and asked herself a number of questions**’. The judgements that the translator has to make as she answers the questions help organise the text. A is like a summary of paragraph 2; C summarises paragraph 5; D summarises paragraphs 3 and 4; and F relates again to paragraph 4. The judgements are, therefore, like headings that summarise the main body of the text.

As regards the distracter B, ‘a poem’ is mentioned in the first sentence of paragraph 6, but nothing is said about whether a translator has to decide if poetry is important or not. As for E, it is incorrect, because the translator does not have to make a judgement about this. In paragraph 7, it says: **The target language, for the best results, should be her mother-tongue . . .**, meaning that translating is best done ‘into’ the mother tongue. Moreover, the writer is not putting this forward as a point on which a decision needs to be made. It is important to read the options carefully to make sure that they contain exactly the same information as the text.

G is not mentioned in the text and H is wrong. See paragraph 5: **it would be wrong to oversimplify**. The decision, in any case, would be whether to simplify rather than ‘oversimplify’.

Question type. The questions in this section test:

- whether you are able to scan a text for specific information.
- whether you can recognise a paraphrase of words and ideas.
- whether you are able to understand and analyse specific points in the text.
- whether you can recognise the function of points in a text.
- whether you are able to summarise a text.

Questions 11–14

11. Answer: culture and truth. The answer is in the fourth sentence in paragraph 1.

12. Answer: certain characteristics/the same expectations. The answer is in paragraph 3. Note that both answers are possible.

13. Answer: style and register. The answer is in paragraph 5. This question asks you about the focus of the fifth paragraph. Compare C in questions 7–10 above. Notice how questions 5, 7–10 and 13 examine different aspects of the information in paragraph 5.

14. Answer: the whole text. This question takes you back to paragraph 1, the last sentence.

In short answer questions such as these, the important thing to remember is to scan the text and look for the clues you have been given in the question: words or phrases that often appear in the same or similar form in the text.

Question type. The questions in this section test:

- whether you are able to scan a text for specific information.
- whether you can recognise a paraphrase of words and ideas.
- whether you are able to understand and analyse specific points in the text.
- whether you can recognise the function of points in a text.

Passage 2**Questions 15–20**

15. **Answer: offshoot.** The answer here is in paragraph **D**, in the first sentence. The word **offshoot** is a paraphrase of the word **branch** in the text. The distracter here is the word **offspring**, which does not mean the same as **branch**.
16. **Answer: in vogue.** The answer here is in paragraph **A**: **For the past few years one of the buzz terms . . .** The rest of the paragraph then shows how fashionable/common combinatorial chemistry is.
17. **Answer: appearing.** The information for this part of the summary is again in paragraph **A**. There is no particular word there which the word **appearing** paraphrases.
18. **Answer: follow religiously.** The answer here is in paragraph **B**: **These reviews all have the same format.** And then the paragraph describes the repeated formula of the paragraph. Note that the word **religiouslly** means faithfully/exactly here. The distracter **usually follow** does not paraphrase exactly the meaning of the phrase quoted above.
19. **Answer: Once.** The answer here is in paragraph **E**: **After the development of solid phase peptide synthesis . . .** The word **Once** is a paraphrase of the word **After**.
20. **Answer: limitless.** The answer here is in paragraph **E**, in the last sentence: **The numbers of possible sequences are truly innumerable!**

Question type. The questions in this section test:

- whether you are able to scan a text for specific information.
- whether you are able to scan a text to recognise the organisation.
- whether you can analyse a text from the top down without being dragged down by detail which is irrelevant to the question.
- whether you can summarise a text.

Questions 21–25

All the answers to complete the flow chart are found in paragraphs **I** and **J**. This summary covers a much smaller part of the text than the previous exercise and is more precise.

21. **Answer: (polypropylene) mesh sacs.**
22. **Answer: thermal sealing/being thermally sealed.** Note that you have to change the words here slightly to fit the wording of the chart. The diagram already mentions the fact that the sacs are **closed**, and you are being asked to say here how that happens.
23. **Answer: resin beads.** Note that here you are being asked to state what the **solid supports** are, or are made of.
24. **Answer: pot to pot.** Note that you cannot use the word **reagent** here; you are only allowed to use three words. Note also that the word **pot** on its own is not enough.
25. **Answer: characterised and purified.**

Note that this section tests the same skills as **Questions 15–20**.

Question type. The questions in this section test:

- whether you are able to scan a text for specific information.
- whether you are able to scan a text to recognise the organisation.
- whether you can analyse a text from the top down without being dragged down by detail which is irrelevant to the question.
- whether you can summarise a text.

Questions 26–28

The answers to this section are found in paragraph **B**. Note that the sections are not in the order in which the information appears in the passage.

26. **Answer: F.** Description **B** is not possible, because the first director mentioned in the original text is not directly involved in research: **a person who has not worked at the bench for years . . .**

27. **Answer: E.** The distracter here is **A**. The text does not say that the second contributor is typically **a director of a technology business park**, but a director whose company is situated **in a new business park**.
28. **Answer: C.** The distracter for this one is **D**. The original text does not say whether the third category of contributor is an amateur or not. The text also says that the chemist **can probably synthesise a few thousand compounds per week**; not that they do.

Note that the details in the exercise and the text are very similar. This means that you have to jump back and forth between the two as you juggle the information.

Question type: The questions in this section test:

- whether you are able to scan a text for specific information.
- whether you are able to scan a text to recognise the organisation.
- whether you can analyse a text from the top down without being dragged down by detail which is irrelevant to the question.
- whether you can summarise a text.
- whether you are able to juggle bits of information between the text and the exercise at the same time.

Questions 29

29. **Answer: A.** The answer to this question is in paragraph **C**. It is important to read the multiple choice answers here very carefully, as you are juggling lots of small pieces of information within a short area of text. If you then answer the question too quickly, you can easily match the wrong bits of information.

Question type: The question in this section tests:

- whether you are able to scan a text for specific information.
- whether you can recognise a paraphrase of words and ideas.
- whether you are able to understand specific points in the text.

Passage 3

Questions 30

30. **Answer: C.** The answer is in paragraph six. **A** is not correct, because **four-wheel- drive vehicles** are listed among **essential travelling companions** (the last paragraph). The text does not say that they connect towns. **B** is not correct, because the writer was referring to the earliest travellers to Iceland (also in the last paragraph). **D** is not correct, because the text does not say that the entire island is connected or served by a fleet of coaches.

Note that the question refers to the end of the text.

Question type: The question in this section tests:

- whether you are able to scan a text for specific information.
- whether you can recognise a paraphrase of words and ideas.
- whether you are able to understand specific points in the text.

Questions 31–36

31. **Answer: Yes.** The answer is in paragraph 2 in the third sentence. The statement is a paraphrase of the phrase: **... landscape is constantly being carved ...**
32. **Answer: No.** The answer is in paragraph 3. At the end of paragraph 2, the writer mentions that Iceland was a Danish colony. Then in the next paragraph it states that the island gained full independence in 1944. So Iceland is no longer a colony of Denmark.
33. **Answer: No.** The answer is in paragraph 2. There is a double negative in the statement; **not dissimilar = the same**, but the text says that Iceland and Scandinavian countries are not similar, so the statement contradicts the information given in the text. It is very important to check negative statements carefully, especially when there are double negatives such as this.

34. **Answer: Yes.** The answer is in the last sentence of paragraph 1:
 . . . those who recoil in horror at the bleak lava fields which surround its airport may never return.
35. **Answer: Not Given.** The answer is in paragraph 1. In the text, it talks about **those once intoxicated by it . . .**, but we do not know if **those** are the majority or not; the text does not say how many people.
36. **Answer: Not Given.** The text nowhere states whether the author of the article is intoxicated by Iceland or not. The writer is talking about the reactions of other people. She starts with a quote from the poet W.H. Auden and goes on to describe the reactions of other people to Iceland, but we do not know what the writer thinks about Iceland.

Note how the questions in this section jump around the text.

Question type. The questions in this section test:

- whether you are able to scan for specific information.
- whether you can recognise an idea which is expressed in another way or a paraphrase.
- whether you are able to analyse a small part of a text and not allow the information around it to interfere with your analysis.

Questions 37–39

37. **Answer:** flourishing and (internationally) respected. The answer is in the first sentence of the fourth paragraph. You need to scan the text for the words **movie business/film industry**.
38. **Answer: (the) geysers.** The answer is in the second sentence of the third paragraph. In this case, it is not possible to give any more information about the geysers without exceeding the word limit given.
39. **Answer: (a) sense of danger.** The answer is in the second sentence of the fourth paragraph. As soon as you find **Icelandic art** by scanning the text, it is easy to find the answer required.

Note the exercise asks for a maximum of **FOUR** words. In the exam, always read the instructions in each exercise. Do not assume that they are the same as the books you read as you were preparing for the exam.

Note that, in this section, you have to jump around the text to find the answer to the questions.

Question type. The questions in this section test:

- whether you are able to scan for specific information.
- whether you can recognise information or an idea which is expressed in another way.
- whether you can recognise a paraphrase.
- whether you are able to analyse a small part of a text and not allow the information around it to interfere with your analysis.

Questions 40 & 41

40. **Answer: limit damage.** The answer is in the last sentence of the fourth paragraph. Be careful about the grammar in this type of gapfill. It is not possible to write **damage limitation**, as a noun does not fit the grammar of the sentence. A verb is needed here. Remember that the exact words you need do not always appear in the text; particularly where filling gaps in a text is concerned, you may have to change the form of some words.
41. **Answer: protecting and developing.** The answer is in the second sentence of the fifth paragraph. Note the change in the form of the verbs. Note you cannot use nouns here, as you would have to write: **the protection and development of**.

Question type. The questions in this section test:

- whether you are able to scan for specific information.
- whether you can recognise information or an idea which is expressed in another way.
- whether you can recognise a paraphrase.
- whether you are able to analyse a small part of a text and not allow the information around it to interfere with your analysis.

The answers to questions in some of the reading texts in the IELTS exam may be like those above; not always one after the other.

Test 6

READING PASSAGE 1--CORK

Cork - the thick bark of the cork oak tree (*Quercus suber*) - is a remarkable material. It is tough, elastic, buoyant, and fire-resistant, and suitable for a wide range of purposes. It has also been used for millennia: the ancient Egyptians sealed their sarcophagi (stone coffins) with cork, while the ancient Greeks and Romans used it for anything from beehives to sandals.

And the cork oak itself is an extraordinary tree. Its bark grows up to 20 cm in thickness, insulating the tree like a coat wrapped around the trunk and branches and keeping the inside at a constant 20°C all year round. Developed most probably as a defence against forest fires, the bark of the cork oak has a particular cellular structure - with about 40 million cells per cubic centimetre - that technology has never succeeded in replicating. The cells are filled with air, which is why cork is so buoyant. It also has an elasticity that means you can squash it and watch it spring back to its original size and shape when you release the pressure.

Cork oaks grow in a number of Mediterranean countries, including Portugal, Spain, Italy, Greece and Morocco. They flourish in warm, sunny climates where there is a minimum of 400 millimetres of rain per year, and no more than 800 millimetres. Like grape vines, the trees thrive in poor soil, putting down deep root in search of moisture and nutrients. Southern Portugal's Alentejo region meets all of these requirements, which explains why, by the early 20th century, this region had become the world's largest producer of cork, and why today it accounts for roughly half of all cork production around the world.

Most cork forests are family-owned. Many of these family businesses, and indeed many of the trees themselves, are around 200 years old. Cork production is, above all, an exercise in patience. From the planting of a cork sapling to the first harvest takes 25 years, and a gap of approximately a decade must separate harvests from an individual tree. And for top-quality cork, it's necessary to wait a further 15 or 20 years. You even have to wait for the right kind of summer's day to harvest cork. If the bark is stripped on a day when it's too cold - or when the air is damp - the tree will be damaged.

Cork harvesting is a very specialised profession. No mechanical means of stripping cork bark has been invented, so the job is done by teams of highly skilled workers. First, they make vertical cuts down the bark using small sharp axes, then lever it away in pieces as large as they can manage. The most skilful cork-strippers prise away a semi-circular husk that runs the length of the trunk from just above ground level to the first branches. It is then dried on the ground for about four months, before being taken to factories, where it is boiled to kill any insects that might remain in the cork. Over 60% of cork then goes on to be made into traditional bottle stoppers, with most of the remainder being used in the construction trade. Corkboard and cork tiles are ideal for thermal and acoustic insulation, while granules of cork are used in the manufacture of concrete.

Recent years have seen the end of the virtual monopoly of cork as the material for bottle stoppers, due to concerns about the effect it may have on the contents of the bottle. This is caused by a chemical compound called

2,4,6-trichloroanisole (TCA), which forms through the interaction of plant phenols, chlorine and mould. The tiniest concentrations - as little as three or four parts to a trillion - can spoil the taste of the product contained in the bottle. The result has been a gradual yet steady move first towards plastic stoppers and, more recently, to aluminium screw caps. These substitutes are cheaper to manufacture and, in the case of screw caps, more convenient for the user.

The classic cork stopper does have several advantages, however. Firstly, its traditional image is more in keeping with that of the type of high quality goods with which it has long been associated. Secondly - and very importantly - cork is a sustainable product that can be recycled without difficulty. Moreover, cork forests are a resource which support local biodiversity, and prevent desertification in the regions where they are planted. So, given the current concerns about environmental issues, the future of this ancient material once again looks promising.

Questions 1-5

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

In boxes 1-5 on your answer sheet, write

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

- 1 The cork oak has the thickest bark of any living tree.
- 2 Scientists have developed a synthetic cork with the same cellular structure as natural cork.
- 3 Individual cork oak trees must be left for 25 years between the first and second harvest.
- 4 Cork bark should be stripped in dry atmospheric conditions.
- 5 The only way to remove the bark from cork oak trees is by hand.

Questions 6-13

Complete the notes below.

Choose ONE WORD ONLY from the passage for each answer.

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

Comparison of aluminium screw caps and cork bottle stoppers

Advantages of aluminium screw caps

- do not affect the 6 of the bottle contents
- are 7 to produce
- are 8 to use

Advantages of cork bottle stoppers

- suit the 9 of quality products
- made from a 10 material
- easily 11
- cork forests aid 12
- cork forests stop 13 happening

READING PASSAGE 2---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 go 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 reading passage?

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.

READING PASSAGE 3--What's the purpose of gaining knowledge?

A'I would found an institution where any person can find instruction in any subject' That was the founders motto for Cornell University, and it seems an apt characterization of the different university, also in the USA, where I currently teach philosophy. A student can prepare for a career in resort management, engineering, interior design, accounting, music, law enforcement, you name it. But what would the founders of these two institutions have thought of a course called Arson for Profit? I kid you not: we

have it on the books. Any undergraduates who have met the academic requirements can sign up for the course in our program in 'fire science'.

B Naturally, the course is intended for prospective arson investigators, who can learn all the tricks of the trade for detecting whether a fire was deliberately set, discovering who did it, and establishing a chain of evidence for effective prosecution in a court of law. But wouldn't this also be the perfect course for prospective arsonists to sign up for? My point is not to criticize academic programs in fire science: they are highly welcome as part of the increasing professionalization of this and many other occupations. However, it's not unknown for a fire fighter to torch a building. This example suggests how dishonest and illegal behavior, with the help of higher education, can creep into every aspect of public and business life.

C I realized this anew when I was invited to speak before a class in marketing, which is another of our degree programs. The regular instructor is a colleague who appreciates the kind of ethical perspective I can bring as a philosopher. There are endless ways I could have approached this assignment, but I took my cue from the title of the course: 'Principles of Marketing'. It made me think to ask the students, 'Is marketing principled?' After all, a subject matter can have principles in the sense of being codified, having rules, as with football or chess, without being principled in the sense of being ethical. Many of the students immediately assumed that the answer to my question about marketing principles was obvious: no. Just look at the ways in which everything under the sun has been marketed; obviously it need not be done in a principled (=ethical) fashion.

D Is that obvious? I made the suggestion, which may sound downright crazy in light of the evidence, that perhaps marketing is by definition principled. My inspiration for this judgement is the philosopher Immanuel Kant, who argued that any body of knowledge consists of an end (or purpose) and a means.

E Let us apply both the terms 'means' and 'end' to marketing. The students have signed up for a course in order to learn how to market effectively. But to what end? There seem to be two main attitudes toward that question. One is that the answer is obvious: the purpose of marketing is to sell things and to make money. The other attitude is that the purpose of marketing is irrelevant: Each person comes to the program and course with his or her own plans, and these need not even concern the acquisition of marketing expertise as such. My proposal, which I believe would also be Kant's, is that neither of these attitudes captures the significance of the end to the means for marketing. A field of knowledge or a professional endeavor is defined by both the means and the end; hence both deserve scrutiny. Students need to study both how to achieve X, and also what X is.

F It is at this point that 'Arson for Profit' becomes supremely relevant. That course is presumably all about means: how to detect and prosecute criminal activity. It is therefore assumed that the end is good in an ethical sense. When I ask fire science students to articulate the end, or purpose, of their field, they eventually generalize to something like, 'The safety and welfare of society,' which seems right. As we have seen, someone could use the very same knowledge of means to achieve a much less noble end, such as personal profit via destructive, dangerous, reckless activity. But we would not call that firefighting. We have a separate word for it: arson. Similarly, if you employed the 'principles of marketing' in an unprincipled way, you would not be doing

marketing. We have another term for it: fraud. Kant gives the example of a doctor and a poisoner, who use the identical knowledge to achieve their divergent ends. We would say that one is practicing medicine, the other, murder.

Questions 27-32

Reading Passage has six sections, A-F.

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

Write the correct number, i-viii, in boxes 27-32 on your answer sheet.

- | | | |
|----|----------------------------------|-----------|
| 27 | <input type="button" value="▼"/> | Section A |
| 28 | <input type="button" value="▼"/> | Section B |
| 29 | <input type="button" value="▼"/> | Section C |
| 30 | <input type="button" value="▼"/> | Section D |
| 31 | <input type="button" value="▼"/> | Section E |
| 32 | <input type="button" value="▼"/> | Section F |

List of Headings	
i	Courses that require a high level of commitment
ii	A course title with two meanings
iii	The equal importance of two key issues
iv	Applying a theory in an unexpected context
v	The financial benefits of studying
vi	A surprising course title
vii	Different names for different outcomes
viii	The possibility of attracting the wrong kind of student

Questions 33-36

Complete the summary below.

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

Write your answers in boxes 33-36 on your answer sheet.

The 'Arson for Profit' course

This is a university course intended for students who are undergraduates and who are studying 33 [] . The expectation is that they will become 34 [] specialising in arson. The course will help them to detect cases of arson and find 35 [] of criminal intent, leading to successful 36 [] in the courts.

Questions 37-40

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

In boxes 37-40 on your answer sheet, write

YES if the statement agrees with the views of the writer

NO if the statement contradicts the views of the writer

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

37 [] It is difficult to attract students onto courses that do not focus on a career.

38 [] The 'Arson for Profit' course would be useful for people intending to set fire to buildings.

39 [] Fire science courses are too academic to help people to be good at the job of fire fighting.

40 [] The writer's fire science students provided a detailed definition of the purpose of their studies.

ANSWER FOR READING PASSAGE TEST6

Reading Passage 1—

1. NOT GIVEN-- The cork oak has the thickest bark of any living tree.	8. convenient
2. FALSE-- Scientists have developed a synthetic cork with the same cellular structure as natural cork.	9. image
3. FALSE-- Individual cork oak trees must be left	10. sustainable

for 25 years between the first and second harvest.	
4. TRUE-- Cork bark should be stripped in dry atmospheric conditions.	11. recycled
5. TRUE-- The only way to remove the bark from cork oak trees is by hand.	12. biodiversity
6. taste	13. desertification
7. cheaper	

Reading Passage—2-- **Collecting as a hobby**

14. antiques	21. trainspotting
15. triumph	22. NOT GIVEN- The number of people buying dolls has grown over the centuries.
16. information	23. FALSE-- Sixteenth century European dolls were normally made of wax and porcelain.
17. contact	24. NOT GIVEN-- Arranging a stamp collection by the size of the stamps is less common than other methods.
18. hunt/desire	25. TRUE--- Someone who collects unusual objects may want others to think he or she is also unusual.
19. aimless/empty	26. TRUE-- Collecting gives a feeling that other hobbies are unlikely to inspire.
20. educational	

Reading Passage—3--**What's the purpose of gaining knowledge?**

List of Headings

- I Courses that require a high level of commitment
- II A course title with two meanings
- III The equal importance of two key issues
- IV Applying a theory in an unexpected context
- V The financial benefits of studying
- VI A surprising course title
- VII Different names for different outcomes
- VIII The possibility of attracting the wrong kind of student

27. vi-- Section A	34. investigators
28. viii-- Section B	35. evidence
29. ii-- Section C	36. prosecution
30. iv-- Section D	37. NOT GIVEN
31. iii-- Section E	38. YES
32. vii-- Section F	39. NO
33. fire science	40. NO

Test 7

READING PASSAGE 1--The risks agriculture faces in developing countries

A --Two things distinguish food production from all other productive activities: first, every single person needs food each day and has a right to it; and second, it is hugely dependent on nature. These two unique aspects, one political, the other natural, make food production highly vulnerable and different from any other business. At the same time, cultural values are highly entrenched in food and agricultural systems worldwide.

B --Farmers everywhere face major risks; including extreme weather, long-term climate change, and price volatility in input and product markets. However, smallholder farmers in developing countries must in addition deal with adverse environments, both natural, in terms of soil quality, rainfall, etc. and human, in terms of infrastructure, financial systems, markets, knowledge and technology. Counter-intuitively, hunger is prevalent among many smallholder farmers in the developing world.

C --Participants in the online debate argued that our biggest challenge is to address the underlying causes of the agricultural system's inability to ensure sufficient food for all, and they identified as drivers of this problem our dependency on fossil fuels and unsupportive government policies.

D --On the question of mitigating the risks farmers face, most essayists called for greater state intervention. In his essay, Kanayo F. Nwanze, President of the International Fund for Agricultural Development, argued that governments can significantly reduce risks for farmers by providing basic services like roads to get produce more efficiently to markets, or water and food storage facilities to reduce losses. Sophia Murphy, senior advisor to the Institute for Agriculture and Trade Policy, suggested that the procurement and holding of stocks by governments can also help mitigate wild swings in food prices by alleviating uncertainties about market supply.

E --Shenggen Fan, Director General of the International Food Policy Research Institute, held up social safety nets and public welfare programmes in Ethiopia, Brazil and Mexico as valuable ways to address poverty among farming families and reduce their vulnerability to agriculture shocks. However, some commentators responded that cash transfers to poor families do not necessarily translate into increased food security, as these programmes do not always strengthen food production or raise incomes.

Regarding state subsidies for agriculture, Rokeya Kabir, Executive Director of Bangladesh NariProgatiSangha, commented in her essay that these 'have not compensated for the stranglehold exercised by private traders.'

In fact, studies show that sixty percent of beneficiaries of subsidies are not poor, but rich landowners and non-farmer traders.

F --Nwanze, Murphy and Fan argued that private risk management tools, like private insurance, commodity futures markets, and rural finance can help small-scale producers mitigate risk and allow for investment in improvements. Kabir warned that financial support schemes often encourage the adoption of high-input agricultural practices, which in the medium term may raise production costs beyond the value of their harvests.

Murphy noted that when futures markets become excessively financialised they can contribute to short-term price volatility, which increases farmers' food insecurity. Many participants and commentators emphasised that greater transparency in markets is needed to mitigate the impact of volatility, and make evident whether adequate stocks and supplies are available. Others contended that agribusiness companies should be held responsible for paying for negative side effects.

G -Many essayists mentioned climate change and its consequences for small-scale agriculture. Fan explained that in addition to reducing crop yields, climate change increases the magnitude and the frequency of extreme weather events, which increase smallholder vulnerability. The growing unpredictability of weather patterns increases farmers' difficulty in managing weather-related risks.

According to this author, one solution would be to develop crop varieties that are more resilient to new climate trends and extreme weather patterns. Accordingly, Pat Mooney, co-founder and executive director of the ETC Group, suggested that 'if we are to survive climate change, we must adopt policies that let peasants diversify the plant and animal species and varieties/breeds that make up our menus.

H -Some participating authors and commentators argued in favour of community- based and autonomous risk management strategies through collective action groups, co-operatives or producers' groups. Such groups enhance market opportunities for small-scale producers, reduce marketing costs and synchronise buying and selling with seasonal price conditions.

According to Murphy, 'collective action offers an important way for farmers to strengthen their political and economic bargaining power, and to reduce their business risks. One commentator, Giel Ton, warned that collective action does not come as a free good. It takes time, effort and money to organise, build trust and to experiment. Others, like Marcel Vernooij and Marcel Beukeboom, suggested that in order to 'apply what we already know', all stakeholders, including business, government, scientists and civil society, must work together, starting at the beginning of the value chain.

I --Some participants explained that market price volatility is often worsened by the presence of intermediary purchasers who, taking advantage of farmers' vulnerability, dictate prices. One commentator suggested farmers can gain greater control over prices and minimise price volatility by selling directly to consumers.

Similarly, SonaliBisht, founder and advisor to the Institute of Himalayan Environmental Research and Education (INHERE), India, wrote that copipunity-supported agriculture, where consumers invest in local farmers by subscription and guarantee producers a fair price, is a risk-sharing model worth more attention. Direct food distribution systems not only encourage small-scale agriculture but also give consumers more control over the food they consume, she wrote.

Questions 1-3

Reading Passage has nine paragraphs, A-I.

Which paragraph contains the following information?

Write the correct letter, A-I, in boxes 1-3 on your answer sheet.

- 1 a reference to characteristics that only apply to food production
- 2 a reference to challenges faced only by farmers in certain parts of the world
- 3 a reference to difficulties in bringing about co-operation between farmers

Questions 4-9

Look at the following statements (Questions 4-9) and the list of people below.

Match each statement with the correct person, A-G.

Write the correct letter, A-G, in boxes 4-9 on your answer sheet.

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

- 4 Financial assistance from the government does not always go to the farmers who most need it.
- 5 Farmers can benefit from collaborating as a group.
- 6 Financial assistance from the government can improve the standard of living of farmers.
- 7 Farmers may be helped if there is financial input by the same individuals who buy
- 8 Governments can help to reduce variation in prices.
- 9 Improvements to infrastructure can have a major impact on risk for farmers.

List of People	
A	Kanayo F. Nwanze
B	Sophia Murphy
C	Shenggen Fan
D	Rokeya Kabir
E	Pat Mooney
F	Giel Ton
G	Sonali Bisht

Questions 10-11

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

Write the correct letters in boxes 10-11 on your answer sheet.

Which **TWO** problems are mentioned which affect farmers with small farms in developing countries?

- A lack of demand for locally produced food
- B lack of irrigation programmes
- C being unable to get insurance
- D the effects of changing weather patterns

- E having to sell their goods to intermediary buyers

Questions 12-13

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

Write the correct letters in boxes 12-13 on your answer sheet.

Which **TWO** actions are recommended for improving conditions for farmers?

- A reducing the size of food stocks
- B attempting to ensure that prices rise at certain times of the year
- C organising co-operation between a wide range of interested parties
- D encouraging consumers to take a financial stake in farming
- E making customers aware of the reasons for changing food prices

READING PASSAGE 2--Lost City

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 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, 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 was a , 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 (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 14-20

Reading Passage 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.

14

15

16

17

18

19

20

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

Questions 21-24

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

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 3--The Benefits of being Bilingual

A--According to the latest figures, the majority of the world's population is now bilingual or multilingual, having grown up speaking two or more languages. In the past, such children were considered to be at a disadvantage compared with their monolingual peers. Over the past few decades, however, technological advances have allowed researchers to look more deeply at how bilingualism interacts with and changes the cognitive and neurological systems, thereby identifying several clear benefits of being bilingual.

B--Research shows that when a bilingual person uses one language, the other is active at the same time. When we hear a word, we don't hear the entire word all at once: the sounds arrive in sequential order. Long before the word is finished, the brain's language system begins to guess what that word might be. If you hear 'can', you will likely activate words like 'candy' and 'candle' as well, at least during the earlier stages of word recognition. For bilingual people, this activation is not limited to a single language; auditory input activates corresponding words regardless of the language to which they belong. Some of the most compelling evidence for this phenomenon, called 'language co-activation', comes from studying eye movements. A Russian-English bilingual asked to 'pick up a marker' from a set of objects would look more at a stamp than someone who doesn't know Russian, because the Russian word for 'stamp', marka, sounds like the English word he or she heard, 'marker'. In cases like this, language co-activation occurs because what the listener hears could map onto words in either language.

C--Having to deal with this persistent linguistic competition can result in difficulties, however. For instance, knowing more than one language can cause speakers to name pictures more slowly, and can increase 'tip-of-the-tongue states', when you can almost, but not quite, bring a word to mind. As a result, the constant juggling of two languages creates a need to control how much a person accesses a language at any given time. For this reason, bilingual people often perform better on tasks that require conflict management. In the classic Stroop Task, people see a word and are asked to name the colour of

the word's font. When the colour and the word match (i., the word 'red' printed in red), people correctly name the colour more quickly than when the colour and the word don't match (i., the word 'red' printed in blue). This occurs because the word itself ('red') and its font colour (blue) conflict. Bilingual people often excel at tasks such as this, which tap into the ability to ignore competing perceptual information and focus on the relevant aspects of the input. Bilinguals are also better at switching between two tasks; for example, when bilinguals have to switch from categorizing objects by colour (red or green) to categorizing them by shape (circle or triangle), they do so more quickly than monolingual people, reflecting better cognitive control when having to make rapid changes of strategy.

D--It also seems that the neurological roots of the bilingual advantage extend to brain areas more traditionally associated with sensory processing. When monolingual and bilingual adolescents listen to simple speech sounds without any intervening background noise, they show highly similar brain stem responses. When researchers play the same sound to both groups in the presence of background noise, however, the bilingual listeners' neural response is considerably larger, reflecting better encoding of the sound's fundamental frequency, a feature of sound closely related to pitch perception.

E--Such improvements in cognitive and sensory processing may help a bilingual person to process information in the environment, and help explain why bilingual adults acquire a third language better than monolingual adults master a second language. This advantage may be rooted in the skill of focussing on information about the new language while reducing interference from the languages they already know.

F--Research also indicates that bilingual experience may help to keep the cognitive mechanisms sharp by recruiting alternate brain networks to compensate for those that become damaged during aging. Older bilinguals enjoy improved memory relative to monolingual people, which can lead to real-world health benefits. In a study of over 200 patients with Alzheimer's disease, a degenerative brain disease, bilingual patients reported showing initial symptoms of the disease an average of five years later than monolingual patients. In a follow-up study, researchers compared the brains of bilingual and monolingual patients matched on the severity of Alzheimer's symptoms. Surprisingly, the bilinguals' brains had more physical signs of disease than their monolingual counterparts, even though their outward behaviour and abilities were the same. If the brain is an engine, bilingualism may help it to go farther on the same amount of fuel.

G--Furthermore, the benefits associated with bilingual experience seem to start very early. In one study, researchers taught seven-month-old babies growing up in monolingual or bilingual homes that when they heard a tinkling sound, a puppet appeared on one side of a screen. Halfway through the study, the puppet began appearing on the opposite side of the screen. In order to get a reward, the infants had to adjust the rule they'd learned; only the bilingual babies were able to successfully learn the new rule. This suggests that for very young children, as well as for older people, navigating a multilingual environment imparts advantages that transfer far beyond language.

Questions 27-31

Complete the table below.

Choose **NO MORE THAN TWO WORDS** from the passage for each answer.
Write your answers in boxes 27-31 on your answer sheet.

Test	Findings
Observing the 27 <input type="text"/> of Russian- English bilingual people when asked to select certain objects	Bilingual people engage both languages simultaneously: a mechanism known as 28 <input type="text"/>
A test called the 29 <input type="text"/> , focusing on naming colours	Bilingual people are more able to handle tasks involving a skill called 30 <input type="text"/>
A test involving switching between tasks	When changing strategies, bilingual people have superior 31 <input type="text"/>

Questions 32-36

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

In boxes 32-36 on your answer sheet, write

YES if the statement agrees with the claims of the writer

NO if the statement contradicts the claims of the writer

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

32 Attitudes towards bilingualism have changed in recent years.

33 Bilingual people are better than monolingual people at guessing correctly what words are before they are finished.

34 Bilingual people consistently name images faster than monolingual people.

35 Bilingual people's brains process single sounds more efficiently than monolingual people in all situations.

36 Fewer bilingual people than monolingual people suffer from brain disease in old age.

Questions 37-40

Reading Passage has seven paragraphs, A-G.

Which paragraph contains the following information?

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

37 an example of how bilingual and monolingual people's brains respond differently to a certain type of non-verbal auditory input

38 a demonstration of how a bilingual upbringing has benefits even before we learn to speak

39 a description of the process by which people identify words that they hear

40 reference to some negative consequences of being bilingual

ANSWER FOR READING PASSAGE TEST 7

READING PASSAGE 1 -- The risks agriculture faces in developing countries

1. A--a reference to characteristics that only apply to food production	8. B-- Governments can help to reduce variation in prices.
2. B-- a reference to challenges faced only by farmers in certain parts of the world	9. A-- Improvements to infrastructure can have a major impact on risk for farmers.
3. H-- a reference to difficulties in bringing about co-operation between farmers	10. D,E IN ANY ORDER
4. D-- Financial assistance from the government does not always go to the farmers who most need it.	11. D,E IN ANY ORDER
5. B-- Farmers can benefit from collaborating as a group.	12. C,D IN ANY ORDER
6. C-- Farmers can benefit from collaborating as a group.	13. C,D IN ANY ORDER
7. G-- Farmers may be helped if there is financial input by the same individuals who buy	

READING PASSAGE—2--Lost City

14. iv	8. TRUE-- Bingham went to South America in search of an Inca city.	21. TRUE
15. vi	9. FALSE-- Bingham chose a particular route down the Urubamba valley because it was the most common route used by travellers.	22. FALSE
16. viii	10. FALSE-- Bingham understood the significance of Machu Picchu as soon as he saw it.	23. FALSE
17. v	11. NOT GIVEN-- Bingham returned to Machu Picchu in order to find evidence to support his theory.	24. NOT GIVEN
18. i	12. rubber	25. rubber
19. vii	13. farmer	26. farmer
20. iii		

READING PASSAGE—3--The Benefits of being Bilingual

27. eye movements	34. NO
28. language co-activation	35. NO
29. Stroop Task	36. NOT GIVEN
30. conflict management	37. D
31. cognitive control	38. G
32. YES	39. B
33. NOT GIVEN	40. C

TEST 8

READING PASSAGE 1--Flying tortoises

A Forests of spiny cacti cover much of the uneven lava plains that separate the interior of the Galapagos island of Isabela from the Pacific Ocean. With its five distinct volcanoes, the island resembles a lunar landscape. Only the thick vegetation at the skirt of the often cloud-covered peak of Sierra Negra offers respite from the barren terrain below.

This inhospitable environment is home to the giant Galapagos tortoise. Sometime after the Galapagos's birth, around five million years ago, the islands were colonised by one or more tortoises from mainland South America. As these ancestral tortoises settled on the individual islands, the different populations adapted to their unique environments, giving rise to at least 14 different subspecies. Island life agreed with them. In the absence of significant predators, they grew to become the largest and longest-living tortoises on the planet, weighing more than 400 kilograms, occasionally exceeding 1,8 metres in length and living for more than a century.

B Before human arrival, the archipelago's tortoises numbered in the hundreds of thousands. From the 17th century onwards, pirates took a few on board for food, but the arrival of whaling ships in the 1790s saw this exploitation grow exponentially. Relatively immobile and capable of surviving for months without food or water, the tortoises were taken on board these ships to act as food supplies during long ocean passages. Sometimes, their bodies were processed into high-grade oil.

In total, an estimated 200,000 animals were taken from the archipelago before the 20th century. This historical exploitation was then exacerbated when settlers came to the islands. They hunted the tortoises and destroyed their habitat to clear land for agriculture. They also introduced alien species - ranging from cattle, pigs, goats, rats and dogs to plants and ants - that either prey on the eggs and young tortoises or damage or destroy their habitat.

C Today, only 11 of the original subspecies survive and of these, several are highly endangered. In 1989, work began on a tortoise-breeding centre just outside the town of Puerto Villamil on Isabela, dedicated to protecting the island's tortoise populations. The centre's captive-breeding programme proved to be extremely successful, and it eventually had to deal with an overpopulation problem.

D The problem was also a pressing one. Captive-bred tortoises can't be reintroduced into the wild until they're at least five years old and weigh at least 4,5 kilograms, at which point their size and weight - and their hardened shells - are sufficient to protect them from predators. But if people wait too long after that point, the tortoises eventually become too large to transport.

E For years, repatriation efforts were carried out in small numbers, with the tortoises carried on the backs of men over weeks of long, treacherous hikes along narrow trails. But in November 2010, the environmentalist and Galapagos National Park liaison officer Godfrey Merlin, a visiting private motor yacht captain and a helicopter pilot gathered around a table in a small cafe in Puerto Ayora on the island of Santa Cruz to work out more ambitious reintroduction. The aim was to use a helicopter to move 300 of the breeding centre's tortoises to various locations close to Sierra Negra.

F This unprecedented effort was made possible by the owners of the 67-metre yacht White Cloud, who provided the Galapagos National Park with free use of their helicopter and its experienced pilot, as well as the logistical support of the yacht, its captain and crew. Originally an air ambulance, the yacht's helicopter has a rear double door and a large internal space that's well suited for cargo, so a custom crate was designed to hold up to 33 tortoises with a total weight of about 150 kilograms. This weight, together with that of the fuel, pilot and four crew, approached the helicopter's maximum payload, and there were times when it was clearly right on the edge of the helicopter's capabilities. During a period of three days, a group of volunteers from the breeding centre worked around the clock to prepare the young tortoises for transport. Meanwhile, park wardens, dropped off ahead of time in remote locations, cleared landing sites within the thick brush, cacti and lava rocks.

G Upon their release, the juvenile tortoises quickly spread out over their ancestral territory, investigating their new surroundings and feeding on the vegetation. Eventually, one tiny tortoise came across a fully grown giant who had been lumbering around the island for around a hundred years. The two stood side by side, a powerful symbol of the regeneration of an ancient species.

Questions 1-7

Reading Passage 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 **1-7** on your answer sheet.

- | | | |
|---|----------------------------------|-------------|
| 1 | <input type="button" value="▼"/> | Paragraph A |
| 2 | <input type="button" value="▼"/> | Paragraph B |
| 3 | <input type="button" value="▼"/> | Paragraph C |
| 4 | <input type="button" value="▼"/> | Paragraph D |
| 5 | <input type="button" value="▼"/> | Paragraph E |
| 6 | <input type="button" value="▼"/> | Paragraph F |
| 7 | <input type="button" value="▼"/> | Paragraph G |

List of Headings	
i	The importance of getting the timing right

ii	Young meets old
iii	Developments to the disadvantage of tortoise populations
iv	Planning a bigger idea
v	Tortoises populate the islands
vi	Carrying out a carefully prepared operation
vii	Looking for a home for the islands' tortoises
viii	The start of the conservation project

Questions 8-13

Complete the notes below.

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

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

- Originally from mainland South America
- Numbers on Galapagos islands increased, due to lack of predators
- 17th century: small numbers taken onto ships used by **8**
- 1790s: very large numbers taken onto whaling ships, kept for **9** and also used to produce **10**
- Hunted by **11** on islands
- Habitat destruction: for the establishment of agriculture and by various **12** not native to the islands, which also fed on baby tortoises and tortoises' **13**

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 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 3--Music and the emotions

Why does music make us feel? On the one hand, music is a purely abstract art form, devoid of language or explicit ideas. And yet, even though music says little, it still manages to touch us deeply. When listening to our favourite songs, our body betrays all the symptoms of emotional arousal. The pupils in our eyes dilate, our pulse and blood pressure rise, the electrical conductance of our skin is lowered, and the cerebellum, a brain region associated with bodily movement, becomes strangely active. Blood is even re-directed to the muscles in our legs. In other words, sound stirs us at our biological roots.

A recent paper in Neuroscience by a research team in Montreal, Canada, marks an important step in repealing the precise underpinnings of 'the potent pleasurable stimulus' that is music. Although the study involves plenty of fancy technology, including functional magnetic resonance imaging (fMRI) and ligand-based positron emission tomography (PET) scanning, the experiment itself was rather straightforward. After screening 217 individuals who responded to advertisements requesting people who experience 'chills' to instrumental music, the scientists narrowed down the subject pool to ten. They then asked the subjects to bring in their playlist of favourite songs - virtually every genre was represented, from techno to tango - and played them the music while their brain activity was monitored. Because the scientists were combining methodologies (PET and fMRI), they were able to obtain an impressively exact and detailed portrait of music in the brain. The first thing they discovered is that music triggers the production of dopamine - a chemical with a key role in setting people's moods - by the neurons (nerve cells) in both the dorsal and ventral regions of the brain. As these two regions have long been linked with the experience of pleasure, this finding isn't particularly surprising.

What is rather more significant is the finding that the dopamine neurons in the caudate-a region of the brain involved in learning stimulus-response associations, and in anticipating food and other 'reward' stimuli - were at their most active around 15 seconds before the participants' favourite moments in the music. The researchers call this the 'anticipatory phase' and argue that the purpose of this activity is to help us predict the arrival of our favourite part. The question, of course, is what all these dopamine neurons are up to. Why are they so active in the period preceding the acoustic climax? After all, we typically associate surges of dopamine with pleasure, with the processing of actual rewards. And yet, this cluster of cells is most active when the 'chills' have yet to arrive, when the melodic pattern is still unresolved.

One way to answer the question is to look at the music and not the neurons. While music can often seem (at least to the outsider) like a labyrinth of intricate patterns, it turns out that the most important part of every song or symphony is when the patterns break down, when the sound becomes unpredictable. If the music is too obvious, it is annoyingly boring, like an

alarm clock. Numerous studies, after all, have demonstrated that dopamine neurons quickly adapt to predictable rewards. If we know what's going to happen next, then we don't get excited. This is why composers often introduce a key note in the beginning of a song, spend most of the rest of the piece in the studious avoidance of the pattern, and then finally repeat it only at the end. The longer we are denied the pattern we expect, the greater the emotional release when the pattern returns, safe and sound.

To demonstrate this psychological principle, the musicologist Leonard Meyer, in his classic book *Emotion and Meaning in Music* (1956), analysed the 5th movement of Beethoven's String Quartet in C-sharp minor, Op. 131. Meyer wanted to show how music is defined by its flirtation with - but not submission to - our expectations of order. Meyer dissected 50 measures (bars) of the masterpiece, showing how Beethoven begins with the clear statement of a rhythmic and harmonic pattern and then, in an ingenious tonal dance, carefully holds off repeating it. What Beethoven does instead is suggest variations of the pattern. He wants to preserve an element of uncertainty in his music, making our brains beg for the one chord he refuses to give us. Beethoven saves that chord for the end.

According to Meyer, it is the suspenseful tension of music, arising out of our unfulfilled expectations, that is the source of the music's feeling. While earlier theories of music focused on the way a sound can refer to the real world of images and experiences - its 'connotative' meaning - Meyer argued that the emotions we find in music come from the unfolding events of the music itself. This 'embodied meaning' arises from the patterns the symphony invokes and then ignores. It is this uncertainty that triggers the surge of dopamine in the , as we struggle to figure out what will happen next. We can predict some of the notes, but we can't predict them all, and that is what keeps us listening, waiting expectantly for our reward, for the pattern to be completed.

Questions 27-31

Complete the summary below.

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

Write your answers in boxes **27-31** on your answer sheet.

The Montreal Study

Participants, who were recruited for the study through advertisements, had their brain activity monitored while listening to their favourite music. It was noted that the music stimulated the brain's neurons to release a substance called **27**

in two of the parts of the brain which are associated with feeling **28**

Researchers also observed that the neurons in the area of the brain called the **29**

were particularly active just before the participants' favourite moments in the music - the period known as the **30** . Activity in this part of the brain is associated with the expectation of 'reward' stimuli such as **31**

Questions 32-36

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

*Write the correct letter in boxes **32-36** on your answer sheet*

32 What point does the writer emphasise in the first paragraph?

- A** how dramatically our reactions to music can vary
- B** how intense our physical responses to music can be
- C** how little we know about the way that music affects us
- D** how much music can tell us about how our brains operate

33 What view of the Montreal study does the writer express in the second paragraph?

- A** Its aims were innovative.
- B** The approach was too simplistic.
- C** It produced some remarkably precise data.
- D** The technology used was unnecessarily complex.

34 What does the writer find interesting about the results of the Montreal study?

- A** the timing of participants' neural responses to the music
- B** the impact of the music on participants' emotional state
- C** the section of participants' brains which was activated by the music
- D** the type of music which had the strongest effect on participants' brains

35 Why does the writer refer to Meyer's work on music and emotion?

- A** to propose an original theory about the subject
- B** to offer support for the findings of the Montreal study
- C** to recommend the need for further research into the subject

- D** to present a view which opposes that of the Montreal researchers

36 According to Leonard Meyer, what causes the listener's emotional response to music?

- A** the way that the music evokes poignant memories in the listener
- B** the association of certain musical chords with certain feelings
- C** the listener's sympathy with the composer's intentions
- D** the internal structure of the musical composition

Questions 37-40

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

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

37 The Montreal researchers discovered that

38 Many studies have demonstrated that

39 Meyer's analysis of Beethoven's music shows that

40 Earlier theories of music suggested that

A our response to music depends on our initial emotional state.
B neuron activity decreases if outcomes become predictable.
C emotive music can bring to mind actual pictures and events.
D experiences on our past can influence our emotional reaction to music.
E emotive music delays giving listeners what they expect to hear.
F neuron activity increases prior to key points in a musical piece.

ANSWER FOR READING PASSAGE TEST8

Reading passage –1 Flying tortoises

1. v	8. pirates
2. iii	9. food

3. viii	10. oil
4. i	11. settlers
5. iv	12. species
6. vi	13. eggs
7. ii	

READING PASSAGE –2 The Intersection of Health Sciences and Geography

1. D	8. antibiotics
2. C	9. mosquitos
3. F	10. factories
4. G	11. forests
5. D	12. polio
6. B	13. mountain
7. vaccinations	

READING PASSAGE –3 Music and the emotions

1. dopamine	8. A
2. pleasure	9. B
3. caudate	10. D
4. anticipatory phase	11. F
5. food	12. B
6. B	13. E

TEST 9

READING PASSAGE 1---The history of glass

From our earliest origins, man has been making use of glass. Historians have discovered that a type of natural glass - obsidian - formed in places such as the mouth of a volcano as a result of the intense heat of an eruption melting sand - was first used as tips for spears. Archaeologists have even found evidence of man-made glass which dates back to 4000 BC; this took the form of glazes used for coating stone beads. It was not until 1500 BC, however, that the first hollow glass container was made by covering a sand core with a layer of molten glass.

Glass blowing became the most common way to make glass containers from the first century BC. The glass made during this time was highly coloured due to the impurities of the raw material. In the first century AD, methods of creating colourless glass were developed, which was then tinted by the addition of colouring materials. The secret of glass making was taken across Europe by the Romans during this century. However, they guarded the skills and technology required to make glass very closely, and it was not until their empire collapsed in 476 AD that glass-making knowledge became widespread throughout Europe and the Middle East. From the 10th century onwards, the Venetians gained a reputation for technical skill and artistic ability in the making of glass bottles, and many of the city's craftsmen left Italy to set up glassworks throughout Europe.

A major milestone in the history of glass occurred with the invention of lead crystal glass by the English glass manufacturer George Ravenscroft (1632 - 1683). He attempted to counter the effect of clouding that sometimes occurred in blown glass by introducing lead to the raw materials used in the process. The new glass he created was softer and easier to decorate, and had a higher refractive index, adding to its brilliance and beauty, and it proved invaluable to the optical industry. It is thanks to Ravenscroft's invention that optical lenses, astronomical telescopes, microscopes and the like became possible.

In Britain, the modern glass industry only really started to develop after the repeal of the Excise Act in 1845. Before that time, heavy taxes had been placed on the amount of glass melted in a glasshouse, and were levied continuously from 1745 to 1845. Joseph Paxton's Crystal Palace at London's Great Exhibition of 1851 marked the beginning of glass as a material used in the building industry. This revolutionary new building encouraged the use of glass in public, domestic and horticultural architecture. Glass manufacturing techniques also improved with the advancement of science and the development of better technology.

From 1887 onwards, glass making developed from traditional mouth-blowing to a semi-automatic process, after factory-owner HM Ashley introduced a machine capable of producing 200 bottles per hour in Castleford, Yorkshire, England - more than three times quicker than any previous production method. Then in 1907, the first fully automated machine was developed in the USA by Michael Owens - founder of the Owens Bottle Machine Company (later the major manufacturers Owens- Illinois) - and installed in its factory. Owens' invention could produce an impressive 2,500 bottles per hour. Other developments followed rapidly, but it was not until the First World War when Britain became cut off from essential glass suppliers, that glass became part of the scientific sector. Previous to this, glass had been seen as a craft rather than a precise science.

Today, glass making is big business. It has become a modern, hi-tech industry operating in a fiercely competitive global market where quality, design and service levels are critical to maintaining market share. Modern glass plants are capable of making millions of glass containers a day in many different colours, with green, brown and clear remaining the most popular. Few of us can imagine modern life without glass. It features in almost every aspect of our lives - in our homes, our cars and whenever we sit down to eat or drink. Glass packaging is used for many products, many beverages are sold in glass, as are numerous foodstuffs, as well as medicines and cosmetics.

Glass is an ideal material for recycling, and with growing consumer concern for green issues, glass bottles and jars are becoming ever more popular. Glass recycling is good news for the environment. It saves used glass containers being sent to landfill. As less energy is needed to melt recycled glass than to melt down raw materials, this also saves fuel and production costs. Recycling also reduces the need for raw materials to be quarried, thus saving precious resources.

Questions 1-8

Complete the notes below.

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

Write your answers in boxes **1-8** on your answer sheet

- Early humans used a material called **1** to make the sharp points of their **2**
- 4000 BC: **3** made of stone were covered in a coating of man-made glass.
- First century BC: glass was coloured because of the **4** in the material.
- Until 476 AD: Only the **5** knew how to make glass.
- From 10th century: Venetians became famous for making bottles out of glass.
- 17th century: George Ravenscroft developed a process using **6** to avoid the occurrence of **7** in blown glass.

- Mid-19th century: British glass production developed after changes to laws concerning **8**

Questions 9-13

In boxes 9-13 on your answer sheet, write

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

9 In 1887, HM Ashley had the fastest bottle-producing machine that existed at the time.

10 Michael Owens was hired by a large US company to design a fully-automated bottle manufacturing machine for them.

11 Nowadays, most glass is produced by large international manufacturers.

12 Concern for the environment is leading to an increased demand for glass containers.

13 It is more expensive to produce recycled glass than to manufacture new glass.

READING PASSAGE 2--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 tassel led 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 Mountains, the Alps, the in eastern France and the 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.

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.

Questions 23-26

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

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.

READING PASSAGE 3--UK companies need more effective boards of directors

A After a number of serious failures of governance (that is, how they are managed at the highest level), companies in Britain, as well as elsewhere, should consider radical changes to their directors' roles. It is clear that the role of a board director today is not an easy one. Following the 2008 financial meltdown, which resulted in a deeper and more prolonged period of economic downturn than anyone expected, the search for explanations in the many post- of the crisis has meant blame has been spread far and wide. Governments, regulators, central banks and auditors have all been in the frame. The role of bank directors and management and their widely publicised failures have been extensively picked over and examined in reports, inquiries and commentaries.

B The knock-on effect of this scrutiny has been to make the governance of companies in general an issue of intense public debate and has significantly increased the pressures on, and the responsibilities of, directors. At the simplest and most practical level, the time involved in fulfilling the demands of a board directorship has increased significantly, calling into question the effectiveness of the classic model of corporate governance by part-time, independent non-executive directors. Where once a board schedule may have consisted of between eight and ten meetings a year, in many companies the number of events requiring board input and decisions has dramatically risen. Furthermore, the amount of reading and preparation required for each meeting is increasing. Agendas can become overloaded and this can mean the time for constructive debate must necessarily be restricted in favour of getting through the business.

C Often, board business is devolved to committees in order to cope with the workload, which may be more efficient but can mean that the board as a whole is less involved in fully addressing some of the most important issues. It is not uncommon for the audit committee meeting to last longer than the main board meeting itself. Process may take the place of discussion and be at the expense of real collaboration, so that boxes are ticked rather than issues tackled.

D A radical solution, which may work for some very large companies whose businesses are extensive and complex, is the professional board, whose members would work up to three or four days a week, supported by their own

dedicated staff and advisers. There are obvious risks to this and it would be important to establish clear guidelines for such a board to ensure that it did not step on the toes of management by becoming too engaged in the day-to-day running of the company. Problems of recruitment, remuneration and independence could also arise and this structure would not be appropriate for all companies. However, more professional and better-informed boards would have been particularly appropriate for banks where the executives had access to information that part-time non-executive directors lacked, leaving the latter unable to comprehend or anticipate the 2008 crash.

E One of the main criticisms of boards and their directors is that they do not focus sufficiently on longer-term matters of strategy, sustainability and governance, but instead concentrate too much on short-term financial metrics. Regulatory requirements and the structure of the market encourage this behaviour. The tyranny of quarterly reporting can distort board decision-making, as directors have to 'make the numbers' every four months to meet the insatiable appetite of the market for more data. This serves to encourage the trading methodology of a certain kind of investor who moves in and out of a stock without engaging in constructive dialogue with the company about strategy or performance, and is simply seeking a short-term financial gain. This effect has been made worse by the changing profile of investors due to the globalisation of capital and the increasing use of automated trading systems. Corporate culture adapts and management teams are largely incentivised to meet financial goals.

F Compensation for chief executives has become a combat zone where pitched battles between investors, management and board members are fought, often behind closed doors but increasingly frequently in the full glare of press attention. Many would argue that this is in the interest of transparency and good governance as shareholders use their muscle in the area of pay to pressure boards to remove underperforming chief executives. Their powers to vote down executive remuneration policies increased when binding votes came into force. The chair of the remuneration committee can be an exposed and lonely role, as Alison Carnwath, chair of Barclays Bank's remuneration committee, found when she had to resign, having been roundly criticised for trying to defend the enormous bonus to be paid to the chief executive; the irony being that she was widely understood to have spoken out against it in the privacy of the committee.

G The financial crisis stimulated a debate about the role and purpose of the company and a heightened awareness of corporate ethics. Trust in the corporation has been eroded and academics such as Michael Sandel, in his thoughtful and bestselling book *What Money Can't Buy*, are questioning the morality of capitalism and the market economy. Boards of companies in all sectors will need to widen their perspective to encompass these issues and this may involve a realignment of corporate goals. We live in challenging times.

Questions 27-33

Reading Passage 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 27-33 on your answer sheet.

27 ▼

28 ▼

29 ▼

30 ▼

31 ▼

32 ▼

33 ▼

List of Headings	
i	Disputes over financial arrangements regarding senior managers
ii	The impact on companies of being subjected to close examination
iii	The possible need for fundamental change in every area of business
iv	Many external bodies being held responsible for problems
v	The falling number of board members with broad enough experience
vi	A risk that not all directors take part in solving major problems
vii	Boards not looking far enough ahead
viii	A proposal to change the way the board operates

Question 34-37

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

In boxes 34-37 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

34 Close scrutiny of the behaviour of boards has increased since the economic downturn.

- 35 Banks have been mismanaged to a greater extent than other businesses.
- 36 Board meetings normally continue for as long as necessary to debate matters in full.
- 37 Using a committee structure would ensure that board members are fully informed about significant issues.

Questions 38-40

Complete the sentences below.

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

Write your answers in boxes 38-40 on your answer sheet.

38 Before 2008, non-executive directors were at a disadvantage because of their lack of .

39 Boards tend to place too much emphasis on considerations that are only of short-term relevance.

40 On certain matters, such as pay, the board may have to accept the views of .

ANSWER FOR READING PASSAGE TEST 9

Reading passage –1 The History of Glass

1. obsidian	8. taxes
2. spears	9. TRUE
3. beads	10. FALSE
4. impurities	11. NOT GIVEN
5. Romans	12. TRUE
6. lead	13. FALSE
7. clouding	

Reading passage –2Bring back the big cats

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

Reading passage –3-UK companies need more effective boards of directors

1. iv	8. YES
2. ii	9. NOT GIVEN
3. vi	10. NO
4. viii	11. NO
5. vii	12. information
6. i	13. financial
7. iii	14. shareholders/investors

TEST 10

READING PASSAGE 1--Australia's sporting success

A They play hard, they play often, and they play to win. Australian sports teams win more than their fair share of titles, demolishing rivals with seeming ease. How do they do it? A big part of the secret is an extensive and expensive network of sporting academies underpinned by science and medicine. At the Australian Institute of Sport (AIS), hundreds of youngsters and pros live and train under the eyes of coaches. Another body, the Australian Sports Commission (ASC), finances programmes of excellence in a total of 96 sports for thousands of sportsmen and women. Both provide intensive coaching, training facilities and nutritional advice.

B Inside the academies, science takes centre stage. The AIS employs more than 100 sports scientists and doctors, and collaborates with scores of others in universities and research centres. AIS scientists work across a number of sports, applying skills learned in one - such as building muscle strength in golfers - to others, such as swimming and squash. They are backed up by technicians who design instruments to collect data from athletes. They all focus on one aim: winning. 'We can't waste our time looking at ethereal scientific questions that don't help the coach work with an athlete and improve performance,' says Peter Pricker chief of science at AIS.

C A lot of their work comes down to measurement - everything from the exact angle of a swimmer's dive to the second-by-second power output of a cyclist. This data is used to wring improvements out of athletes. The focus is on individuals, tweaking performances to squeeze an extra hundredth of a second here, an extra millimetre there. No gain is too slight to bother with. It's the tiny, gradual improvements that add up to world-beating results. To demonstrate how the system works, Bruce Mason at AIS shows off the prototype of a 3D analysis tool for studying swimmers. A wire-frame model of a champion swimmer slices through the water, her arms moving in slow motion. Looking side-on, Mason measures the distance between strokes. From above, he analyses how her spine swivels. When fully developed, this system will enable him to build a biomechanical profile for coaches to use to help budding swimmers. Mason's contribution to sport also includes the development of the SWAN (SWimmingANalysis) system now used in Australian national competitions. It collects images from digital cameras running at 50 frames a second and breaks down each part of a swimmer's performance into factors that can be analysed individually - stroke length, stroke frequency, average duration of each stroke, velocity, start, lap and finish times, and so on. At the end of each race, SWAN spits out data on each swimmer.

D Take a look,' says Mason, pulling out a sheet of data. He points out the data on the swimmers in second and third place, which shows that the one who finished third actually swam faster. So why did he finish 35 hundredths of a second down? 'His turn times were 44 hundredths of a second behind the other guy,' says Mason. 'If he can improve on his turns, he can do much better.' This is the kind of accuracy that AIS scientists' research is bringing to a range of sports. With the Cooperative Research Centre for Micro Technology in Melbourne, they are developing unobtrusive sensors that will be embedded in an athlete's clothes or running shoes to monitor heart rate,

sweating, heat production or any other factor that might have an impact on an athlete's ability to run. There's more to it than simply measuring performance. Pricker gives the example of athletes who may be down with coughs and colds 11 or 12 times a year. After years of experimentation, AIS and the University of Newcastle in New South Wales developed a test that measures how much of the immune-system protein immunoglobulin A is present in athletes' saliva. If IgA levels suddenly fall below a certain level, training is eased or dropped altogether. Soon, IgA levels start rising again, and the danger passes. Since the tests were introduced, AIS athletes in all sports have been remarkably successful at staying healthy.

E Using data is a complex business. Well before a championship, sports scientists and coaches start to prepare the athlete by developing a 'competition model', based on what they expect will be the winning times. 'You design the model to make that time,' says Mason. 'A start of this much, each free-swimming period has to be this fast, with a certain stroke frequency and stroke length, with turns done in these times.' All the training is then geared towards making the athlete hit those targets, both overall and for each segment of the race. Techniques like these have transformed Australia into arguably the world's most successful sporting nation.

F Of course, there's nothing to stop other countries copying - and many have tried. Some years ago, the AIS unveiled coolant-lined jackets for endurance athletes. At the Atlanta Olympic Games in 1996, these sliced as much as two per cent off cyclists' and rowers' times. Now everyone uses them. The same has happened to the 'altitude tent', developed by AIS to replicate the effect of altitude training at sea level. But Australia's success story is about more than easily copied technological fixes, and up to now no nation has replicated its all-encompassing system.

Questions 1-7

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

Which paragraph contains the following information?

Write the correct letter, **A-F**, in boxes **1-7** on your answer sheet.

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

1 a reference to the exchange of expertise between different sports

2 an explanation of how visual imaging is employed in investigations

3 a reason for narrowing the scope of research activity

4 how some AIS ideas have been reproduced

5 how obstacles to optimum achievement can be investigated

6 an overview of the funded support of athletes

7 how performance requirements are calculated before an event

Questions 8-11

Classify the following techniques according to whether the writer states they

- A** are currently exclusively used by Australians
- B** will be used in the future by Australians
- C** are currently used by both Australians and their rivals

Write the correct letter, **A**, **B** or **C**. in boxes **8-11** on your answer sheet.

- 8 cameras
- 9 sensors
- 10 protein tests
- 11 altitude tents

Questions 12-13

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 **12-13** on your answer sheet.

- 12 What is produced to help an athlete plan their performance in an event?
- 13 By how much did some cyclists' performance improve at the 1996 Olympic Games?

READING PASSAGE 2--Delivering The Goods

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

AInternational 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.

Questions 14-17

Reading Passage 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?

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.

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

READING PASSAGE 3 Climate Change and the Inuit

The threat posed by climate change in the Arctic and the problems faced by Canada's Inuit people

AUnusual incidents are being reported across the Arctic. Inuit families going off on snowmobiles to prepare their summer hunting camps have found themselves cut off from home by a sea of mud, following early thaws. There are reports of igloos losing their insulating properties as the snow drips and refreezes, of lakes draining into the sea as permafrost melts, and sea ice breaking up earlier than usual, carrying seals beyond the reach of hunters. Climate change may still be a rather abstract idea to most of us, but in the Arctic it is already having dramatic effects - if summertime ice continues to shrink at its present rate, the Arctic Ocean could soon become virtually ice-free in summer. The knock-on effects are likely to include more warming, cloudier skies, increased precipitation and higher sea levels. Scientists are increasingly keen to find out what's going on because they consider the Arctic the 'canary in the mine' for global warming - a warning of what's in store for the rest of the world.

B For the Inuit the problem is urgent. They live in precarious balance with one of the toughest environments on earth. Climate change, whatever its causes, is a direct threat to their way of life. Nobody knows the Arctic as well as the locals, which is why they are not content simply to stand back and let outside experts tell them what's happening. In Canada, where the Inuit people are jealously guarding their hard-won autonomy in the country's newest territory, Nunavut, they believe their best hope of survival in this changing environment lies in combining their ancestral knowledge with the best of modern science. This is a challenge in itself.

C The Canadian Arctic is a vast, treeless polar desert that's covered with snow for most of the year. Venture into this terrain and you get some idea of the hardships facing anyone who calls this home. Farming is out of the question and nature offers meagre pickings. Humans first settled in the Arctic a mere 4,500 years ago, surviving by exploiting sea mammals and fish. The environment tested them to the limits: sometimes the colonists were successful, sometimes they failed and vanished. But around a thousand years ago, one group emerged that was uniquely well adapted to cope with the Arctic environment. These Thule people moved in from Alaska, bringing kayaks, sleds, dogs, pottery and iron tools. They are the ancestors of today's Inuit people.

D Life for the descendants of the Thule people is still harsh. Nunavut is 1.9 million square kilometres of rock and ice, and a handful of islands around the North Pole. It's currently home to 2,500 people, all but a handful of them indigenous Inuit. Over the past 40 years, most have abandoned their nomadic ways and settled in the territory's 28 isolated communities, but they still rely heavily on nature to provide food and clothing. Provisions available in local shops have to be flown into Nunavut on one of the most costly air networks in the world, or brought by supply ship during the few ice-free weeks of summer. It would cost a family around £7,000 a year to replace meat they obtained themselves through hunting with imported meat. Economic opportunities are scarce, and for many people state benefits are their only income.

E While the Inuit may not actually starve if hunting and trapping are curtailed by climate change, there has certainly been an impact on people's health. Obesity, heart disease and diabetes are beginning to appear in a people for whom these have never before been problems. There has been a crisis of identity as the traditional skills of hunting, trapping and preparing skins have begun to disappear. In Nunavut's 'igloo and email' society, where adults who were born in igloos have children who may never have been out on the land, there's a high incidence of depression.

F With so much at stake, the Inuit are determined to play a key role in teasing out the mysteries of climate change in the Arctic. Having survived there for centuries, they believe their wealth of traditional knowledge is vital to the task. And Western scientists are starting to draw on this wisdom, increasingly referred to as 'Inuit Qaujimajatuqangit', or IQ. 'In the early days scientists ignored us when they came up here to study anything. They just figured these people don't know very much so we won't ask them,' says John Amagoalik, an Inuit leader and politician. 'But in recent years IQ has had much more credibility and weight.' In fact it is now a requirement for anyone hoping to get permission to do research that they consult the communities, who are helping

to set the research agenda to reflect their most important concerns. They can turn down applications from scientists they believe will work against their interests, or research projects that will impinge too much on their daily lives and traditional activities.

G Some scientists doubt the value of traditional knowledge because the occupation of the Arctic doesn't go back far enough. Others, however, point out that the first weather stations in the far north date back just 50 years. There are still huge gaps in our environmental knowledge, and despite the scientific onslaught, many predictions are no more than best guesses. IQ could help to bridge the gap and resolve the tremendous uncertainty about how much of what we're seeing is natural capriciousness and how much is the consequence of human activity.

Questions 27-32

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

Choose the correct heading for paragraphs **B-G** from the list of headings below.

Write the correct number, **i-ix**, in boxes **27-32** on your answer sheet.

List of Headings

- i** The reaction of the limit community to climate change
- ii** Understanding of climate change remains limited
- iii** Alternative sources of essential supplies
- iv** Respect for limit opinion grows
- v** A healthier choice of food
- vi** A difficult landscape
- vii** Negative effects on well-being
- viii** Alarm caused by unprecedented events in the Arctic
- ix** The benefits of an easier existence

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

Questions 33-40

Complete the summary of **paragraphs C and D** below.

Choose **NO MORE THAN TWO WORDS** from **paragraphs C and D** for each answer.

Write your answers in boxes **33-40** on your answer sheet.

If you visit the Canadian Arctic, you immediately appreciate the problems faced by people for whom this is home.

It would clearly be impossible for the people to engage in **33** as a means of supporting themselves.

For thousands of years they have had to rely on catching **34** and **35** Locate as a means of sustenance.

The harsh surroundings saw many who tried to settle there pushed to their limits, although some were successful.

The **36** people were an example of the latter and for them the environment did not prove unmanageable. For the present inhabitants, life continues to be a struggle.

The territory of Nunavut consists of little more than ice, rock and a few **37**

In recent years, many of them have been obliged to give up their **38** lifestyle, but they continue to depend mainly on **39** for their food and clothes. **40** produce is particularly expensive.

ANSWER FOR READING PASSAGE 10

Reading passage -1 Australia's sporting success

1. B	8. A
2. C	9. B
3. B	10. A
4. F	11. C
5. D	12. (a) competition model

6. A

13. (by) 2

Reading passage –2 Delivering The Goods

14. I	21. TRUE
15. F	22. NOT GIVEN
16. E	23. G
17. D	24. B
18. TRUE	25. C
19. FALSE	26. A
20. NOT GIVEN	

Reading passage –3 Climate Change and the Inuit

27. i	34. sea mammals, fish IN EITHER ORDER
28. vi	35. sea mammals, fish IN EITHER ORDER
29. iii	36. Thule
30. vii	37. islands
31. iv	38. nomadic
32. ii	39. nature
33. farming	40. imported

Test 11

READING PASSAGE 1--Advantages of public transport

A new study conducted for the World Bank by Murdoch University's Institute for Science and Technology Policy (ISTP) has demonstrated that public transport is more efficient than cars. The study compared the proportion of wealth poured into transport by thirty-seven cities around the world. This included both the public and private costs of building, maintaining and using a transport system.

The study found that the Western Australian city of Perth is a good example of a city with minimal public transport. As a result, 17% of its wealth went into transport costs. Some European and Asian cities, on the other hand, spent as little as 5%. Professor Peter Newman, ISTP Director, pointed out that these more efficient cities were able to put the difference into attracting industry and jobs or creating a better place to live.

According to Professor Newman, the larger Australian city of Melbourne is a rather unusual city in this sort of comparison. He describes it as two cities: 'A European city surrounded by a car-dependent one'. Melbourne's large tram network has made car use in the inner city much lower, but the outer suburbs have the same car-based structure as most other Australian cities. The explosion in demand for accommodation in the inner suburbs of Melbourne suggests a recent change in many people's preferences as to where they live.

Newman says this is a new, broader way of considering public transport issues. In the past, the case for public transport has been made on the basis of environmental and social justice considerations rather than economics. Newman, however, believes the study demonstrates that 'the auto-dependent city model is inefficient and grossly inadequate in economic as well as environmental terms'.

Bicycle use was not included in the study but Newman noted that the two most 'bicycle friendly' cities considered - Amsterdam and Copenhagen - were very efficient, even though their public transport systems were 'reasonable but not special'.

It is common for supporters of road networks to reject the models of cities with good public transport by arguing that such systems would not work in their particular city. One objection is climate. Some people say their city could not make more use of public transport because it is either too hot or too cold. Newman rejects this, pointing out that public transport has been successful in both Toronto and Singapore and, in fact, he has checked the use of cars against climate and found 'zero correlation'.

When it comes to other physical features, road lobbies are on stronger ground. For example, Newman accepts it would be hard for a city as hilly as Auckland to develop a really good rail network. However, he points out that both Hong Kong and Zurich have managed to make a success of their rail systems, heavy and light respectively, though there are few cities in the world as hilly.

A In fact, Newman believes the main reason for adopting one sort of transport over another is politics: 'The more democratic the process, the more public transport is favored.' He considers Portland, Oregon, a perfect example of this. Some years ago, federal money was granted to build a new road. However, local pressure groups forced a referendum over whether to spend the money on light rail instead. The rail proposal won and the railway worked spectacularly well. In the years that have followed, more and more rail systems have been put in, dramatically changing the nature of the city. Newman notes that Portland has about the same population as Perth and had a similar population density at the time.

B In the UK, travel times to work had been stable for at least six centuries, with people avoiding situations that required them to spend more than half an hour travelling to work. Trains and cars initially allowed people to live at greater distances without taking longer to reach their destination. However, public infrastructure did not keep pace with urban sprawl, causing massive congestion problems which now make commuting times far higher.

C There is a widespread belief that increasing wealth encourages people to live farther out where cars are the only viable transport. The example of European cities refutes that. They are often wealthier than their American counterparts but have not generated the same level of car use. In Stockholm, car use has actually fallen in recent years as the city has become larger and wealthier. A new study makes this point even more starkly. Developing cities in Asia, such as Jakarta and Bangkok, make more use of the car than wealthy Asian cities such as Tokyo and Singapore. In cities that developed later, the World Bank and Asian Development Bank discouraged the building of public transport and people have been forced to rely on cars -creating the massive traffic jams that characterize those cities.

D Newman believes one of the best studies on how cities built for cars might be converted to rail use is The Urban Village report, which used Melbourne as an example. It found that pushing everyone into the city centre was not the best approach. Instead, the proposal advocated the creation of urban villages at hundreds of sites, mostly around railway stations.

E It was once assumed that improvements in telecommunications would lead to more dispersal in the population as people were no longer forced into cities. However, the ISTP team's research demonstrates that the population and job density of cities rose or remained constant in the 1980s after decades of decline. The explanation for this seems to be that it is valuable to place people working in related fields together. 'The new world will largely depend on human creativity, and creativity flourishes where people come together face-to-face.'

Questions 1-5

Reading Passage has five marked paragraphs, A-E.

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

Write the correct number, i-viii, in boxes 1-5 on your answer sheet.

List of Headings

- i** Avoiding an overcrowded centre

- ii** A successful exercise in people power
- iii** The benefits of working together in cities
- iv** Higher incomes need not mean more cars
- v** Economic arguments fail to persuade
- vi** The impact of telecommunications on population distribution
- vii** Increases in travelling time
- viii** Responding to arguments against public transport

- 1** Paragraph A
- 2** Paragraph B
- 3** Paragraph C
- 4** Paragraph D
- 5** Paragraph E

Questions 6-10

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

*In boxes **6-10** on your answer sheet, write*

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

6 The ISTP study examined public and private systems in every city of the world.

7 Efficient cities can improve the quality of life for their inhabitants.

8 An inner-city tram network is dangerous for car drivers.

9 In Melbourne, people prefer to live in the outer suburbs.

10 Cities with high levels of bicycle usage can be efficient even when public transport is only averagely good.

Questions 11-13

*Look at the following cities (Questions **11-13**) and the list of descriptions below.*

*Match each city with the correct description, **A-F**.*

*Write the correct letter, **A-F**, in boxes **11-13** on your answer sheet.*

List of Descriptions

- A** successfully uses a light rail transport system in hilly environment
- B** successful public transport system despite cold winters
- C** profitably moved from road to light rail transport system
- D** hilly and inappropriate for rail transport system
- E** heavily dependent on cars despite widespread poverty
- F** inefficient due to a limited public transport system

11 Perth

12 Auckland

13 Portland

READING PASSAGE 2--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 felt 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 are 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.

- | |
|--|
| 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.

23 Home medical aids

24 Regular amounts of exercise

25 Feelings of control over life

26 Feelings of loneliness

READING PASSAGE 3--Numeration

One of the first great intellectual feats of a young child is learning how to talk, closely followed by learning how to count. From earliest childhood we are so bound up with our system of numeration that it is a feat of imagination to consider the problems faced by early humans who had not yet developed this facility. Careful consideration of our system of numeration leads to the conviction that, rather than being a facility that comes naturally to a person, it is one of the great and remarkable achievements of the human race.

It is impossible to learn the sequence of events that led to our developing the concept of number. Even the earliest of tribes had a system of numeration that, if not advanced, was sufficient for the tasks that they had to perform. Our ancestors had little use for actual numbers; instead their considerations would have been more of the kind Is this enough? rather than How many? when they were engaged in food gathering, for example. However, when early humans first began to reflect on the nature of things around them, they discovered that they needed an idea of number simply to keep their thoughts in order. As they began to settle, grow plants and herd animals, the need for a sophisticated number system became paramount. It will never be known how and when this numeration ability developed, but it is certain that numeration was well developed by the time humans had formed even semipermanent settlements.

Evidence of early stages of arithmetic and numeration can be readily found. The indigenous peoples of Tasmania were only able to count one, two, many; those of South Africa counted one, two, two and one, two twos, two twos and one, and so on. But in real situations the number and words are often accompanied by gestures to help resolve any confusion. For example, when using the one, two, many type of system, the word many would mean, Look at my hands and see how many fingers I am showing you. This basic approach is limited in the range of numbers that it can express, but this range will generally suffice when dealing with the simpler aspects of human existence.

The lack of ability of some cultures to deal with large numbers is not really surprising. European languages, when traced back to their earlier version, are very poor in number words and expressions. The ancient Gothic word for ten, tachund, is used to express the number 100 as tachundtachund. By the seventh century, the word teon had become interchangeable with the tachund or hund of the Anglo-Saxon language, and so 100 was denoted as hundleonlig, or ten times ten. The average person in the seventh century in Europe was not

as familiar with numbers as we are today. In fact, to qualify as a witness in a court of law a man had to be able to count to nine!

Perhaps the most fundamental step in developing a sense of number is not the ability to count, but rather to see that a number is really an abstract idea instead of a simple attachment to a group of particular objects. It must have been within the grasp of the earliest humans to conceive that four birds are distinct from two birds; however, it is not an elementary step to associate the number 4, as connected with four birds, to the number 4, as connected with four rocks. Associating a number as one of the qualities of a specific object is a great hindrance to the development of a true number sense. When the number 4 can be registered in the mind as a specific word, independent of the object being referenced, the individual is ready to take the first step toward the development of a notational system for numbers and, from there, to arithmetic.

Traces of the very first stages in the development of numeration can be seen in several living languages today. The numeration system of the Tsimshian language in British Columbia contains seven distinct sets of words for numbers according to the class of the item being counted: for counting flat objects and animals, for round objects and time, for people, for long objects and trees, for canoes, for measures, and for counting when no particular object is being numerated. It seems that the last is a later development while the first six groups show the relics of an older system. This diversity of number names can also be found in some widely used languages such as Japanese.

Intermixed with the development of a number sense is the development of an ability to count. Counting is not directly related to the formation of a number concept because it is possible to count by matching the items being counted against a group of pebbles, grains of corn, or the counter's fingers. These aids would have been indispensable to very early people who would have found the process impossible without some form of mechanical aid. Such aids, while different, are still used even by the most educated in today's society due to their convenience.

All counting ultimately involves reference to something other than the things being counted. At first it may have been grains or pebbles but now it is a memorised sequence of words that happen to be the names of the numbers.

Questions 27-31

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

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

A was necessary in order to fulfil a civic role.

B was necessary when people began farming.

C was necessary for the development of arithmetic.

D persists in all societies.

E was used when the range of number words was restricted.

F can be traced back to early European languages.

G was a characteristic of early numeration systems.

- 27** A developed system of numbering
- 28** An additional hand signal
- 29** In seventh-century Europe, the ability to count to a certain number
- 30** Thinking about numbers as concepts separate from physical objects
- 31** Expressing number differently according to class of item

Questions 32-40

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

In boxes 32-40 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

- 32** For the earliest tribes, the concept of sufficiency was more important than the concept of quantity.
- 33** Indigenous Tasmanians used only four terms to indicate numbers of objects.
- 34** Some peoples with simple number systems use body language to prevent misunderstanding of expressions of number.
- 35** All cultures have been able to express large numbers clearly.
- 36** The word 'thousand' has Anglo-Saxon origins.
- 37** In general, people in seventh-century Europe had poor counting ability.
- 38** In the Tsimshian language, the number for long objects and canoes is expressed with the same word.
- 39** The Tsimshian language contains both older and newer systems of counting.

40 Early peoples found it easier to count by using their fingers rather than a group of pebbles.

ANSWER FOR READING PASSAGE 11

Reading passage – 1Advantages of public transport

1. ii	8. NOT GIVEN
2. vii	9. FALSE
3. iv	10. TRUE
4. i	11. F
5. iii	12. D
6. FALSE	13. C
7. TRUE	

Reading passage – 2 Greying population stays in the pink

1. B	8. G
2. I	9. A
3. F	10. G
4. M	11. E
5. J	12. H
6. N	13. C
7. K	

Reading passage – 3 Numeration

1. B	8. TRUE
2. E	9. FALSE
3. A	10. NOT GIVEN
4. C	11. TRUE
5. G	12. FALSE
6. TRUE	13. TRUE
7. FALSE	14. NOT GIVEN

Test 12**READING PASSAGE 1--The Lumière Brothers and Cinematographer**

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

A The Lumière Brothers opened their Cinematographer, at 14 Boulevard des Capucines in Paris, to 100 paying customers over 100 years ago, on December 8, 1895. Before the eyes of the stunned, thrilled audience, photographs came to life and moved across a flat screen.

B So ordinary and routine has this become to us that it takes a determined leap of imagination to grasp the impact of those first moving images. But it is worth trying, for to understand the initial shock of those images is to understand the extraordinary power and magic of cinema, the unique, hypnotic quality that has made films the most dynamic, effective art form of the 20th century.

C One of the Lumière Brothers' earliest films was a 30-second piece which showed a section of a railway platform flooded with sunshine. A train appears and heads straight for the camera. And that is all that happens. Yet the Russian director Andrei Tarkovsky, one of the greatest of all film artists, described the film as a 'work of genius'. 'As the train approached,' wrote Tarkovsky, 'panic started in the theatre: people jumped and ran away. That

was the moment when cinema was born. The frightened audience could not accept that they were watching a mere picture. Pictures were still, only reality moved; this must, therefore, be reality. In their confusion, they feared that a real train was about to crush them.'

D Early cinema audiences often experienced the same confusion. In time, the idea of films became familiar, the magic was accepted- but it never stopped being magic. Film has never lost its unique power to embrace its audience and transport them to a different world. For Tarkovsky, the key to that magic dynamic image of the real flow of events. A still picture could only imply the existence of time, while time in a novel passed at the whim of the reader. But in cinema, the real, objective flow of time was captured.

E One effect of this realism was to educate the world about itself. For cinema makes the world smaller. Long before people travelled to America or anywhere else, they knew what other places looked like; they knew how other people worked and lived. Overwhelmingly, the lives recorded at least in film fiction- have been American. From the earliest days of the industry, Hollywood has dominated the world film market. American imagery-the cars, the cities, the cowboys became the primary imagery of film. Film carried American life and values around the globe.

F And, thanks to film, future generations will know the 20-th century more intimately than any other period. We can only imagine what life was like in the 14th century or in classical Rome. But the life of the modern world has been recorded on film in massive encyclopaedic detail. We shall be known better than any preceding generations.

G The 'star' was another natural consequence of cinema. The cinema star was effectively born in 1910. Film personalities have such an immediate presence that inevitably, they become super-real. Because we watch them so closely and because everybody in the world seems to know who they are, they appear more real to us than we do ourselves. The star as magnified human self is one of cinema's most strange and enduring legacies.

H Cinema has also given a new lease of life to the idea of the story. When the Lumiere Brothers and other pioneers began showing off this new invention, it was by no means obvious how it would be used. All that mattered at first was the wonder of movement. Indeed, some said that, once this novelty had worn

off, cinema would fade away. It was no more than a passing gimmick, a fairground attraction.

I Cinema might, for example, have become primarily a documentary form. Or it might have developed like television -as a strange noisy transfer of music, information and narrative. But what happened was that it became, overwhelmingly, a medium for telling stories. Originally these were conceived as short stories- early producers doubted the ability of audiences to concentrate for more than the length of a reel. Then, in 1912, an Italian 2-hour film was hugely successful, and Hollywood settled upon the novel-length narrative that remains the dominant cinematic convention of today.

J And it has all happened so quickly. Almost unbelievably, it is a mere 100 years since that train arrived and the audience screamed and fled, convinced by the dangerous reality of what they saw, and, perhaps, suddenly aware that the world could never be the same again -that, maybe, it could be better, brighter, more astonishing, more real than reality.

Questions 1-5

Reading Passage 148 has ten paragraphs, **A-J**.

Which paragraph contains the following information?

Write the correct letter, **A-J**. in boxes **1-5** on your answer sheet.

- 1.** the location of [he first cinema
- 2.** how cinema came to focus on stories
- 3.** the speed with which cinema has changed
- 4.** how cinema teaches us about other cultures
- 5.** the attraction of actors in films

Questions 6-9

Do the following statements agree with the views of the writer in Reading Passage 148?

In boxes **6-9** 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

- 6.** It is important to understand how the first audiences reacted to the cinema.
- 7.** The Lumiere Brothers' film about the train was one of the greatest films ever made.

- 8.** Cinema presents a biased view of other countries.
- 9.** Storylines were important in very early cinema.

Questions 10-13

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

Write the correct letter in boxes 10-13 on your answer sheet.

- 10.** The writer refers to the film of the train in order to demonstrate
 - A. the simplicity of early films.
 - B. the impact of early films.
 - C. how short early films were.
 - D. how imaginative early films were.
- 11.** In Tarkovsky's opinion, the attraction of the cinema is that it
 - A. aims to impress its audience.
 - B. tells stories better through books.
 - C. illustrates the passing of time.
 - D. describes familiar events.
- 12.** When cinema first began, people thought that
 - A. it would always tell stories.
 - B. it should be used in fairgrounds.
 - C. US audiences were unappreciative.
 - D. its future was uncertain.
- 13.** What is the best title for this passage?
 - A. The rise of the cinema star
 - B. Cinema and novels compared
 - C. The domination of Hollywood
 - D. The power of the big screen

READING PASSAGE 2--Motivating Employees under Adverse Conditions 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 feelings of optimism. Management is able to 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 the highest skills and experience. The minor employees remain because their job options are limited.

Morale also suffers 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 of goal acceptance and the organisation's culture. If resistance to goals is expected, the use of participation in goal-setting should increase acceptance. If participation is inconsistent with 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 for 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 to 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 are 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 and 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 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 to 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	<u>viii</u>

- 14** Key Point Two
- 15** Key Point Three
- 16** Key Point Four
- 17** Key Point Five
- 18** Key Point Six

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 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

19 A shrinking organisation tends to lose its less skilled employees rather than its more skilled employees.

20 It is easier to manage a small business than a large business.

21 High achievers are well suited to team work.

22 Some employees can feel 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 following groups of workers (Questions **25-27**) 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.

List of Descriptions

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

- 25** high achievers
- 26** clerical workers
- 27** production workers

READING PASSAGE 3--The search for the anti aging pill

In government laboratories and elsewhere, scientists are seeking a drug able to prolong life and youthful vigor. Studies of caloric restriction are showing the way

As researchers on aging noted recently, no treatment on the market today has been proved to slow human aging - the build-up of molecular and cellular damage that increases vulnerability to infirmity as we grow older. But one intervention, consumption of a low-calorie* yet nutritionally balanced diet, works incredibly well in a broad range of animals, increasing longevity and prolonging good health. Those findings suggest that caloric restriction could delay aging and increase longevity in humans, too.

Unfortunately, for maximum benefit, people would probably have to reduce their caloric intake by roughly thirty per cent, equivalent to dropping from 2,500 calories a day to 1,750. Few mortals could stick to that harsh a regimen, especially for years on end. But what if someone could create a pill that mimicked the physiological effects of eating less without actually forcing people to eat less? Could such a 'caloric-restriction mimetic', as we call it, enable people to stay healthy longer, postponing age-related disorders (such as diabetes, arteriosclerosis, heart disease and cancer) until very late in life? Scientists first posed this question in the mid-1990s, after researchers came upon a chemical agent that in rodents seemed to reproduce many of caloric restriction's benefits. No compound that would safely achieve the same feat in people has been found yet, but the search has been informative and has fanned hope that caloric-restriction (CR) mimetics can indeed be developed eventually.

The benefits of caloric restriction

The hunt for CR mimetics grew out of a desire to better understand caloric restriction's many effects on the body. Scientists first recognized the value of the practice more than 60 years ago, when they found that rats fed a low-calorie diet lived longer on average than free-feeding rats and also had a reduced incidence of conditions that become increasingly common in old age. What is more, some of the treated animals survived longer than the oldest-living animals in the control group, which means that the maximum lifespan (the oldest attainable age), not merely the normal lifespan, increased. Various interventions, such as infection-fighting drugs, can increase a population's average survival time, but only approaches that slow the body's rate of aging will increase the maximum lifespan.

The rat findings have been replicated many times and extended to creatures ranging from yeast to fruit flies, worms, fish, spiders, mice and hamsters. Until fairly recently, the studies were limited to short-lived creatures genetically distant from humans. But caloric-restriction projects underway in two species more closely related to humans - rhesus and squirrel monkeys - have made scientists optimistic that CR mimetics could help people.

The monkey projects demonstrate that, compared with control animals that eat normally, caloric-restricted monkeys have lower body temperatures and levels of the pancreatic hormone insulin, and they retain more youthful levels of certain hormones that tend to fall with age.

The caloric-restricted animals also look better on indicators of risk for age-related diseases. For example, they have lower blood pressure and triglyceride levels (signifying a decreased likelihood of heart disease), and they have more normal blood glucose levels (pointing to a reduced risk for diabetes, which is marked by unusually high blood glucose levels). Further, it has recently been shown that rhesus monkeys kept on caloric-restricted diets for an extended time (nearly 15 years) have less chronic disease. They and the other monkeys must be followed still longer, however, to know whether low-calorie intake can increase both average and maximum lifespans in monkeys. Unlike the multitude of elixirs being touted as the latest anti-aging cure, CR mimetics would alter fundamental processes that underlie aging. We aim to develop compounds that fool cells into activating maintenance and repair.

How a prototype caloric-restriction mimetic works

The best-studied candidate for a caloric-restriction mimetic, 2DG (2-deoxy-D-glucose), works by interfering with the way cells process glucose. It has proved toxic at some doses in animals and so cannot be used in humans. But it has demonstrated that chemicals can replicate the effects of caloric restriction; the trick is finding the right one.

Cells use the glucose from food to generate ATP (adenosine triphosphate), the molecule that powers many activities in the body. By limiting food intake, caloric restriction minimizes the amount of glucose entering cells and decreases ATP generation. When 2DG is administered to animals that eat normally, glucose reaches cells in abundance but the drug prevents most of it from being processed and thus reduces ATP synthesis. Researchers have proposed several explanations for why interruption of glucose processing and ATP production might retard aging. One possibility relates to the ATP-making machinery's emission of free radicals, which are thought to contribute to aging

and to such age-related diseases as cancer by damaging cells. Reduced operation of the machinery should limit their production and thereby constrain the damage. Another hypothesis suggests that decreased processing of glucose could indicate to cells that food is scarce (even if it isn't) and induce them to shift into an anti-aging mode that emphasizes preservation of the organism over such 'luxuries' as growth and reproduction.

*** caloric: a measure of the energy value of food**

Questions 28-32

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

In boxes 28-32 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*

28 Studies show drugs available today can delay the process of growing old.

29 There is scientific evidence that eating fewer calorics may extend human life.

30 Not many people are likely to find a caloric-restricted diet attractive.

31 Diet-related diseases are common in older people.

32 In experiments, rats who ate what they wanted led shorter lives than rats on a low-calorie diet.

Questions 33-37

Classify the following descriptions as relating to

A *caloric-restricted monkeys*

B *control monkeys*

C *neither caloric-restricted monkeys nor control monkeys*

*Write the correct letter, **A**, **B** or **C**, in boxes 32-36 on your answer sheet.*

33 Monkeys were less likely to become diabetic.

34 Monkeys experienced more chronic disease.

35 Monkeys have been shown to experience a longer than average life span.

36 Monkeys enjoyed a reduced chance of heart disease.

37 Monkeys produced greater quantities of insulin.

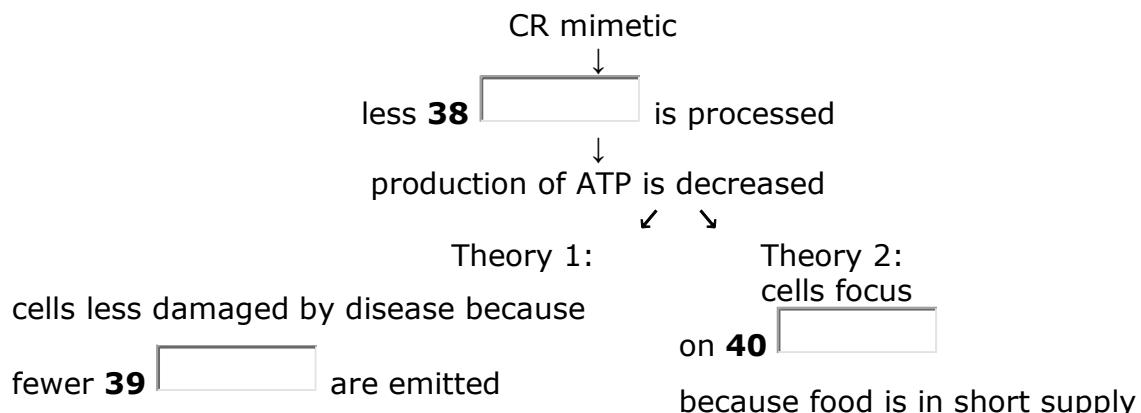
Questions 38-40

Complete the flow-chart below.

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

Write your answers in boxes **38-40** on your answer sheet.

How a caloric-restriction mimetic works



ANSWER FOR READING PASSAGE 12

Reading passage -1-- The Lumière Brothers and Cinematographer

1. A
2. I
3. J
4. E
5. G
6. YES
7. NOT GIVEN
8. NOT GIVEN
9. NOT
10. B
11. C
12. D
13. D

Reading passage -2 Motivating Employees under Adverse Conditions

1. vii

8. NO

2. iii	9. YES
3. ii	10. NOT GIVEN
4. iv	11. YES
5. i	12. B
6. NO	13. C
7. NOT GIVEN	14. A

Reading passage -3-- **The search for the anti aging pill**

1. NO	8. C
2. YES	9. A
3. YES	10. B
4. NOT GIVEN	11. glucose
5. YES	12. free radicals
6. A	13. preservation
7. B	

Test 13

READING TEST –1---Doctoring sales

Pharmaceuticals is one of the most profitable industries in North America. But do the drugs industry's sales and marketing strategies go too far?

A A few months ago Kim Schaefer, sales representative of a major global pharmaceutical company, walked into a medical center in New York to bring information and free samples of her company's latest products. That day she was lucky - a doctor was available to see her. 'The last rep offered me a trip to Florida. What do you have?' the physician asked. He was only half joking.

B What was on offer that day was a pair of tickets for a New York musical. But on any given day, what Schaefer can offer is typical for today's drugs rep - a car trunk full of promotional gifts and gadgets, a budget that could buy lunches and dinners for a small country, hundreds of free drug samples and the freedom to give a physician \$200 to prescribe her new product to the next six patients who fit the drug's profile. And she also has a few \$ 1,000 honoraria to offer in exchange for doctors' attendance at her company's next educational lecture.

C Selling pharmaceuticals is a daily exercise in ethical judgement. Salespeople like Schaefer walk the line between the common practice of buying a prospect's time with a free meal, and bribing doctors to prescribe their drugs. They work in an industry highly criticized for its sales and marketing practices, but find themselves in the middle of the age-old chicken-or-egg question - businesses won't use strategies that don't work, so are doctors to blame for the escalating extravagance of pharmaceutical marketing? Or is it the industry's responsibility to decide the boundaries?

D The explosion in the sheer number of salespeople in the field - and the amount of funding used to promote their causes - forces close examination of the pressures, influences and relationships between drug reps and doctors. Salespeople provide much-needed information and education to physicians. In many cases the glossy brochures, article reprints and prescriptions they deliver are primary sources of drug education for healthcare givers. With the huge investment the industry has placed in face-to-face selling, salespeople have essentially become specialists in one drug or group of drugs - a tremendous advantage in getting the attention of busy doctors in need of quick information.

E But the sales push rarely stops in the office. The flashy brochures and pamphlets left by the sales reps are often followed up with meals at expensive restaurants, meetings in warm and sunny places, and an inundation of promotional gadgets. Rarely do patients watch a doctor write with a pen that isn't emblazoned with a drug's name, or see a nurse use a tablet not bearing a pharmaceutical company's logo. Millions of dollars are spent by pharmaceutical companies on promotional products like coffee mugs, shirts, umbrellas, and golf balls. Money well spent? It's hard to tell. 'I've been the recipient of golf balls from one company and I use them, but it doesn't make me prescribe their medicine,' says one doctor. 'I tend to think I'm not influenced by what they give me.'

F Free samples of new and expensive drugs might be the single most effective way of getting doctors and patients to become loyal to a product. Salespeople hand out hundreds of dollars' worth of samples each week - \$7.2 billion worth of them In one year. Though few comprehensive studies have been conducted, one by the University of Washington Investigated how drug sample availability affected what physicians prescribe. A total of 131 doctors self-reported their prescribing patterns - the conclusion was that the availability of samples led them to dispense and prescribe drugs that differed from their preferred drug choice.

G The bottom line Is that pharmaceutical companies as a whole Invest more In marketing than they do in research and development. And patients are the ones who pay - in the form of sky-rocketing prescription prices - for every pen that's handed out, every free theatre ticket, and every steak dinner eaten. In the end the fact remains that pharmaceutical companies have every right to make a profit and will continue to find new ways to increase sales. But as the medical world continues to grapple with what's acceptable and what's not, It is clear that companies must continue to be heavily scrutinized for their sales and marketing strategies.

Questions 1-7

Reading Passage 1 has seven paragraphs, A-G.

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

Write the correct number, i-x, in boxes 1-7 on your answer sheet.

List of Headings

- i Not all doctors are persuaded
- ii Choosing the best offers
- iii Who is responsible for the increase in promotions?
- iv Fighting the drug companies
- v An example of what doctors expect from drug companies
- vi Gifts include financial incentives
- vii Research shows that promotion works
- viii The high costs of research
- ix The positive side of drugs promotion
- x Who really pays for doctors' free gifts?

1 Paragraph A

2 Paragraph B

3 Paragraph C

4 Paragraph D

5 Paragraph E

6 Paragraph F

7 Paragraph G

Questions 8-13

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

In boxes 8-13 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

8 Sales representatives like Kim Schaefer work to a very limited budget.

9 Kim Schaefer's marketing technique may be open to criticism on moral grounds.

10 The information provided by drug companies is of little use to doctors.

11 Evidence of drug promotion is clearly visible in the healthcare environment.

12 The drug companies may give free drug samples to patients without doctors' prescriptions.

13 It is legitimate for drug companies to make money.

READING PASSAGE 2--Do 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 fie 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 **17** 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 and 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

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 of the women interviewed by the researchers had learnt to read when 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 25-26

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.

READING PASSAGE 3--Persistent bullying is one of the worst experiences

**Persistent bullying is one of the worst experiences a child can face.
How can it be prevented?**

**Peter Smith, Professor of Psychology at the University of Sheffield,
directed the Sheffield
Anti-Bullying Intervention Project, funded by the Department for
Education.**

Here he reports on his findings

A Bullying can take a variety of forms, from the verbal -being taunted or called hurtful names- to the physical- being kicked or shoved- as well as indirect forms, such as being excluded from social groups. A survey I conducted with Irene Whitney found that in British primary schools up to a quarter of pupils reported experience of bullying, which in about one in ten cases was persistent. There was less bullying in secondary schools, with about one in twenty-five suffering persistent bullying, but these cases may be particularly recalcitrant.

B Bullying is clearly unpleasant and can make the child experiencing it feel unworthy and depressed. In extreme cases, it can even lead to suicide, though this is thankfully rare. Victimised pupils are more likely to experience difficulties with interpersonal relationships as adults, while children who persistently bully are more likely to grow up to be physically violent, and convicted of anti-social offences.

C Until recently, not much was known about the topic, and little help was available to teachers to deal with bullying. Perhaps as a consequence, schools would often deny the problem. 'There is no bullying at this school' has been a common refrain, almost certainly all true. Fortunately, more schools are now saying: There is not much bullying here, but when it occurs we have a clear policy for dealing with it.'

D Three factors are involved in this change. First is an awareness of the severity of the problem. Second, a number of resources to help tackle bullying have become available in Britain. For example, the Scottish Council for Research in Education produced a package of materials, Action Against Bullying, circulated to all schools in England and Wales as well as in Scotland in summer 1992, with a second pack, Supporting Schools Against Bullying, produced the following year. In Ireland, Guidelines on Countering Bullying Behaviour in Post-Primary Schools was published in 1993. Third, there is evidence that these materials work, and that schools can achieve something.

This comes from carefully conducted 'before and after' evaluations of interventions in schools, monitored by a research team. In Norway, after an intervention campaign was introduced nationally, an evaluation of forty-two schools suggested that, over a two-year period, bullying was halved. The Sheffield investigation, which involved sixteen primary schools and seven secondary schools, found that most schools succeeded in reducing bullying.

E Evidence suggests that a key step is to develop a policy on bullying, saying clearly what is meant by bullying, and giving explicit guidelines on what will be done if it occurs, what record will be kept, who will be informed, what sanctions will be employed. The policy should be developed through consultation, over a period of time - not just imposed from the head teacher's office! Pupils, parents and staff should feel they have been involved in the policy, which needs to be disseminated and implemented effectively.

Other actions can be taken to back up the policy. There are ways of dealing with the topic through the curriculum, using video, drama and literature. These are useful for raising awareness, and can best be tied into early phases of development while the school is starting to discuss the issue of bullying. They are also useful in renewing the policy for new pupils or revising it in the light of experience. But curriculum work alone may only have short-term effects; it should be an addition to policy work, not a substitute.

There are also ways of working with individual pupils, or in small groups. Assertiveness training for pupils who are liable to be victims is worthwhile, and certain approaches to group bullying such as 'no blame', can be useful in changing the behaviour of bullying pupils without confronting them directly, although other sanctions may be needed for those who continue with persistent bullying.

Work in the playground is important, too. One helpful step is to train lunchtime supervisors to distinguish bullying from playful fighting and help them break up conflicts. Another possibility is to improve the playground environment so that pupils are less likely to be led into bullying from boredom or frustration.

F With these developments, schools can expect that at least the most serious kinds of bullying can largely be prevented. The more effort put in and the wider the whole school involvement, the more substantial the results are likely

to be. The reduction in bullying - and the consequent improvement in pupil happiness- is surely a worthwhile objective.

Questions 27-30

Reading Passage 153 has **six** sections,

Choose the correct heading for sections **A-D** from the list of headings below.

Write the correct number, **i-vii**, in boxes **27-30** on your answer sheet.

List of Headings

- i The role of video violence
- ii The failure of government policy
- iii Reasons for the increased rate of bullying
- iv Research into how common bullying is in British schools
- v The reaction from schools to enquiries about bullying
- vi The effect of bullying on the children involved
- vii Developments that have led to a new approach by schools

27 Section A

28 Section B

29 Section C

30 Section D

Questions 31-34

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

Write the correct letter in boxes 31-34 on your answer sheet.

31 A recent survey found that in British secondary schools

- A there was more bullying than had previously been the case.
- B there was less bullying than in primary schools.
- C cases of persistent bullying were very common.
- D indirect forms of bullying were particularly difficult to deal with.

32 Children who are bullied

- A are twice as likely to commit suicide as the average person.
- B find it more difficult to relate to adults.
- C are less likely to be violent in later life.
- D may have difficulty forming relationships in later life.

33 The writer thinks that the declaration 'There is no bullying at this school'

- A is no longer true in many schools.
- B was not in fact made by many schools.
- C reflected the school's lack of concern.
- D reflected a lack of knowledge and resources.

- 34 What were the findings of research carried out in Norway?
- A Bullying declined by 50% after an anti-bullying campaign.
 - B Twenty-one schools reduced bullying as a result of an anti-bullying campaign
 - C Two years is the optimum length for an anti-bullying campaign.
 - D Bullying is a less serious problem in Norway than in the UK.

Questions 35-39

Complete the summary below

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

Write your answers in boxes **35-39** on your answer sheet.

What steps should schools take to reduce bullying?

The most important step is for the school authorities to produce a 35 which makes the school's attitude towards bullying quite clear. It should include detailed 36 as to how the school and its staff will react if bullying occurs. In addition, action can be taken through the 37 This is particularly useful in the early part of the process, as a way of raising awareness and encouraging discussion. On its own, however, it is insufficient to bring about a permanent solution. Effective work can also be done with individual pupils and small groups. For example, potential 38 of bullying can be trained to be more self-confident. Or again, in dealing with group bullying, a 'no blame' approach, which avoids confronting the offender too directly, is often effective. Playground supervision will be more effective if members of staff are trained to recognise the difference between bullying and mere 39

Question 40

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

Write the correct letter in box **40** on your answer sheet.

Which of the following is the most suitable title for Reading Passage 153?

- A Bullying: what parents can do
- B Bullying: are the media to blame?
- C Bullying: the link with academic failure
- D Bullying: from crisis management to prevention

ANSWER FOR READING PASSAGE 13

Reading passage –1 -Doctoring sales

1. v	8. NO
2. vi	9. YES
3. iii	10. NO
4. ix	11. YES
5. i	12. NOT GIVEN
6. vii	13. YES
7. x	

READING PASSAGE---2 Do literate women make better mothers?

1. B	8. YES
2. F	9. YES
3. C	10. NO
4. J	11. NOT GIVEN
5. F	12. C, E IN EITHER ORDER
6. NOT GIVEN	13. C, E IN EITHER ORDER
7. NO	

READING PASSAGE---3 Persistent bullying is one of the worst experiences

- 27 iv
- 28 vi
- 29 v
- 30 vii
- 31 B
- 32 D
- 33 D
- 34 A
- 35 *policy*
- 36 (*explicit*) *guidelines*
- 37 (*school*) *curriculum*
- 38 *victims*
- 39 *playful fighting*
- 40 D

TEST 14

READING PASSAGE 1--LETS GO BAT'S

A Bats have a problem: how to find their way around in the dark. They hunt at night, and cannot use light to help them find prey and avoid obstacles. You might say that this is a problem of their own making, one that they could avoid simply by changing their habits and hunting by day. But the daytime economy is already heavily exploited by other creatures such as birds. Given that there is a living to be made at night, and given that alternative daytime trades are thoroughly occupied, natural selection has favoured bats that make a go of the night-hunting trade. It is probable that the nocturnal trades go way back in the ancestry of all mammals. In the time when the dinosaurs dominated the daytime economy, our mammalian ancestors probably only managed to survive at all because they found ways of scraping a living at night. Only after the mysterious mass extinction of the dinosaurs about 65 million years ago were our ancestors able to emerge into the daylight in any substantial numbers.

B Bats have an engineering problem: how to find their way and find their prey in the absence of light. Bats are not the only creatures to face this difficulty today. Obviously the night-flying insects that they prey on must find their way about somehow. Deep-sea fish and whales have little or no light by day or by night. Fish and dolphins that live in extremely muddy water cannot see because, although there is light, it is obstructed and scattered by the dirt in the water. Plenty of other modern animals make their living in conditions where seeing is difficult or impossible.

C Given the questions of how to manoeuvre in the dark, what solutions might an engineer consider? The first one that might occur to him is to manufacture light, to use a lantern or a searchlight. Fireflies and some fish (usually with the help of bacteria) have the power to manufacture their own light, but the process seems to consume a large amount of energy. Fireflies use their light

for attracting mates. This doesn't require a prohibitive amount of energy: a male's tiny pinprick of light can be seen by a female from some distance on a dark night, since her eyes are exposed directly to the light source itself. However using light to find one's own way around requires vastly more energy, since the eyes have to detect the tiny fraction of the light that bounces off each part of the scene. The light source must therefore be immensely brighter if it is to be used as a headlight to illuminate the path, than if it is to be used as a signal to others. In any event, whether or not the reason is the energy expense, it seems to be the case that, with the possible exception of some weird deep-sea fish, no animal apart from man uses manufactured light to find its way about.

D What else might the engineer think of? Well, blind humans sometimes seem to have an uncanny sense of obstacles in their path. It has been given the name 'facial vision', because blind people have reported that it feels a bit like the sense of touch, on the face. One report tells of a totally blind boy who could ride his tricycle at good speed round the block near his home, using facial vision. Experiments showed that, in fact, facial vision is nothing to do with touch or the front of the face, although the sensation may be referred to the front of the face, like the referred pain in a phantom limb. The sensation of facial vision, it turns out, really goes in through the ears.

Blind people, without even being aware of the fact, are actually using echoes of their own footsteps and of other sounds, to sense the presence of obstacles. Before this was discovered, engineers had already built instruments to exploit the principle, for example to measure the depth of the sea under a ship. After this technique had been invented, it was only a matter of time before weapons designers adapted it for the detection of submarines. Both sides in the Second World War relied heavily on these devices, under such codenames as Asdic (British) and Sonar (American), as well as Radar (American) or RDF (British), which uses radio echoes rather than sound echoes.

E The Sonar and Radar pioneers didn't know it then, but all the world now knows that bats, or rather natural selection working on bats, had perfected the system tens of millions of years earlier; and their radar' achieves feats of detection and navigation that would strike an engineer dumb with admiration. It is technically incorrect to talk about bat 'radar', since they do not use radio waves. It is sonar. But the underlying mathematical theories of radar and sonar are very similar; and much of our scientific understanding of the details of what bats are doing has come from applying radar theory to them. The American zoologist Donald Griffin, who was largely responsible for the discovery of sonar in bats, coined the term 'écholocation' to cover both sonar and radar, whether used by animals or by human instruments.

Questions 1-5

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

Which paragraph contains the following information?

Write the correct letter, **A-E**, in boxes **1-5** on your answer sheet.

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

- 1** examples of wildlife other than bats which do not rely on vision to navigate by
- 2** how early mammals avoided dying out
- 3** why bats hunt in the dark
- 4** how a particular discovery has helped our understanding of bats
- 5** early military uses of echolocation

Questions 6-9

Complete the summary below.

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

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

Facial Vision

Blind people report that so-called 'facial vision' is comparable to the sensation of touch on the face. In fact, the sensation is more similar to the way in which pain from a **6** arm or leg might be felt. The ability actually comes from perceiving **7** Locate through the ears. However, even before this was understood, the principle had been applied in the design of instruments which calculated the **8** of the seabed. This was followed by a wartime application in devices for finding **9**

Questions 10-13

Complete the sentences below.

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

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

- 10** Long before the invention of radar, had resulted in a sophisticated radar-like system in bats.
- 11** Radar is an inaccurate term when referring to bats because are not used in their navigation system.
- 12** Radar and sonar are based on similar
- 13** The word 'echolocation' was first used by someone working as a

READING PASSAGE 2--Making every drop count

A - A description of ancient water supplies

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 - How a global challenge was met

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 - The relevance to health

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 - Environmental effects

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 - Scientists' call for a revision of policy

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 - A surprising downward trend in demand for water

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 - An explanation for reduced water use

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 - The need to raise standards

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.

Questions 14-20

Reading Passage 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

Questions 21-26

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

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.

READING PASSAGE 3---Educating psyche

Educating Psyche by Bernie Neville is a book which looks at radical new approaches to learning, describing the effects of emotion, imagination and the unconscious on learning. One theory discussed in the book is that proposed by George Lozanov, which focuses on the power of suggestion.

Lozanov's instructional technique is based on the evidence that the connections made in the brain through unconscious processing (which he calls non-specific mental reactivity) are more durable than those made through conscious processing. Besides the laboratory evidence for this, we know from our experience that we often remember what we have perceived peripherally, long after we have forgotten what we set out to learn. If we think of a book we studied months or years ago, we will find it easier to recall peripheral details - the colour, the binding, the typeface, the table at the library where we sat while studying it - than the content on which we were concentrating. If we think of a lecture we listened to with great concentration, we will recall the lecturer's appearance and mannerisms, our place in the auditorium, the failure of the air-conditioning, much more easily than the ideas we went to learn. Even if these peripheral details are a bit elusive, they come back readily in hypnosis or when we relive the event imaginatively, as in psychodrama. The details of the content of the lecture, on the other hand, seem to have gone forever.

This phenomenon can be partly attributed to the common counterproductive approach to study (making extreme efforts to memorise, tensing muscles, inducing fatigue), but it also simply reflects the way the brain functions. Lozanov therefore made indirect instruction (suggestion) central to his teaching system. In suggestopedia, as he called his method, consciousness is shifted away from the curriculum to focus on something peripheral. The curriculum then becomes peripheral and is dealt with by the reserve capacity of the brain.

The suggestopedic approach to foreign language learning provides a good illustration. In its most recent variant (1980), it consists of the reading of vocabulary and text while the class is listening to music. The first session is in two parts. In the first part, the music is classical (Mozart, Beethoven, Brahms)

and the teacher reads the text slowly and solemnly, with attention to the dynamics of the music. The students follow the text in their books. This is followed by several minutes of silence. In the second part, they listen to baroque music (Bach, Corelli, Handel) while the teacher reads the text in a normal speaking voice. During this time they have their books closed. During the whole of this session, their attention is passive; they listen to the music but make no attempt to learn the material.

Beforehand, the students have been carefully prepared for the language learning experience. Through meeting with the staff and satisfied students they develop the expectation that learning will be easy and pleasant and that they will successfully learn several hundred words of the foreign language during the class. In a preliminary talk, the teacher introduces them to the material to be covered, but does not 'teach' it. Likewise, the students are instructed not to try to learn it during this introduction.

Some hours after the two-part session, there is a follow-up class at which the students are stimulated to recall the material presented. Once again the approach is indirect. The students do not focus their attention on trying to remember the vocabulary, but focus on using the language to communicate (e.g. through games or improvised dramatisations). Such methods are not unusual in language teaching. What is distinctive in the suggestopedia method is that they are devoted entirely to assisting recall. The 'learning' of the material is assumed to be automatic and effortless, accomplished while listening to music. The teacher's task is to assist the students to apply what they have learned paraconsciously, and in doing so to make it easily accessible to consciousness. Another difference from conventional teaching is the evidence that students can regularly learn 1000 new words of a foreign language during a suggestopedia session, as well as grammar and idiom.

Lozanov experimented with teaching by direct suggestion during sleep, hypnosis and trance states, but found such procedures unnecessary. Hypnosis, yoga, Silva mind-control, religious ceremonies and faith healing are all associated with successful suggestion, but none of their techniques seem to be essential to it. Such rituals may be seen as placebos. Lozanov acknowledges that the ritual surrounding suggestion in his own system is also a placebo, but maintains that without such a placebo people are unable or afraid to tap the reserve capacity of their brains. Like any placebo, it must be dispensed with authority to be effective. Just as a doctor calls on the full power of autocratic suggestion by insisting that the patient take precisely this white capsule precisely three times a day before meals, Lozanov is categoric in insisting that the suggestopedia session be conducted exactly in the manner designated, by trained and accredited suggestopedia teachers.

While suggestopedia has gained some notoriety through success in the teaching of modern languages, few teachers are able to emulate the spectacular results of Lozanov and his associates. We can, perhaps, attribute mediocre results to an inadequate placebo effect. The students have not developed the appropriate mind set. They are often not motivated to learn through this method. They do not have enough 'faith'. They do not see it as 'real teaching', especially as it does not seem to involve the 'work' they have learned to believe is essential to learning.

Questions 27-30

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

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

27. The book *Educating Psyche* is mainly concerned with

- A** the power of suggestion in learning.
- B** a particular technique for learning based on emotions.
- C** the effects of emotion on the imagination and the unconscious.
- D** ways of learning which are not traditional.

28. Lozanov's theory claims that, when we try to remember things,

- A** unimportant details are the easiest to recall.
- B** concentrating hard produces the best results.
- C** the most significant facts are most easily recalled.
- D** peripheral vision is not important.

29. In this passage, the author uses the examples of a book and a lecture to illustrate that

- A** both of these are important for developing concentration.
- B** his theory about methods of learning is valid.
- C** reading is a better technique for learning than listening.
- D** we can remember things more easily under hypnosis.

30. Lozanov claims that teachers should train students to

- A** memorise details of the curriculum.
- B** develop their own sets of indirect instructions.
- C** think about something other than the curriculum content.
- D** avoid overloading the capacity of the brain.

Questions 31-35

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

In boxes **31-35** 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

31 In the example of suggestopedia teaching in the fourth paragraph, the only variable that changes is the music.

32 Prior to the suggestopedia class, students are made aware that the language experience will be demanding.

33 In the follow-up class, the teaching activities are similar to those used in conventional classes.

34 As an indirect benefit, students notice improvements in their memory.

35 Teachers say they prefer suggestopedia to traditional approaches to language teaching.

36 Students in a suggestopedia class retain more new vocabulary than those in ordinary classes.

Questions 37-40

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

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

Suggestopedia uses a less direct method of suggestion than other techniques such as hypnosis. However, Lozanov admits that a certain amount of **37**

is necessary in order to convince students, even if this is just a **38** . Furthermore, if the method is to succeed, teachers must follow a set procedure. Although Lozanov's method has become quite **39** the results of most other teachers using this method have been **40**

A spectacular

B teaching

C lesson

D authoritarian

- E** unpopular
- F** ritual
- G** unspectacular
- H** placebo
- I** involved
- J** appropriate
- K** well known

ANSWER FOR READING PASSAGE 14

Reading passage -1 - LETS GO BAT'S

1. B	8. depth
2. A	9. submarines
3. A	10. natural selection
4. E	11. radio waves/echoes
5. D	12. mathematical theories
6. phantom	13. zoologist
7. echoes/obstacles	

Reading passage -2- Making every drop count

1. xi	8. NO
2. vii	9. YES
3. v	10. NOT GIVEN
4. i	11. NO
5. ix	12. YES

6. ii	13. NOT GIVEN
7. x	

Reading passage –3 - Educating psyche

1. D	8. NOT GIVEN
2. A	9. NOT GIVEN
3. B	10. TRUE
4. C	11. F
5. FALSE	12. H
6. FALSE	13. K
7. TRUE	14. G

TEST 15

READING PASSAGE 1--Why pagodas don't fall down

In a land swept by typhoons and shaken by earthquakes, how have Japan's tallest and seemingly flimsiest old buildings - 500 or so wooden pagodas - remained standing for centuries? Records show that only two have collapsed during the past 1400 years. Those that have disappeared were destroyed by fire as a result of lightning or civil war. The disastrous Hanshin earthquake in 1995 killed 6,400 people, toppled elevated highways, flattened office blocks and devastated the port area of Kobe. Yet it left the magnificent five-storey pagoda at the Toji temple in nearby Kyoto unscathed, though it levelled a number of buildings in the neighbourhood.

Japanese scholars have been mystified for ages about why these tall, slender buildings are so stable. It was only thirty years ago that the building industry felt confident enough to erect office blocks of steel and reinforced concrete that had more than a dozen floors. With its special shock absorbers to dampen the effect of sudden sideways movements from an earthquake, the thirty-six-storey Kasumigaseki building in central Tokyo - Japan's first skyscraper - was considered a masterpiece of modern engineering when it was built in 1968.

Yet in 826, with only pegs and wedges to keep his wooden structure upright, the master builder Kobodaishi had no hesitation in sending his majestic Toji pagoda soaring fifty-five metres into the sky - nearly half as high as the Kasumigaseki skyscraper built some eleven centuries later. Clearly, Japanese carpenters of the day knew a few tricks about allowing a building to sway and settle itself rather than fight nature's forces. But what sort of tricks?

The multi-storey pagoda came to Japan from China in the sixth century. As in China, they were first introduced with Buddhism and were attached to important temples. The Chinese built their pagodas in brick or stone, with inner staircases, and used them in later centuries mainly as watchtowers. When the pagoda reached Japan, however, its architecture was freely adapted to local conditions - they were built less high, typically five rather than nine storeys, made mainly of wood and the staircase was dispensed with because the Japanese pagoda did not have any practical use but became more of an art object. Because of the typhoons that batter Japan in the summer, Japanese builders learned to extend the eaves of buildings further beyond the walls. This prevents rainwater gushing down the walls. Pagodas in China and Korea have nothing like the overhang that is found on pagodas in Japan.

The roof of a Japanese temple building can be made to overhang the sides of the structure by fifty per cent or more of the building's overall width. For the same reason, the builders of Japanese pagodas seem to have further increased their weight by choosing to cover these extended eaves not with the porcelain tiles of many Chinese pagodas but with much heavier earthenware tiles.

But this does not totally explain the great resilience of Japanese pagodas. Is the answer that, like a tall pine tree, the Japanese pagoda - with its massive trunk-like central pillar known as shinbashira - simply flexes and sways during a typhoon or earthquake? For centuries, many thought so. But the answer is not so simple because the startling thing is that the shinbashira actually carries no load at all. In fact, in some pagoda designs, it does not even rest on the ground, but is suspended from the top of the pagoda - hanging loosely down through the middle of the building. The weight of the building is supported entirely by twelve outer and four inner columns.

And what is the role of the shinbashira, the central pillar? The best way to understand the shinbashira's role is to watch a video made by Shuzo Ishida, a structural engineer at Kyoto Institute of Technology. Mr Ishida, known to his students as 'Professor Pagoda' because of his passion to understand the pagoda, has built a series of models and tested them on a 'shake-table' in his laboratory. In short, the shinbashira was acting like an enormous stationary pendulum. The ancient craftsmen, apparently without the assistance of very advanced mathematics, seemed to grasp the principles that were, more than a thousand years later, applied in the construction of Japan's first skyscraper. What those early craftsmen had found by trial and error was that under pressure a pagoda's loose stack of floors could be made to slither to and fro independent of one another. Viewed from the side, the pagoda seemed to be doing a snake dance - with each consecutive floor moving in the opposite direction to its neighbours above and below. The shinbashira, running up through a hole in the centre of the building, constrained individual storeys from moving too far because, after

moving a certain distance, they banged into it, transmitting energy away along the column.

Another strange feature of the Japanese pagoda is that, because the building tapers, with each successive floor plan being smaller than the one below, none of the vertical pillars that carry the weight of the building is connected to its corresponding pillar above. In other words, a five-storey pagoda contains not even one pillar that travels right up through the building to carry the structural loads from the top to the bottom. More surprising is the fact that the individual storeys of a Japanese pagoda, unlike their counterparts elsewhere, are not actually connected to each other. They are simply stacked one on top of another like a pile of hats. Interestingly, such a design would not be permitted under current Japanese building regulations.

And the extra-wide eaves? Think of them as a tightrope walker's balancing pole. The bigger the mass at each end of the pole, the easier it is for the tightrope walker to maintain his or her balance. The same holds true for a pagoda. 'With the eaves extending out on all sides like balancing poles,' says Mr Ishida, 'the building responds to even the most powerful jolt of an earthquake with a graceful swaying, never an abrupt shaking.' Here again, Japanese master builders of a thousand years ago anticipated concepts of modern structural engineering.

Questions 1-4

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

In boxes 1-4 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

- | | | |
|---|----------------------|---|
| 1 | <input type="text"/> | Only two Japanese pagodas have collapsed in 1400 years. |
| 2 | <input type="text"/> | The Hanshin earthquake of 1995 destroyed the pagoda at the Toji temple. |
| 3 | <input type="text"/> | The other buildings near the Toji pagoda had been built in the last 30 years. |
| 4 | <input type="text"/> | The builders of pagodas knew how to absorb some of the power produced by severe weather conditions. |

Questions 5-10

Classify the following as typical of

- A** both Chinese and Japanese pagodas
- B** only Chinese pagodas
- C** only Japanese pagodas

*Write the correct letter, A, B or C, in boxes **5-10** on your answer sheet.*

- 5 easy interior access to top
- 6 tiles on eaves
- 7 use as observation post
- 8 size of eaves up to half the width of the building
- 9 original religious purpose
- 10 floors fitting loosely over each other

Questions 11-13

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

*Write the correct letter in boxes **11-13** on your answer sheet.*

11 In a Japanese pagoda, the shinbashira

- A** bears the full weight of the building.
- B** bends under pressure like a tree.
- C** connects the floors with the foundations.
- D** stops the floors moving too far.

12 Shuzo Ishida performs experiments in order to

- A** improve skyscraper design.
- B** be able to build new pagodas.
- C** learn about the dynamics of pagodas.
- D** understand ancient mathematics.

13 The storeys of a Japanese pagoda are

- A** linked only by wood.
- B** fastened only to the central pillar.

- C fitted loosely on top of each other.
- D joined by special weights.

READING PASSAGE 2--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 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?

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

READING PASSAGE 3--Makete Integrated Rural Transport Project Section A

The disappointing results of many conventional road transport projects in Africa led some experts to rethink the strategy by which rural transport problems were to be tackled at the beginning of the 1980s. A request for help in improving the availability of transport within the remote Makete District of southwestern Tanzania presented the opportunity to try a new approach.

The concept of 'integrated rural transport' was adopted in the task of examining the transport needs of the rural households in the district. The objective was to reduce the time and effort needed to obtain access to essential goods and services through an improved rural transport system. The underlying assumption was that the time saved would be used instead for

activities that would improve the social and economic development of the communities. The Makete Integrated Rural Transport Project (MIRTP) started in 1985 with financial support from the Swiss Development Corporation and was co-ordinated with the help of the Tanzanian government.

Section B

When the project began, Makete District was virtually totally isolated during the rainy season. The regional road was in such bad shape that access to the main towns was impossible for about three months of the year. Road traffic was extremely rare within the district, and alternative means of transport were restricted to donkeys in the north of the district. People relied primarily on the paths, which were slippery and dangerous during the rains.

Before solutions could be proposed, the problems had to be understood. Little was known about the transport demands of the rural households, so Phase I, between December 1985 and December 1987, focused on research. The socio-economic survey of more than 400 households in the district indicated that a household in Makete spent, on average, seven hours a day on transporting themselves and their goods, a figure which seemed extreme but which has also been obtained in surveys in other rural areas in Africa. Interesting facts regarding transport were found: 95% was on foot; 80% was within the locality; and 70% was related to the collection of water and firewood and travelling to grinding mills.

Section C

Having determined the main transport needs, possible solutions were identified which might reduce the time and burden. During Phase II, from January to February 1991, a number of approaches were implemented in an effort to improve mobility and access to transport.

An improvement of the road network was considered necessary to ensure the import and export of goods to the district. These improvements were carried out using methods that were heavily dependent on labour. In addition to the improvement of roads, these methods provided training in the operation of a mechanical workshop and bus and truck services. However the difference from the conventional approach was that this time consideration was given to local transport needs outside the road network.

Most goods were transported along the paths that provide short-cuts up and down the hillsides, but the paths were a real safety risk and made the journey on foot even more arduous. It made sense to improve the paths by building steps, handrails and footbridges.

It was uncommon to find means of transport that were more efficient than walking but less technologically advanced than motor vehicles. The use of bicycles was constrained by their high cost and the lack of available spare parts. Oxen were not used at all but donkeys were used by a few households in the northern part of the district. MIRTP focused on what would be most appropriate for the inhabitants of Makete in terms of what was available, how much they could afford and what they were willing to accept.

After careful consideration, the project chose the promotion of donkeys - a donkey costs less than a bicycle - and the introduction of a locally manufacturable wheelbarrow.

Section D

At the end of Phase II, it was clear that the selected approaches to Makete's transport problems had had different degrees of success. Phase III, from March 1991 to March 1993, focused on the refinement and institutionalisation of these activities.

The road improvements and accompanying maintenance system had helped make the district centre accessible throughout the year. Essential goods from outside the district had become more readily available at the market, and prices did not fluctuate as much as they had done before.

Paths and secondary roads were improved only at the request of communities who were willing to participate in construction and maintenance. However the improved paths impressed the inhabitants, and requests for assistance greatly increased soon after only a few improvements had been completed.

The efforts to improve the efficiency of the existing transport services were not very successful because most of the motorised vehicles in the district broke down and there were no resources to repair them. Even the introduction of low-cost means of transport was difficult because of the general poverty of the district. The locally manufactured wheelbarrows were still too expensive for all but a few of the households. Modifications to the original design by local carpenters cut production time and costs. Other local carpenters have been trained in the new design so that they can respond to requests. Nevertheless, a locally produced wooden wheelbarrow which costs around 5000 Tanzanian shillings (less than US\$20) in Makete, and is about one quarter the cost of a metal wheelbarrow, is still too expensive for most people.

Donkeys, which were imported to the district, have become more common and contribute, in particular, to the transportation of crops and goods to market. Those who have bought donkeys are mainly from richer households but, with an increased supply through local breeding, donkeys should become more affordable. Meanwhile, local initiatives are promoting the renting out of the existing donkeys.

It should be noted, however, that a donkey, which at 20,000 Tanzanian shillings costs less than a bicycle, is still an investment equal to an average household's income over half a year. This clearly illustrates the need for supplementary measures if one wants to assist the rural poor.

Section E

It would have been easy to criticise the MIRTP for using in the early phases a 'top-down' approach, in which decisions were made by experts and officials before being handed down to communities, but it was necessary to start the process from the level of the governmental authorities of the district. It would have been difficult to respond to the requests of villagers and other rural inhabitants without the support and understanding of district authorities.

Section F

Today, nobody in the district argues about the importance of improved paths and inexpensive means of transport. But this is the result of dedicated work over a long period, particularly from the officers in charge of community development. They played an essential role in raising awareness and interest among the rural communities.

The concept of integrated rural transport is now well established in Tanzania, where a major program of rural transport is just about to start. The experiences from Makete will help in this initiative, and Makete District will act as a reference for future work.

Questions 27-30

Reading Passage has six sections, **A-F**.

Choose the correct heading for sections **B, C, E** and **F** from the list of headings below.

Write the correct number, **i-xi**, in boxes **27-30** on your answer sheet.

List of Headings

- i** MIRTP as a future model
- ii** Identifying the main transport problems
- iii** Preference for motorised vehicles
- iv** Government authorities' instructions
- v** Initial improvements in mobility and transport modes
- vi** Request for improved transport in Makete
- vii** Transport improvements in the northern part of the district
- viii** Improvements in the rail network
- ix** Effects of initial MI RTP measures
- x** Co-operation of district officials
- xi** Role of wheelbarrows and donkeys

Example Answer

Section A **vi**

27 Section B 

28 Section C 

Example Answer

Section D **ix**

29 Section E 

30 Section F 

Questions 31-35

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

In boxes 31-35 on your answer sheet, write

YES if the statement agrees with the claims of the writer

NO if the statement contradicts the claims of the writer

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

- 31 MIRTP was divided into five phases.
- 32 Prior to the start of MIRTP the Makete district was almost inaccessible during the rainy season.
- 33 Phase I of MIRTP consisted of a survey of household expenditure on transport.
- 34 The survey concluded that one-fifth or 20% of the household transport requirement was outside the local area.
- 35 MIRTP hoped to improve the movement of goods from Makete district to the country's capital.

Questions 36-39

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

Write the correct letter, **A-J**, in boxes **36-39** on your answer sheet.

- 36 Construction of footbridges, steps and handrails
- 37 Frequent breakdown of buses and trucks in Makete
- 38 The improvement of secondary roads and paths
- 39 The isolation of Makete for part of the year

A provided the people of Makete with experience in running bus and truck services.

B was especially successful in the northern part of the district.

C differed from earlier phases in that the community became less actively involved.

D improved paths used for transport up and down hillsides.

E was no longer a problem once the roads had been improved.

F cost less than locally made wheelbarrows.

G was done only at the request of local people who were willing to lend a hand.

H was at first considered by MIRTP to be affordable for the people of the district.

I hindered attempts to make the existing transport services more efficient.

J was thought to be the most important objective of Phase III.

Questions 40

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

*Write the correct letter in box **40** on your answer sheet.*

Which of the following phrases best describes the main aim of Reading Passage?

- A** to suggest that projects such as MIRTP are needed in other countries
- B** to describe how MIRTP was implemented and how successful it was
- C** to examine how MIRTP promoted the use of donkeys
- D** to warn that projects such as MIRTP are likely to have serious problems

ANSWER FOR READING PASSAGE 15

Reading passage –1 why pagodas don't fall down

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

Reading passage –2 The true cost of food

1. E	8. YES
2. B	9. food bills/costs
3. C	10. (modern) intensive farming

4. B	11. organic farming
5. YES	12. Greener Food Standard
6. NOT GIVEN	13. IN EITHER ORDER farmers (and) consumers
7. NO	

Reading passage –3 Makete Integrated Rural Transport Project

1. ii	8. YES
2. v	9. NOT GIVEN
3. x	10. D
4. i	11. I
5. NO	12. G
6. YES	13. E
7. NO	14. B

TEST 16

READING PASSAGE 1--Ant intelligence

When we think of intelligent members of the animal kingdom, the creatures that spring immediately to mind are apes and monkeys. But in fact the social lives of some members of the insect kingdom are sufficiently complex to suggest more than a hint of intelligence.

Among these, the world of the ant has come in for considerable scrutiny lately, and the idea that ants demonstrate sparks of cognition has certainly not been rejected by those involved in these investigations.

Ants store food, repel attackers and use chemical signals to contact one another in case of attack. Such chemical communication can be compared to the human use of visual and auditory channels (as in religious chants, advertising images and jingles, political slogans and martial music) to arouse and propagate moods and attitudes. The biologist Lewis Thomas wrote, 'Ants are so much like human beings as to be an embarrassment. They farm fungi, raise aphids* as livestock, launch armies to war, use chemical sprays to alarm and confuse enemies, capture slaves, engage in child labour, exchange information ceaselessly. They do everything but watch television.'

However, in ants there is no cultural transmission -everything must be encoded in the genes - whereas in humans the opposite is true. Only basic instincts are carried in the genes of a newborn baby, other skills being learned from others in the community as the child grows up. It may seem that this cultural continuity gives us a huge advantage over ants. They have never mastered fire nor progressed. Their fungus farming and aphid herding crafts are sophisticated when compared to the agricultural skills of humans five thousand years ago but have been totally overtaken by modern human agribusiness.

Or have they? The farming methods of ants are at least sustainable. They do not ruin environments or use enormous amounts of energy. Moreover, recent evidence suggests that the crop farming of ants may be more sophisticated and adaptable than was thought.

Ants were farmers fifty million years before humans were. Ants can't digest the cellulose in leaves - but some fungi can. The ants therefore cultivate these fungi in their nests, bringing them leaves to feed on, and then use them as a source of food. Farmer ants secrete antibiotics to control other fungi that might act as 'weeds', and spread waste to fertilise the crop.

It was once thought that the fungus that ants cultivate was a single type that they had propagated, essentially unchanged from the distant past. Not so. Ulrich Mueller of Maryland and his colleagues genetically screened 862 different types of fungi taken from ants' nests. These turned out to be highly diverse: it seems that ants are continually domesticating new species. Even more impressively, DNA analysis of the fungi suggests that the ants improve or modify the fungi by regularly swapping and sharing strains with neighbouring ant colonies.

Whereas prehistoric man had no exposure to urban lifestyles - the forcing house of intelligence - the evidence suggests that ants have lived in urban settings for close on a hundred million years, developing and maintaining underground cities of specialised chambers and tunnels.

When we survey Mexico City, Tokyo, Los Angeles, we are amazed at what has been accomplished by humans. Yet Hoelldobler and Wilson's magnificent work for ant lovers, *The Ants*, describes a supercolony of the ant *Formica yessensis* on the Ishikari Coast of Hokkaido. This 'megalopolis' was reported to be composed of 360 million workers and a million queens living in 4,500 interconnected nests across a territory of 2.7 square kilometres.

Such enduring and intricately meshed levels of technical achievement outstrip by far anything achieved by our distant ancestors. We hail as masterpieces the cave paintings in southern France and elsewhere, dating back some 20,000 years. Ant societies existed in something like their present form more than

seventy million years ago. Beside this, prehistoric man looks technologically primitive. Is this then some kind of intelligence, albeit of a different kind?

Research conducted at Oxford, Sussex and Zurich Universities has shown that when desert ants return from a foraging trip, they navigate by integrating bearings and distances, which they continuously update in their heads. They combine the evidence of visual landmarks with a mental library of local directions, all within a framework which is consulted and updated. So ants can learn too.

And in a twelve-year programme of work, Ryabko and Reznikova have found evidence that ants can transmit very complex messages. Scouts who had located food in a maze returned to mobilise their foraging teams. They engaged in contact sessions, at the end of which the scout was removed in order to observe what her team might do. Often the foragers proceeded to the exact spot in the maze where the food had been. Elaborate precautions were taken to prevent the foraging team using odour clues. Discussion now centres on whether the route through the maze is communicated as a 'left-right' sequence of turns or as a 'compass bearing and distance' message.

During the course of this exhaustive study, Reznikova has grown so attached to her laboratory ants that she feels she knows them as individuals - even without the paint spots used to mark them. It's no surprise that Edward Wilson, in his essay, 'In the company of ants', advises readers who ask what to do with the ants in their kitchen to: 'Watch where you step. Be careful of little lives.'

* *aphids: small insects of a different species from ants*

Questions 1-6

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

In boxes 1-6 on your answer sheet, write

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

1 Ants use the same channels of communication as humans do.

2 City life is one factor that encourages the development of intelligence.

3 Ants can build large cities more quickly than humans do.

4 Some ants can find their way by making calculations based on distance and position.

5 In one experiment, foraging teams were able to use their sense of smell to find food.

6

The essay, 'In the company of ants', explores ant communication.

Questions 7-13

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

Write the correct letter, A-O, in boxes 7-13 on your answer sheet.

Ants as farmers

Ants have sophisticated methods of farming, including herding livestock and growing crops, which are in many ways similar to those used in human agriculture. The ants cultivate a large number of different species of edible fungi which convert 7 [] into a form which they can digest. They use their own natural 8 [] as weed-killers and also use unwanted materials as 9 []. Genetic analysis shows they constantly upgrade these fungi by developing new species and by 10 [] species with neighbouring ant colonies. In fact, the farming methods of ants could be said to be more advanced than human agribusiness, since they use 11 [] methods, they do not affect the 12 [] and do not waste 13 [].

A aphids B agricultural C cellulose D exchanging
E energy F fertilizers G food H fungi
I growing J interbreeding K natural L other species
M secretions N sustainable O environment

READING PASSAGE 2--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'. 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^{1,2}.

C An important project, led by the biological anthropologist Robert Williams, focused on the variants (called Gm allotypes) of one particular protein -

immunoglobulin 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 Aleut³ 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 DNA⁴ in blood samples from three widely separated Native American groups: Pima-Papago Indians in Arizona, Maya Indians on the Yucatán peninsula, Mexico, and 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 roots⁵ 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 incisor⁶ shoveling (a scooping out on one or both surfaces of the tooth), single-rooted upper first premolars⁶ and triple-rooted lower first molars⁶.

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.

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*

⁵ *crown/root: parts of the tooth*

⁶ *incisor/premolar/molar: kinds of teeth*

Questions 14-19

Reading Passage 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	<input type="button" value="▼"/>
15	Section B	<input type="button" value="▼"/>
16	Section C	<input type="button" value="▼"/>
17	Section D	<input type="button" value="▼"/>
18	Section E	<input type="button" value="▼"/>
19	Section F	<input type="button" value="▼"/>

<i>Example</i>	<i>Answer</i>
Section G	<u>viii</u>

Questions 20-21

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 20-21 on your answer sheet.

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

Questions 22-25

Reading Passage 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

Questions 26

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

Write the correct letter in box 13 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.

READING PASSAGE 3--Plans to protect the forests of Europe

Forests are one of the main elements of our natural heritage. The decline of Europe's forests over the last decade and a half has led to an increasing awareness and understanding of the serious imbalances which threaten them. European countries are becoming increasingly concerned by major threats to European forests, threats which know no frontiers other than those of geography or climate: air pollution, soil deterioration, the increasing number of forest fires and sometimes even the mismanagement of our woodland and forest heritage. There has been a growing awareness of the need for countries to get together to co-ordinate their policies. In December 1990, Strasbourg hosted the first Ministerial Conference on the protection of Europe's forests. The conference brought together 31 countries from both Western and Eastern Europe. The topics discussed included the co-ordinated study of the destruction of forests, as well as how to combat forest fires and the extension of European research programs on the forest ecosystem. The preparatory work for the conference had been undertaken at two meetings of experts. Their initial task was to decide which of the many forest problems of concern to Europe involved the largest number of countries and might be the subject of joint action. Those confined to particular geographical areas, such as countries bordering the Mediterranean or the Nordic countries therefore had to be discarded. However, this does not mean that in future they will be ignored.

As a whole, European countries see forests as performing a triple function: biological, economic and recreational. The first is to act as a 'green lung' for our planet; by means of photosynthesis, forests produce oxygen through the transformation of solar energy, thus fulfilling what for humans is the essential role of an immense, non-polluting power plant. At the same time, forests provide raw materials for human activities through their constantly renewed production of wood. Finally, they offer those condemned to spend five days a week in an urban environment an unrivalled area of freedom to unwind and take part in a range of leisure activities, such as hunting, riding and hiking. The economic importance of forests has been understood since the dawn of man - wood was the first fuel. The other aspects have been

recognised only for a few centuries but they are becoming more and more important. Hence, there is a real concern throughout Europe about the damage to the forest environment which threatens these three basic roles.

The myth of the 'natural' forest has survived, yet there are effectively no remaining 'primary' forests in Europe. All European forests are artificial, having been adapted and exploited by man for thousands of years. This means that a forest policy is vital, that it must transcend national frontiers and generations of people, and that it must allow for the inevitable changes that take place in the forests, in needs, and hence in policy. The Strasbourg conference was one of the first events on such a scale to reach this conclusion. A general declaration was made that 'a central place in any ecologically coherent forest policy must be given to continuity over time and to the possible effects of unforeseen events, to ensure that the full potential of these forests is maintained'.

That general declaration was accompanied by six detailed resolutions to assist national policymaking. The first proposes the extension and systematisation of surveillance sites to monitor forest decline. Forest decline is still poorly understood but leads to the loss of a high proportion of a tree's needles or leaves. The entire continent and the majority of species are now affected: between 30% and 50% of the tree population. The condition appears to result from the cumulative effect of a number of factors, with atmospheric pollutants the principal culprits. Compounds of nitrogen and sulphur dioxide should be particularly closely watched. However, their effects are probably accentuated by climatic factors, such as drought and hard winters, or soil imbalances such as soil acidification, which damages the roots. The second resolution concentrates on the need to preserve the genetic diversity of European forests. The aim is to reverse the decline in the number of tree species or at least to preserve the 'genetic material' of all of them. Although forest fires do not affect all of Europe to the same extent, the amount of damage caused the experts to propose as the third resolution that the Strasbourg conference consider the establishment of a European databank on the subject. All information used in the development of national preventative policies would become generally available. The subject of the fourth resolution discussed by the ministers was mountain forests. In Europe, it is undoubtedly the mountain ecosystem which has changed most rapidly and is most at risk. A thinly scattered permanent population and development of leisure activities, particularly skiing, have resulted in significant long-term changes to the local ecosystems. Proposed developments include a preferential research program on mountain forests. The fifth resolution relaunched the European research network on the physiology of trees, called Eurosilia. Eurosilia should support joint European research on tree diseases and their physiological and biochemical aspects. Each country concerned could increase the number of scholarships and other financial support for doctoral theses and research projects in this area. Finally, the conference established the framework for a European research network on forest ecosystems. This would also involve harmonising activities in individual countries as well as identifying a number of priority research topics relating to the protection of forests. The Strasbourg conference's main concern was to provide for the future. This was the initial motivation, one now shared by all 31 participants representing 31 European countries. Their final text commits them to on-going discussion between government representatives with responsibility for forests.

Questions 27-33

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

In boxes 27-33 on your answer sheet, write

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

27 Forest problems of Mediterranean countries are to be discussed at the next meeting of experts.

28 Problems in Nordic countries were excluded because they are outside the European Economic Community.

29 Forests are a renewable source of raw material.

30 The biological functions of forests were recognised only in the twentieth century.

31 Natural forests still exist in parts of Europe.

32 Forest policy should be limited by national boundaries.

33 The Strasbourg conference decided that a forest policy must allow for the possibility of change.

Questions 34-39

Look at the following statements issued by the conference.

Which six of the following statements, A-J, refer to the resolutions that were issued? Match the statements with the appropriate resolutions (Questions 34-39).

Write the correct letter, A-J, in boxes 34-39 on your answer sheet.

A All kinds of species of trees should be preserved.

B Fragile mountain forests should be given priority in research programs.

C The surviving natural forests of Europe do not need priority treatment.

D Research is to be better co-ordinated throughout Europe.

E Information on forest fires should be collected and shared.

F Loss of leaves from trees should be more extensively and carefully monitored.

G Resources should be allocated to research into tree diseases.

H Skiing should be encouraged in thinly populated areas.

I Soil imbalances such as acidification should be treated with compounds of nitrogen and sulphur.

J Information is to be systematically gathered on any decline in the condition of forests.

34 Resolution 1

35 Resolution 2

36 Resolution 3

37 Resolution 4

38 Resolution 5

39 Resolution 6

Questions 40

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

Write the correct letter in box 40 on your answer sheet.

15 What is the best title for Reading Passage?

A The biological, economic and recreational role of forests

B Plans to protect the forests of Europe

C The priority of European research into ecosystems

D Proposals for a world-wide policy on forest management

ANSWER FOR READING PASSAGE 16

Reading passage -1 Ant intelligence

1. FALSE	8. M
2. TRUE	9. F
3. NOT GIVEN	10. D
4. TRUE	11. N
5. FALSE	12. O

6. NOT GIVEN	13. E
7. C	

Reading passage – 2 Population movements and genetics

1. iv	8. D
2. vii	9. C
3. x	10. B
4. i	11. A
5. vi	12. A
6. ii	13. A
7. E	

Reading passage – 3 Plans to protect the forests of Europe

1. NOT GIVEN	8. J
2. FALSE	9. A
3. TRUE	10. E
4. FALSE	11. B
5. FALSE	12. G
6. FALSE	13. D
7. TRUE	14. B

TEST 17

READING PASSAGE 1--Pulling strings to build pyramids

No one knows exactly how the pyramids were built. Marcus Chown reckons the answer could be 'hanging in the air'.

The pyramids of Egypt were built more than three thousand years ago, and no one knows how. The conventional picture is that tens of thousands of slaves dragged stones on sledges. But there is no evidence to back this up. Now a Californian software consultant called Maureen Clemons has suggested that kites might have been involved. While perusing a book on the monuments of Egypt, she noticed a hieroglyph that showed a row of men standing in odd postures. They were holding what looked like ropes that led, via some kind of mechanical system, to a giant bird in the sky. She wondered if perhaps the bird was actually a giant kite, and the men were using it to lift a heavy object.

Intrigued, Clemons contacted MortezaGharib, aeronautics professor at the California Institute of Technology. He was fascinated by the idea. 'Coming from Iran, I have a keen interest in Middle Eastern science/ he says. He too was puzzled by the picture that had sparked Clemons's interest. The object in the sky apparently had wings far too short and wide for a bird. The possibility certainly existed that it was a kite/ he says. And since he needed a summer project for his student Emilio Graff, investigating the possibility of using kites as heavy lifters seemed like a good idea.

Gharib and Graff set themselves the task of raising a 4.5-metre stone column from horizontal to vertical, using no source of energy except the wind. Their initial calculations and scale-model wind-tunnel experiments convinced them they wouldn't need a strong wind to lift the 33.5-tonne column. Even a modest force, if sustained over a long time, would do. The key was to use a pulley system that would magnify the applied force. So they rigged up a tent-shaped scaffold directly above the tip of the horizontal column, with pulleys suspended from the scaffold's apex. The idea was that as one end of the column rose, the base would roll across the ground on a trolley.

Earlier this year, the team put Clemons's unlikely theory to the test, using a 40-square-metre rectangular nylon sail. The kite lifted the column clean off the ground. 'We were absolutely stunned,' Gharib says. The instant the sail opened into the wind, a huge force was generated and the column was raised to the vertical in a mere 40 seconds.'

The wind was blowing at a gentle 16 to 20 kilometres an hour, little more than half what they thought would be needed. What they had failed to reckon with was what happened when the kite was opened. There was a huge initial force - five times larger than the steady state force,' Gharib says. This jerk meant that kites could lift huge weights, Gharib realised. Even a 300-tonne column could have been lifted to the vertical with 40 or so men and four or five sails. So Clemons was right: the pyramid, builders could have used kites to lift massive stones into place. 'Whether they actually did is another matter,' Gharib says. There are no pictures showing the construction of the pyramids, so there is no way to tell what really happened. The evidence for using kites to

move large stones is no better or worse than the evidence for the brute force method,' Gharib says.

Indeed, the experiments have left many specialists unconvinced. The evidence for kitelifting is non-existent,' says Willeke Wendrich, an associate professor of Egyptology at the University of California, Los Angeles.

Others feel there is more of a case for the theory. Harnessing the wind would not have been a problem for accomplished sailors like the Egyptians. And they are known to have used wooden pulleys, which could have been made strong enough to bear the weight of massive blocks of stone. In addition, there is some physical evidence that the ancient Egyptians were interested in flight. A wooden artefact found on the step pyramid at Saqqara looks uncannily like a modern glider. Although it dates from several hundred years after the building of the pyramids, its sophistication suggests that the Egyptians might have been developing ideas of flight for a long time. And other ancient civilisations certainly knew about kites; as early as 1250 BC, the Chinese were using them to deliver messages and dump flaming debris on their foes.

The experiments might even have practical uses nowadays. There are plenty of places around the globe where people have no access to heavy machinery, but do know how to deal with wind, sailing and basic mechanical principles. Gharib has already been contacted by a civil engineer in Nicaragua, who wants to put up buildings with adobe roofs supported by concrete arches on a site that heavy equipment can't reach. His idea is to build the arches horizontally, then lift them into place using kites. 'We've given him some design hints,' says Gharib. 'We're just waiting for him to report back.' So whether they were actually used to build the pyramids or not, it seems that kites may make sensible construction tools in the 21st century AD.

Questions 1-7

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

In boxes 1-7 on your answer sheet, write

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

1 It is generally believed that large numbers of people were needed to build the pyramids.

2 Clemmons found a strange hieroglyph on the wall of an Egyptian monument.

3 Gharib had previously done experiments on bird flight.

4 Gharib and Graff tested their theory before applying it.

5 The success of the actual experiment was due to the high speed of the wind.

6 [] They found that, as the kite flew higher, the wind force got stronger.

7 [] The team decided that it was possible to use kites to raise very heavy stones.

Questions 8-13

Complete the summary below.

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

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

Additional evidence for theory of kite-lifting

The Egyptians had 8 [] which could lift large pieces of 9 [] and they knew how to use the energy of the wind from their skill as 10 []. The discovery on one pyramid of an object which resembled a 11 [] suggests they may have experimented with 12 []. In addition, over two thousand years ago kites were used in China as weapons, as well as for sending 13 [].

READING PASSAGE 2--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 \$US 260 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 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.

* *spawners: fish that have released eggs*

** *spawn: release eggs*

*** *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?

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.

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 sports

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.

- 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

READING PASSAGE 3-Effects of noise

In general, it is plausible to suppose that we should prefer peace and quiet to noise. And yet most of us have had the experience of having to adjust to sleeping in the mountains or the countryside because it was initially 'too quiet', an experience that suggests that humans are capable of adapting to a wide range of noise levels. Research supports this view. For example, Glass and Singer (1972) exposed people to short bursts of very loud noise and then measured their ability to work out problems and their physiological reactions to the noise. The noise was quite disruptive at first, but after about four minutes the subjects were doing just as well on their tasks as control subjects who were not exposed to noise. Their physiological arousal also declined quickly to the same levels as those of the control subjects.

But there are limits to adaptation and loud noise becomes more troublesome if the person is required to concentrate on more than one task. For example, high noise levels interfered with the performance of subjects who were required to monitor three dials at a time, a task not unlike that of an

aeroplane pilot or an air-traffic controller (Broadbent, 1957). Similarly, noise did not affect a subject's ability to track a moving line with a steering wheel, but it did interfere with the subject's ability to repeat numbers while tracking (Finkelman and Glass, 1970).

Probably the most significant finding from research on noise is that its predictability is more important than how loud it is. We are much more able to 'tune out' chronic background noise, even if it is quite loud, than to work under circumstances with unexpected intrusions of noise. In the Glass and Singer study, in which subjects were exposed to bursts of noise as they worked on a task, some subjects heard loud bursts and others heard soft bursts. For some subjects, the bursts were spaced exactly one minute apart (predictable noise); others heard the same amount of noise overall, but the bursts

	Unpredictable Noise	Predictable Noise	Average
Loud noise	40.1	31.8	35.9
Soft noise	36.7	21A	32.1
Average	38.4	29.6	

Table 1 : Proofreading Errors and Noise

occurred at random intervals (unpredictable noise). Subjects reported finding the predictable and unpredictable noise equally annoying, and all subjects performed at about the same level during the noise portion of the experiment. But the different noise conditions had quite different after-effects when the subjects were required to proofread written material under conditions of no noise. As shown in Table 1 the unpredictable noise produced more errors in the later proofreading task than predictable noise; and soft, unpredictable noise actually produced slightly more errors on this task than the loud, predictable noise.

Apparently, unpredictable noise produces more fatigue than predictable noise, but it takes a while for this fatigue to take its toll on performance.

Predictability is not the only variable that reduces or eliminates the negative effects of noise. Another is control. If the individual knows that he or she can control the noise, this seems to eliminate both its negative effects at the time and its after-effects. This is true even if the individual never actually exercises his or her option to turn the noise off (Glass and Singer, 1972). Just the knowledge that one has control is sufficient.

The studies discussed so far exposed people to noise for only short periods and only transient effects were studied. But the major worry about noisy environments is that living day after day with chronic noise may produce serious, lasting effects. One study, suggesting that this worry is a realistic one, compared elementary school pupils who attended schools near Los Angeles's busiest airport with students who attended schools in quiet neighbourhoods (Cohen et al., 1980). It was found that children from the noisy schools had higher blood pressure and were more easily distracted than those who attended the quiet schools. Moreover, there was no evidence of adaptability to the noise. In fact, the longer the children had attended the noisy schools, the more distractible they became. The effects also seem to be long lasting. A follow-up study showed that children who were moved to less

noisy classrooms still showed greater distractibility one year later than students who had always been in the quiet schools (Cohen et al, 1981). It should be noted that the two groups of children had been carefully matched by the investigators so that they were comparable in age, ethnicity, race, and social class.

Questions 27-29

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

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

27 The writer suggests that people may have difficulty sleeping in the mountains because

- A humans do not prefer peace and quiet to noise.
- B they may be exposed to short bursts of very strange sounds.
- C humans prefer to hear a certain amount of noise while they sleep.
- D they may have adapted to a higher noise level in the city.

28 In noise experiments, Glass and Singer found that

- A problem-solving is much easier under quiet conditions.
- B physiological arousal prevents the ability to work.
- C bursts of noise do not seriously disrupt problem-solving in the long term.
- D the physiological arousal of control subjects declined quickly.

29 Researchers discovered that high noise levels are not likely to interfere with the

- A successful performance of a single task.
- B tasks of pilots or air traffic controllers.
- C ability to repeat numbers while tracking moving lines.
- D ability to monitor three dials at once.

Questions 30-34

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

Write the correct letter, A-J, in boxes 30-34 on your answer sheet.

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

- A no control over
- B unexpected
- C intense
- D the same amount of
- E performed better than
- F performed at about the same level as
- G no
- H showed more irritation than
- I made more mistakes than
- J different types of

Glass and Singer (1972) showed that situations in which there is intense noise have less effect on performance than circumstances in which 30 [] noise occurs. Subjects were divided into groups to perform a task. Some heard loud bursts of noise, others soft. For some subjects, the noise was predictable, while for others its occurrence was random. All groups were exposed to 31 [] noise. The predictable noise group 32 [] the unpredictable noise group on this task. In the second part of the experiment, the four groups were given a proofreading task to complete under conditions of no noise. They were required to check written material for errors. The group which had been exposed to unpredictable noise 33 [] the group which had been exposed to predictable noise. The group which had been exposed to loud predictable noise performed better than those who had heard soft, unpredictable bursts. The results suggest that 34 [] noise produces fatigue but that this manifests itself later.

Questions 35-40

Look at the following statements (Questions 35-40) and the list of researchers below.

Match each statement with the correct researcher(s), A-E.

Write the correct letter, A-E, in boxes 35-40 on your answer sheet.

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

List of Researchers

- AGlass and Singer
- BBroadbent
- CFinkelman and Glass
- DCohen et al.

E None of the above

35 Subjects exposed to noise find it difficult at first to concentrate on problem-solving tasks.

36 Long-term exposure to noise can produce changes in behaviour which can still be observed a year later.

37 The problems associated with exposure to noise do not arise if the subject knows they can make it stop.

38 Exposure to high-pitched noise results in more errors than exposure to low-pitched noise.

39 Subjects find it difficult to perform three tasks at the same time when exposed to noise.

40 Noise affects a subject's capacity to repeat numbers while carrying out another task

ANSWER FOR READING PASSAGE 8

Reading passage –1 Pulling strings to build pyramids

1. TRUE	8. (wooden) pulleys
2. FALSE	9. stone
3. NOT GIVEN	10. (accomplished) sailors
4. TRUE	11. (modern) glider
5. FALSE	12. flight
6. NOT GIVEN	13. messages
7. TRUE	

Reading passage –2 Endless harvest

1. FALSE	8. G
2. NOT GIVEN	9. E

3. TRUE	10. B
4. NOT GIVEN	11. A
5. TRUE	12. K
6. TRUE	13. F
7. FALSE	

Reading passage –3 Effects of noise

1. D	8. B
2. C	9. A
3. A	10. D
4. B	11. A
5. D	12. E
6. F	13. B
7. I	14. C

TEST 18

READING PASSAGE 1--A chronicle of timekeeping answers

A According to archaeological evidence, at least 5,000 years ago, and long before the advent of the Roman Empire, the Babylonians began to measure time, introducing calendars to co-ordinate communal activities, to plan the shipment of goods and, in particular, to regulate planting and harvesting. They based their calendars on three natural cycles: the solar day, marked by the successive periods of light and darkness as the earth rotates on its axis; the lunar month, following the phases of the moon as it orbits the earth; and the solar year, defined by the changing seasons that accompany our planet's revolution around the sun.

B Before the invention of artificial light, the moon had greater social impact. And, for those living near the equator in particular, its waxing and waning was more conspicuous than the passing of the seasons. Hence, the calendars that were developed at the lower latitudes were influenced more by the lunar cycle than by the solar year. In more northern climes, however, where seasonal agriculture was practised, the solar year became more crucial. As the Roman Empire expanded northward, it organised its activity chart for the most part around the solar year.

C Centuries before the Roman Empire, the Egyptians had formulated a municipal calendar having 12 months of 30 days, with five days added to approximate the solar year. Each period of ten days was marked by the appearance of special groups of stars called decans. At the rise of the star Sirius just before sunrise, which occurred around the all-important annual flooding of the Nile, 12 decans could be seen spanning the heavens. The cosmic significance the Egyptians placed in the 12 decans led them to develop a system in which each interval of darkness (and later, each interval of daylight) was divided into a dozen equal parts. These periods became known as temporal hours because their duration varied according to the changing length of days and nights with the passing of the seasons. Summer hours were long, winter ones short; only at the spring and autumn equinoxes were the hours of daylight and darkness equal. Temporal hours, which were first adopted by the Greeks and then the Romans, who disseminated them through Europe, remained in use for more than 2,500 years.

D In order to track temporal hours during the day, inventors created sundials, which indicate time by the length or direction of the sun's shadow. The sundial's counterpart, the water clock, was designed to measure temporal hours at night. One of the first water clocks was a basin with a small hole near the bottom through which the water dripped out. The falling water level denoted the passing hour as it dipped below hour lines inscribed on the inner surface. Although these devices performed satisfactorily around the Mediterranean, they could not always be depended on in the cloudy and often freezing weather of northern Europe.

E The advent of the mechanical clock meant that although it could be adjusted to maintain temporal hours, it was naturally suited to keeping equal ones. With these, however, arose the question of when to begin counting, and so, in the early 14th century, a number of systems evolved. The schemes that divided the day into 24 equal parts varied according to the start of the count: Italian hours began at sunset, Babylonian hours at sunrise, astronomical hours at midday and 'great clock' hours, used for some large public clocks in Germany, at midnight. Eventually these were superseded by 'small clock', or French, hours, which split the day into two 12-hour periods commencing at midnight.

F The earliest recorded weight-driven mechanical clock was built in 1283 in Bedfordshire in England. The revolutionary aspect of this new timekeeper was neither the descending weight that provided its motive force nor the gear wheels (which had been around for at least 1,300 years) that transferred the power; It was the part called the escapement. In the early 1400s came the invention of the coiled spring or fusee which maintained constant force to the gear wheels of the timekeeper despite the changing tension of its

mainspring. By the 16th century, a pendulum clock had been devised, but the pendulum swung in a large arc and thus was not very efficient.

G To address this, a variation on the original escapement was invented in 1670, in England. It was called the anchor escapement, which was a lever-based device shaped like a ship's anchor. The motion of a pendulum rocks this device so that it catches and then releases each tooth of the escape wheel, in turn allowing it to turn a precise amount. Unlike the original form used in early pendulum clocks, the anchor escapement permitted the pendulum to travel in a very small arc. Moreover, this invention allowed the use of a long pendulum which could beat once a second and thus led to the development of a new floorstanding case design, which became known as the grandfather clock.

H Today, highly accurate timekeeping instruments set the beat for most electronic devices. Nearly all computers contain a quartz-crystal clock to regulate their operation. Moreover, not only do time signals beamed down from Global Positioning System satellites calibrate the functions of precision navigation equipment, they do so as well for mobile phones, instant stock-trading systems and nationwide power-distribution grids. So integral have these time-based technologies become to day-to-day existence that our dependency on them is recognised only when they fail to work.

Questions 1-4

Reading Passage has eight paragraphs, A-H.

Which paragraph contains the following information?

Write the correct letter, A-H, in boxes 1-4 on your answer sheet

1 a description of an early timekeeping invention affected by cold temperatures

2 an explanation of the importance of geography in the development of the calendar in farming communities

3 a description of the origins of the pendulum clock

4 details of the simultaneous efforts of different societies to calculate time using uniform hours

Questions 5-8

Look at the following events (Questions 5-8) and the list of nationalities below.

Match each event with the correct nationality, A-F.

Write the correct letter, A-F, in boxes 5-8 on your answer sheet.

List of Nationalities

A Babylonians

B Egyptians

- C Greeks
- D English
- E Germans
- F French

- 5 They devised a civil calendar in which the months were equal in length.
- 6 They divided the day into two equal halves.
- 7 They developed a new cabinet shape for a type of timekeeper.
- 8 They created a calendar to organise public events and work schedules.

Questions 9-13

Label the diagram below.

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

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

- 9
- 10
- 11
- 12
- 13

READING PASSAGE 2--Air traffic control in the USA

A - Aviation disaster prompts action

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 - First steps towards ATC

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 - Two coincidental developments

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 - An oversimplified view

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 - Setting altitude zones

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 - Setting rules to weather conditions

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 - Defining airspace categories

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 14-19

Reading Passage 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.

14 Paragraph A	<input type="text"/>	<input type="button" value="▼"/>
Example	Answer	
Paragraph B	x	
15 Paragraph C	<input type="text"/>	<input type="button" value="▼"/>
16 Paragraph D	<input type="text"/>	<input type="button" value="▼"/>
17 Paragraph E	<input type="text"/>	<input type="button" value="▼"/>
18 Paragraph F	<input type="text"/>	<input type="button" value="▼"/>
19 Paragraph G	<input type="text"/>	<input type="button" value="▼"/>

- 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

Questions 20-26

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

In boxes 20-27 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 3--Telepathy

Can human beings communicate by thought alone? For more than a century the issue of telepathy has divided the scientific community, and even today it still sparks bitter controversy among top academics.

Since the 1970s, parapsychologists at leading universities and research institutes around the world have risked the derision of sceptical colleagues by putting the various claims for telepathy to the test in dozens of rigorous scientific studies. The results and their implications are dividing even the researchers who uncovered them.

Some researchers say the results constitute compelling evidence that telepathy is genuine. Other parapsychologists believe the field is on the brink of collapse, having tried to produce definitive scientific proof and failed. Sceptics and advocates alike do concur on one issue, however: that the most impressive evidence so far has come from the so-called 'ganzfeld' experiments, a German term that means 'whole field'. Reports of telepathic experiences had by people during meditation led parapsychologists to suspect that telepathy might involve 'signals' passing between people that were so faint that they were usually swamped by normal brain activity. In this case, such signals might be more easily detected by those experiencing meditation-like tranquillity in a relaxing 'whole field' of light, sound and warmth.

The ganzfeld experiment tries to recreate these conditions with participants sitting in soft reclining chairs in a sealed room, listening to relaxing sounds while their eyes are covered with special filters letting in only soft pink light. In

early ganzfeld experiments, the telepathy test involved identification of a picture chosen from a random selection of four taken from a large image bank. The idea was that a person acting as a 'sender' would attempt to beam the image over to the 'receiver' relaxing in the sealed room.

Once the session was over, this person was asked to identify which of the four images had been used. Random guessing would give a hit-rate of 25 per cent; if telepathy is real, however, the hit-rate would be higher. In 1982, the results from the first ganzfeld studies were analysed by one of its pioneers, the American parapsychologist Charles Honorton. They pointed to typical hit-rates of better than 30 per cent - a small effect, but one which statistical tests suggested could not be put down to chance.

The implication was that the ganzfeld method had revealed real evidence for telepathy. But there was a crucial flaw in this argument - one routinely overlooked in more conventional areas of science. Just because chance had been ruled out as an explanation did not prove telepathy must exist; there were many other ways of getting positive results. These ranged from 'sensory leakage' - where clues about the pictures accidentally reach the receiver - to outright fraud. In response, the researchers issued a review of all the ganzfeld studies done up to 1985 to show that 80 per cent had found statistically significant evidence. However, they also agreed that there were still too many problems in the experiments which could lead to positive results, and they drew up a list demanding new standards for future research.

After this, many researchers switched to autoganzfeld tests - an automated variant of the technique which used computers to perform many of the key tasks such as the random selection of images. By minimising human involvement, the idea was to minimise the risk of flawed results. In 1987, results from hundreds of autoganzfeld tests were studied by Honorton in a 'meta-analysis', a statistical technique for finding the overall results from a set of studies. Though less compelling than before, the outcome was still impressive.

Yet some parapsychologists remain disturbed by the lack of consistency between individual ganzfeld studies. Defenders of telepathy point out that demanding impressive evidence from every study ignores one basic statistical fact: it takes large samples to detect small effects. If, as current results suggest, telepathy produces hit-rates only marginally above the 25 per cent expected by chance, it's unlikely to be detected by a typical ganzfeld study involving around 40 people: the group is just not big enough. Only when many studies are combined in a meta-analysis will the faint signal of telepathy really become apparent. And that is what researchers do seem to be finding.

What they are certainly not finding, however, is any change in attitude of mainstream scientists: most still totally reject the very idea of telepathy. The problem stems at least in part from the lack of any plausible mechanism for telepathy.

Various theories have been put forward, many focusing on esoteric ideas from theoretical physics. They include 'quantum entanglement', in which events affecting one group of atoms instantly affect another group, no matter how far apart they may be. While physicists have demonstrated entanglement with specially prepared atoms, no-one knows if it also exists between atoms

making up human minds. Answering such questions would transform parapsychology. This has prompted some researchers to argue that the future lies not in collecting more evidence for telepathy, but in probing possible mechanisms. Some work has begun already, with researchers trying to identify people who are particularly successful in autoganzfeld trials. Early results show that creative and artistic people do much better than average: in one study at the University of Edinburgh, musicians achieved a hit-rate of 56 per cent. Perhaps more tests like these will eventually give the researchers the evidence they are seeking and strengthen the case for the existence of telepathy.

Questions 27-30

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

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

- A the discovery of a mechanism for telepathy.
- B the need to create a suitable environment for telepathy.
- C their claims of a high success rate.
- D a solution to the problem posed by random guessing.
- E the significance of the ganzfeld experiments.
- F a more careful selection of subjects.
- G a need to keep altering conditions.

27 Researchers with differing attitudes towards telepathy agree on

28 Reports of experiences during meditation indicated

29 Attitudes to parapsychology would alter drastically with

30 Recent autoganzfeld trials suggest that success rates will improve with

Questions 31-40

Complete the table below.

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

Write your answers in boxes 31-40 on your answer sheet.

Telepathy Experiments			
Name/Date	Description	Result	Flaw
Ganzfeld	Involved a person acting as	Hit-rates were higher than	Positive results could be produced by factors

studies 1982	a 31 [] , who picked out one 32 [] from a random selection of four, and a 33 [] , who then tried to identify it.	with random guessing.	such as 34 [] or 35 []
Autoganzfeld studies 1987	36 [] were used for key tasks to limit the amount of 37 [] in carrying out the tests.	The results were then subjected to a 38 []	The 39 [] between different test results was put down to the fact that sample groups were not 40 [] (as with most ganzfeld studies).

ANSWER FOR READING PASSAGE 18

Reading passage –1 A chronicle of timekeeping answers

1. D	8. A
2. B	9. (ship's) anchor/(an/the) anchor
3. F	10. (escape) wheel
4. E	11. tooth
5. B	12. (long) pendulum
6. F	13. second
7. D	

Reading passage – 2 Air traffic control in the USA

1. ii	8. FALSE
2. iii	9. NOT GIVEN

3. v	10. TRUE
4. iv	11. TRUE
5. viii	12. FALSE
6. vii	13. TRUE
7. FALSE	

Reading passage –3 Telepathy

1. E	8. sensory leakage, (outright) fraud IN EITHER ORDER
2. B	9. sensory leakage, (outright) fraud IN EITHER ORDER
3. A	10. computers
4. F	11. human involvement
5. sender	12. meta-analysis
6. picture/image	13. lack of consistency
7. receiver	14. big/large enough

TEST 19

READING PASSAGE 1--Sheet glass manufacture: the float process

Glass, which has been made since the time of the Mesopotamians and Egyptians, is little more than a mixture of sand, soda ash and lime. When heated to about 1500 degrees Celsius (°C) this becomes a molten mass that hardens when slowly cooled. The first successful method for making clear, flat glass involved spinning. This method was very effective as the glass had not touched any surfaces between being soft and becoming hard, so it stayed perfectly unblemished, with a 'fire finish'. However, the process took a long time and was labour intensive.

Nevertheless, demand for flat glass was very high and glassmakers across the world were looking for a method of making it continuously. The first continuous ribbon process involved squeezing molten glass through two hot rollers, similar to an old mangle. This allowed glass of virtually any thickness to be made non-stop, but the rollers would leave both sides of the glass marked, and these would then need to be ground and polished. This part of the process rubbed away around 20 per cent of the glass, and the machines were very expensive.

The float process for making flat glass was invented by Alistair Pilkington. This process allows the manufacture of clear, tinted and coated glass for buildings, and clear and tinted glass for vehicles. Pilkington had been experimenting with improving the melting process, and in 1952 he had the idea of using a bed of molten metal to form the flat glass, eliminating altogether the need for rollers within the float bath. The metal had to melt at a temperature less than the hardening point of glass (about 600°C), but could not boil at a temperature below the temperature of the molten glass (about 1500°C). The best metal for the job was tin.

The rest of the concept relied on gravity, which guaranteed that the surface of the molten metal was perfectly flat and horizontal. Consequently, when pouring molten glass onto the molten tin, the underside of the glass would also be perfectly flat. If the glass were kept hot enough, it would flow over the molten tin until the top surface was also flat, horizontal and perfectly parallel to the bottom surface. Once the glass cooled to 604°C or less it was too hard to mark and could be transported out of the cooling zone by rollers. The glass settled to a thickness of six millimetres because of surface tension interactions between the glass and the tin. By fortunate coincidence, 60 per cent of the flat glass market at that time was for six-millimetre glass.

Pilkington built a pilot plant in 1953 and by 1955 he had convinced his company to build a full-scale plant. However, it took 14 months of non-stop production, costing the company £100,000 a month, before the plant produced any usable glass. Furthermore, once they succeeded in making marketable flat glass, the machine was turned off for a service to prepare it for years of continuous production. When it started up again it took another four months to get the process right again. They finally succeeded in 1959 and there are now float plants all over the world, with each able to produce around 1000 tons of glass every day, non-stop for around 15 years.

Float plants today make glass of near optical quality. Several processes - melting, refining, homogenising - take place simultaneously in the 2000 tonnes of molten glass in the furnace. They occur in separate zones in a complex glass flow driven by high temperatures. It adds up to a continuous melting process, lasting as long as 50 hours, that delivers glass smoothly and continuously to the float bath, and from there to a coating zone and finally a heat treatment zone, where stresses formed during cooling are relieved.

The principle of float glass is unchanged since the 1950s. However, the product has changed dramatically, from a single thickness of 6.8 mm to a range from sub-millimetre to 25 mm, from a ribbon frequently marred by inclusions and bubbles to almost optical perfection. To ensure the highest quality, inspection takes place at every stage. Occasionally, a bubble is not removed during refining, a sand grain refuses to melt, a tremor in the tin puts ripples into the glass ribbon. Automated on-line inspection does two

things. Firstly, it reveals process faults upstream that can be corrected. Inspection technology allows more than 100 million measurements a second to be made across the ribbon, locating flaws the unaided eye would be unable to see. Secondly, it enables computers downstream to steer cutters around flaws.

Float glass is sold by the square metre, and at the final stage computers translate customer requirements into patterns of cuts designed to minimise waste.

Questions 1-8

Complete the table and diagram below.

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

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

Early methods of producing flat glass

Method	Advantages	Disadvantages
1	<ul style="list-style-type: none">Glass remained2	<ul style="list-style-type: none">Slow3
Ribbon	<ul style="list-style-type: none">Could produce glass sheets of varying 4Non-stop process	<ul style="list-style-type: none">Glass was 520% of glass rubbed awayMachines were expensive

6

7

8

Questions 9-13

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

In boxes 9-13 on your answer sheet, write

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

9 The metal used in the float process had to have specific properties.

- 10 Pilkington invested some of his own money in his float plant.
- 11 Pilkington's first full-scale plant was an instant commercial success.
- 12 The process invented by Pilkington has now been improved.
- 13 Computers are better than humans at detecting faults in glass.

READING PASSAGE 2--The little ice age

A - People have always responded to climate change

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 relevance of the Little Ice Age today

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 - How past climatic conditions can be determined

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 - A study covering a thousand years

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 - Enough food at last

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 - Human impact on the climate

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 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 14-18 on your answer sheet.

Example	Answer
Paragraph A	viii

14 Paragraph

Example	Answer
Paragraph C	v

15 Paragraph

16 Paragraph

17 Paragraph

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

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.

Aclimatic shifts Bice cores Ctree rings

Dglaciers Einteractions Fweather observations
Gheat waves Hstorms 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 10-13 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 3--The meaning and power of smell

The sense of smell, or olfaction, is powerful. Odours affect us on a physical, psychological and social level. For the most part, however, we breathe in the aromas which surround us without being consciously aware of their importance to us. It is only when the faculty of smell is impaired for some reason that we begin to realise the essential role the sense of smell plays in our sense of well-being

A - The relationship between smell and feelings

A survey conducted by Anthony Synott at Montreal's Concordia University asked participants to comment on how important smell was to them in their lives. It became apparent that smell can evoke strong emotional responses. A scent associated with a good experience can bring a rush of joy, while a foul odour or one associated with a bad memory may make us grimace with disgust. Respondents to the survey noted that many of their olfactory likes and dislikes were based on emotional associations. Such associations can be powerful enough so that odours that we would generally label unpleasant become agreeable, and those that we would generally consider fragrant become disagreeable for particular individuals. The perception of smell, therefore, consists not only of the sensation of the odours themselves, but of the experiences and emotions associated with them.

B - The role of smell in personal relationships

Odours are also essential cues in social bonding. One respondent to the survey believed that there is no true emotional bonding without touching and smelling a loved one. In fact, infants recognise the odours of their mothers soon after birth and adults can often identify their children or spouses by scent. In one well-known test, women and men were able to distinguish by smell alone clothing worn by their marriage partners from similar clothing worn by other people. Most of the subjects would probably never have given much thought to odour as a cue for identifying family members before being involved in the test, but as the experiment revealed, even when not consciously considered, smells register.

C - Why our sense of smell is not appreciated

In spite of its importance to our emotional and sensory lives, smell is probably the most undervalued sense in many cultures. The reason often given for the low regard in which smell is held is that, in comparison with its importance among animals, the human sense of smell is feeble and undeveloped. While it is true that the olfactory powers of humans are nothing like as fine as those possessed by certain animals, they are still remarkably acute. Our noses are able to recognise thousands of smells, and to perceive odours which are present only in extremely small quantities.

D - The difficulties of talking about smells

Smell, however, is a highly elusive phenomenon. Odours, unlike colours, for instance, cannot be named in many languages because the specific vocabulary simply doesn't exist. 'It smells like . . . , we have to say when describing an odour, struggling to express our olfactory experience. Nor can odours be recorded: there is no effective way to either capture or store them over time. In the realm of olfaction, we must make do with descriptions and recollections. This has implications for olfactory research.

E - Future studies into smell

Most of the research on smell undertaken to date has been of a physical scientific nature. Significant advances have been made in the understanding of the biological and chemical nature of olfaction, but many fundamental questions have yet to be answered. Researchers have still to decide whether smell is one sense or two - one responding to odours proper and the other registering odourless chemicals in the air. Other unanswered questions are whether the nose is the only part of the body affected by odours, and how smells can be measured objectively given the nonphysical components. Questions like these mean that interest in the psychology of smell is inevitably set to play an increasingly important role for researchers.

F - The interpretation of smells as a factor in defining groups

However, smell is not simply a biological and psychological phenomenon. Smell is cultural, hence it is a social and historical phenomenon. Odours are invested with cultural values: smells that are considered to be offensive in some cultures may be perfectly acceptable in others. Therefore, our sense of smell is a means of, and model for, interacting with the world. Different smells can provide us with intimate and emotionally charged experiences and the value that we attach to these experiences is interiorised by the members of society in a deeply personal way. Importantly, our commonly held feelings about smells can help distinguish us from other cultures. The study of the

cultural history of smell is, therefore, in a very real sense, an investigation into the essence of human culture.

Questions 27-32

Reading Passage 3 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 1-6 on your answer sheet.

List of Headings

- i The difficulties of talking about smells
- ii The role of smell in personal relationships
- iii Future studies into smell
- iv The relationship between the brain and the nose
- v The interpretation of smells as a factor in defining groups
- vi Why our sense of smell is not appreciated
- vii Smell is our superior sense
- viii The relationship between smell and feelings

27 Paragraph A

28 Paragraph B

29 Paragraph C

30 Paragraph D

31 Paragraph E

32 Paragraph F

Questions 33-36

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

Write the correct letter in boxes 33-36 on your answer sheet.

33 According to the introduction, we become aware of the importance of smell when

- A we discover a new smell.
- B we experience a powerful smell.
- C our ability to smell is damaged.

D we are surrounded by odours.

34 The experiment described in paragraph B

- A shows how we make use of smell without realising it.
- B demonstrates that family members have a similar smell.
- C proves that a sense of smell is learnt.
- D compares the sense of smell in males and females.

35 What is the writer doing in paragraph C?

- A supporting other research
- B making a proposal
- C rejecting a common belief
- D describing limitations

36 What does the writer suggest about the study of smell in the atmosphere in paragraph E?

- A The measurement of smell is becoming more accurate.
- B Researchers believe smell is a purely physical reaction.
- C Most smells are inoffensive.
- D Smell is yet to be defined.

Questions 37-40

Complete the sentences below.

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

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

37 Tests have shown that odours can help people recognise the belonging to their husbands and wives.

38 Certain linguistic groups may have difficulty describing smell because they lack the appropriate

39 The sense of smell may involve response to [] which do not smell, in addition to obvious odours.

40 Odours regarded as unpleasant in certain [] are not regarded as unpleasant in others.

ANSWER FOR READING PASSAGE 19

Reading passage –1 Sheet glass manufacture: the float process

1. spinning	8. rollers
2. (perfectly) unblemished	9. TRUE
3. labour/labor-intensive	10. NOT GIVEN
4. thickness	11. FALSE
5. marked	12. TRUE
6. (molten) glass	13. TRUE
7. (molten) tin/metal	

Reading passage –2 The little ice age

1. ii	8. H
2. vii	9. G
3. ix	10. C
4. iv	11. C
5. 18&19 IN EITHER ORDER C,B	12. A
6. 18&19 IN EITHER ORDER C,B	13. B
7. A	

Reading passage –3The meaning and power of smell

1. viii	8. A
2. ii	9. C
3. vi	10. D
4. i	11. clothing
5. iii	12. vocabulary
6. v	13. chemicals
7. C	14. cultures

TEST 20

READING PASSAGE 1--Striking back at lightning with lasers

Seldom is the weather more dramatic than when thunderstorms strike. Their electrical fury inflicts death or serious injury on around 500 people each year in the United States alone. As the clouds roll in, a leisurely round of golf can become a terrifying dice with death - out in the open, a lone golfer may be a lightning bolt's most inviting target. And there is damage to property too. Lightning damage costs American power companies more than \$100 million a year.

But researchers in the United States and Japan are planning to hit back. Already in laboratory trials they have tested strategies for neutralising the power of thunderstorms, and this winter they will brave real storms, equipped with an armoury of lasers that they will be pointing towards the heavens to discharge thunderclouds before lightning can strike.

The idea of forcing storm clouds to discharge their lightning on command is not new. In the early 1960s, researchers tried firing rockets trailing wires into thunderclouds to set up an easy discharge path for the huge electric charges that these clouds generate. The technique survives to this day at a test site in Florida run by the University of Florida, with support from the Electrical Power Research Institute (EPRI), based in California. EPRI, which is funded by power companies, is looking at ways to protect the United States' power grid from lightning strikes. 'We can cause the lightning to strike where we want it to using rockets,' says Ralph Bernstein, manager of lightning projects at EPRI.

The rocket site is providing precise measurements of lightning voltages and allowing engineers to check how electrical equipment bears up.

Bad behaviour

But while rockets are fine for research, they cannot provide the protection from lightning strikes that everyone is looking for. The rockets cost around \$1,200 each, can only be fired at a limited frequency and their failure rate is about 40 per cent. And even when they do trigger lightning, things still do not always go according to plan. 'Lightning is not perfectly well behaved,' says Bernstein. 'Occasionally, it will take a branch and go someplace it wasn't supposed to go.'

And anyway, who would want to fire streams of rockets in a populated area? 'What goes up must come down,' points out Jean-Claude Diels of the University of New Mexico. Diels is leading a project, which is backed by EPRI, to try to use lasers to discharge lightning safely - and safety is a basic requirement since no one wants to put themselves or their expensive equipment at risk. With around \$500,000 invested so far, a promising system is just emerging from the laboratory.

The idea began some 20 years ago, when high-powered lasers were revealing their ability to extract electrons out of atoms and create ions. If a laser could generate a line of ionisation in the air all the way up to a storm cloud, this conducting path could be used to guide lightning to Earth, before the electric field becomes strong enough to break down the air in an uncontrollable surge. To stop the laser itself being struck, it would not be pointed straight at the clouds. Instead it would be directed at a mirror, and from there into the sky. The mirror would be protected by placing lightning conductors close by. Ideally, the cloud-zapper (gun) would be cheap enough to be installed around all key power installations, and portable enough to be taken to international sporting events to beam up at brewing storm clouds.

A stumbling block

However, there is still a big stumbling block. The laser is no nifty portable: it's a monster that takes up a whole room. Diels is trying to cut down the size and says that a laser around the size of a small table is in the offing. He plans to test this more manageable system on live thunderclouds next summer. Bernstein says that Diels's system is attracting lots of interest from the power companies.

But they have not yet come up with the \$5 million that EPRI says will be needed to develop a commercial system, by making the lasers yet smaller and cheaper. I cannot say I have money yet, but I'm working on it,' says Bernstein. He reckons that the forthcoming field tests will be the turning point - and he's hoping for good news. Bernstein predicts 'an avalanche of interest and support' if all goes well. He expects to see cloud-zappers eventually costing \$50,000 to \$100,000 each.

Other scientists could also benefit. With a lightning 'switch' at their fingertips, materials scientists could find out what happens when mighty currents meet matter. Diels also hopes to see the birth of 'interactive meteorology' - not just forecasting the weather but controlling it. 'If we could discharge clouds, we might affect the weather,' he says.

And perhaps, says Diels, we'll be able to confront some other meteorological menaces. 'We think we could prevent hail by inducing lightning,' he says. Thunder, the shock wave that comes from a lightning flash, is thought to be the trigger for the torrential rain that is typical of storms. A laser thunder factory could shake the moisture out of clouds, perhaps preventing the formation of the giant hailstones that threaten crops. With luck, as the storm clouds gather this winter, laser-toting researchers could, for the first time, strike back.

Questions 1-3

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

Write the correct letter in boxes 1-3 on your answer sheet.

1 The main topic discussed in the text is

- A the damage caused to US golf courses and golf players by lightning strikes.
- B the effect of lightning on power supplies in the US and in Japan.
- C a variety of methods used in trying to control lightning strikes.
- D a laser technique used in trying to control lightning strikes.

2 According to the text, every year lightning

- A does considerable damage to buildings during thunderstorms.
- B kills or injures mainly golfers in the United States.
- C kills or injures around 500 people throughout the world.
- D damages more than 100 American power companies.

3 Researchers at the University of Florida and at the University of New Mexico

- A receive funds from the same source.
- B are using the same techniques.
- C are employed by commercial companies.
- D are in opposition to each other.

Questions 4-6

Complete the sentences below.

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

Write your answers in boxes 4-6 on your answer sheet.

- 4 EPRI receives financial support from
- 5 The advantage of the technique being developed by Diels is that it can be used
- 6 The main difficulty associated with using the laser equipment is related to its

Questions 7-10

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

Write the correct letter, A-I, in boxes 7-10 on your answer sheet.

In this method, a laser is used to create a line of ionisation by removing electrons from 7 This laser is then directed at 8 in order to control electrical charges, a method which is less dangerous than using 9 As a protection for the lasers, the beams are aimed firstly at 10 .

A cloud-zappers Batoms C storm clouds

D mirrors E technique F ions

G rockets H conductors I thunder

Questions 11-13

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

In boxes 11-13 on your answer sheet write

YES if the statement agrees with the claims of the writer

NO if the statement contradicts the claims of the writer

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

11 Power companies have given Diels enough money to develop his laser.

12 Obtaining money to improve the lasers will depend on tests in real storms.

13 Weather forecasters are intensely interested in Diels's system.

READING PASSAGE 2--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 3--How does the biological clock tick

A - Limitations of life span

Our life span is restricted. Everyone accepts this as 'biologically' obvious. 'Nothing lives for ever!' However, in this statement we think of artificially produced, technical objects, products which are subjected to natural wear and tear during use. This leads to the result that at some time or other the object stops working and is unusable ('death' in the biological sense). But are the wear and tear and loss of function of technical objects and the death of living organisms really similar or comparable?

B - Fundamental differences in ageing of objects and organisms

Our 'dead' products are 'static', closed systems. It is always the basic material which constitutes the object and which, in the natural course of things, is worn down and becomes 'older'. Ageing in this case must occur according to the laws of physical chemistry and of thermodynamics. Although the same law holds for a living organism, the result of this law is not inexorable in the same way. At least as long as a biological system has the ability to renew itself it could actually become older without ageing; an organism is an open, dynamic system through which new material continuously flows. Destruction of old material and formation of new material are thus in permanent dynamic equilibrium. The material of which the organism is formed changes continuously. Thus our bodies continuously exchange old substance for new, just like a spring which more or less maintains its form and movement, but in which the water molecules are always different.

C - Why dying is beneficial

Thus ageing and death should not be seen as inevitable, particularly as the organism possesses many mechanisms for repair. It is not, in principle, necessary for a biological system to age and die. Nevertheless, a restricted life span, ageing, and then death are basic characteristics of life. The reason for this is easy to recognise: in nature, the existent organisms either adapt or are regularly replaced by new types. Because of changes in the genetic material (mutations) these have new characteristics and in the course of their individual lives they are tested for optimal or better adaptation to the environmental conditions. Immortality would disturb this system - it needs room for new and better life. This is the basic problem of evolution.

D - A stable life span despite improvements

Every organism has a life span which is highly characteristic. There are striking differences in life span between different species, but within one species the parameter is relatively constant. For example, the average duration of human life has hardly changed in thousands of years. Although more and more people attain an advanced age as a result of developments in medical care and better nutrition, the characteristic upper limit for most remains 80 years. A further argument against the simple wear and tear theory is the

observation that the time within which organisms age lies between a few days (even a few hours for unicellular organisms) and several thousand years, as with mammoth trees.

E - The biological clock

If a life span is a genetically determined biological characteristic, it is logically necessary to propose the existence of an internal clock, which in some way measures and controls the ageing process and which finally determines death as the last step in a fixed programme. Like the life span, the metabolic rate has for different organisms a fixed mathematical relationship to the body mass. In comparison to the life span this relationship is 'inverted': the larger the organism the lower its metabolic rate. Again this relationship is valid not only for birds, but also, similarly on average within the systematic unit, for all other organisms (plants, animals, unicellular organisms).

F - Energy consumption

Animals which behave 'frugally' with energy become particularly old, for example, crocodiles and tortoises. Parrots and birds of prey are often held chained up. Thus they are not able to 'experience life' and so they attain a high life span in captivity. Animals which save energy by hibernation or lethargy (e.g. bats or hedgehogs) live much longer than those which are always active. The metabolic rate of mice can be reduced by a very low consumption of food (hunger diet). They then may live twice as long as their well fed comrades. Women become distinctly (about 10 per cent) older than men. If you examine the metabolic rates of the two sexes you establish that the higher male metabolic rate roughly accounts for the lower male life span. That means that they live life 'energetically' - more intensively, but not for as long.

G - Prolonging your life

It follows from the above that sparing use of energy reserves should tend to extend life. Extreme high performance sports may lead to optimal cardiovascular performance, but they quite certainly do not prolong life. Relaxation lowers metabolic rate, as does adequate sleep and in general an equable and balanced personality. Each of us can develop his or her own 'energy saving programme' with a little self-observation, critical self-control and, above all, logical consistency. Experience will show that to live in this way not only increases the life span but is also very healthy. This final aspect should not be forgotten.

Questions 27-32

Reading Passage 3 has seven paragraphs, A-G.

Choose the correct heading for paragraphs B-G from the list of headings below.

Write the correct number, i-x, in boxes 27-32 on your answer sheet.

List of Headings

- i The biological clock
- ii Why dying is beneficial

- iii The ageing process of men and women
- iv Prolonging your life
- v Limitations of life span
- vi Modes of development of different species
- vii A stable life span despite improvements
- viii Energy consumption
- ix Fundamental differences in ageing of objects and organisms
- x Repair of genetic material

Example	Answer
Paragraph A	V

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

Questions 33-36

Complete the notes below.

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

Write your answers in boxes 33-36 on your answer sheet.

- Objects age in accordance with principles of 33 and of 34
- Through mutations, organisms can 35 better to the environment
- 36 would pose a serious problem for the theory of evolution

Questions 37-40

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

In boxes 37-40 on your answer sheet, write

YES if the statement agrees with the views of the writer

NO if the statement contradicts the views of the writer

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

37 The wear and tear theory applies to both artificial objects and biological systems.

38 In principle, it is possible for a biological system to become older without ageing.

39 Within seven years, about 90 per cent of a human body is replaced as new.

40 Conserving energy may help to extend a human's life.

ANSWER FOR READING PASSAGE 20

Reading passage –1 Striking back at lightning with lasers

1. D	8. C
2. A	9. G
3. A	10. D
4. power companies	11. NO
5. safely	12. YES
6. size	13. NOT GIVEN
7. B	

Reading passage –2 The nature of genius

1. B, C, F, H, J IN ANY ORDER	8. FALSE
2. B, C, F, H, J IN ANY ORDER	9. TRUE
3. B, C, F, H, J IN ANY ORDER	10. TRUE

4. B, C, F, H, J IN ANY ORDER	11. NOT GIVEN
5. B, C, F, H, J IN ANY ORDER	12. TRUE
6. TRUE	13. NOT GIVEN
7. TRUE	

Reading passage –3 **How does the biological clock tick**

1. ix	8. physical chemistry, thermodynamics IN EITHER ORDER
2. ii	9. adapt
3. vii	10. immortality
4. i	11. NO
5. viii	12. YES
6. iv	13. NOT GIVEN
7. physical chemistry, thermodynamics IN EITHER ORDER	14. YES

TEST 21

READING PASSAGE 1--LAND OF THE RISING SUN

A - Research findings concerning achievements in maths

Japan has a significantly better record in terms of average mathematical attainment than England and Wales. Large sample international comparisons of pupils' attainments since the 1960s have established that not only did Japanese pupils at age 13 have better scores of average attainment, but there was also a larger proportion of 'low' attainers in England, where, incidentally, the variation in attainment scores was much greater. The percentage of Gross National Product spent on education is reasonably similar in the two countries, so how is this higher and more consistent attainment in maths achieved?

B - Background to middle-years education in Japan

Lower secondary schools in Japan cover three school years, from the seventh grade (age 13) to the ninth grade (age 15). Virtually all pupils at this stage attend state schools: only 3 per cent are in the private sector. Schools are usually modern in design, set well back from the road and spacious inside. Classrooms are large and pupils sit at single desks in rows. Lessons last for a standardised 50 minutes and are always followed by a 10-minute break, which gives the pupils a chance to let off steam. Teachers begin with a formal address and mutual bowing, and then concentrate on whole-class teaching.

Classes are large - usually about 40 - and are unstreamed. Pupils stay in the same class for all lessons throughout the school and develop considerable class identity and loyalty. Pupils attend the school in their own neighbourhood, which in theory removes ranking by school. In practice in Tokyo, because of the relative concentration of schools, there is some competition to get into the 'better' school in a particular area.

C - The influence of Monbusho

Traditional ways of teaching form the basis of the lesson and the remarkably quiet classes take their own notes of the points made and the examples demonstrated. Everyone has their own copy of the textbook supplied by the central education authority, Monbusho, as part of the concept of free compulsory education up to the age of 15. These textbooks are, on the whole, small, presumably inexpensive to produce, but well set out and logically developed. (One teacher was particularly keen to introduce colour and pictures into maths textbooks: he felt this would make them more accessible to pupils brought up in a cartoon culture.) Besides approving textbooks, Monbusho also decides the highly centralised national curriculum and how it is to be delivered.

D - The typical format of a maths lesson

Lessons all follow the same pattern. At the beginning, the pupils put solutions to the homework on the board, then the teachers comment, correct or elaborate as necessary. Pupils mark their own homework: this is an important principle in Japanese schooling as it enables pupils to see where and why they made a mistake, so that these can be avoided in future. No one minds mistakes or ignorance as long as you are prepared to learn from them.

After the homework has been discussed, the teacher explains the topic of the lesson, slowly and with a lot of repetition and elaboration. Examples are demonstrated on the board; questions from the textbook are worked through first with the class, and then the class is set questions from the textbook to do individually. Only rarely are supplementary worksheets distributed in a maths class. The impression is that the logical nature of the textbooks and their comprehensive coverage of different types of examples, combined with the relative homogeneity of the class, renders work sheets unnecessary. At this point, the teacher would circulate and make sure that all the pupils were coping well.

E - Helping less successful students

It is remarkable that large, mixed-ability classes could be kept together for maths throughout all their compulsory schooling from 6 to 15. Teachers say that they give individual help at the end of a lesson or after school, setting

extra work if necessary. In observed lessons, any strugglers would be assisted by the teacher or quietly seek help from their neighbour. Carefully fostered class identity makes pupils keen to help each other - anyway, it is in their interests since the class progresses together.

This scarcely seems adequate help to enable slow learners to keep up. However, the Japanese attitude towards education runs along the lines of 'if you work hard enough, you can do almost anything'. Parents are kept closely informed of their children's progress and will play a part in helping their children to keep up with class, sending them to 'Juku' (private evening tuition) if extra help is needed and encouraging them to work harder. It seems to work, at least for 95 per cent of the school population.

F - The key to Japanese successes in maths education

So what are the major contributing factors in the success of maths teaching? Clearly, attitudes are important. Education is valued greatly in Japanese culture; maths is recognised as an important compulsory subject throughout schooling; and the emphasis is on hard work coupled with a focus on accuracy.

Other relevant points relate to the supportive attitude of a class towards slower pupils, the lack of competition within a class, and the positive emphasis on learning for oneself and improving one's own standard. And the view of repetitively boring lessons and learning the facts by heart, which is sometimes quoted in relation to Japanese classes, may be unfair and unjustified. No poor maths lessons were observed. They were mainly good and one or two were inspirational.

Questions 1-5

Reading Passage 1 has six sections, A-F.

Choose the correct heading for sections B-F from the list of headings below.

Write the correct number, i-ix, in boxes 1-5 on your answer sheet.

List of Headings

- i The influence of Monbusho
- ii Helping less successful students
- iii The success of compulsory education
- iv Research findings concerning achievements in maths
- v The typical format of a maths lesson
- vi Comparative expenditure on maths education
- vii Background to middle-years education in Japan
- viii The key to Japanese successes in maths education
- ix The role of homework correction

Example	Answer
Section A	iv

- 1 Section B
- 2 Section C
- 3 Section D
- 4 Section E
- 5 Section F

Questions 6-9

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

In boxes 6-9 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

6 There is a wider range of achievement amongst English pupils studying maths than amongst their Japanese counterparts.

7 The percentage of Gross National Product spent on education generally reflects the level of attainment in mathematics.

8 Private schools in Japan are more modern and spacious than state-run lower secondary schools.

9 Teachers mark homework in Japanese schools.

Questions 10-13

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

Write the correct letter in boxes 10-13 on your answer sheet.

10 Maths textbooks in Japanese schools are

- A cheap for pupils to buy.
- B well organised and adapted to the needs of the pupils.
- C written to be used in conjunction with TV programmes.
- D not very popular with many Japanese teachers.

- 11 When a new maths topic is introduced,
- A students answer questions on the board.
 - B students rely entirely on the textbook.
 - C it is carefully and patiently explained to the students.
 - D it is usual for students to use extra worksheets.

- 12 How do schools deal with students who experience difficulties?
- A They are given appropriate supplementary tuition.
 - B They are encouraged to copy from other pupils.
 - C They are forced to explain their slow progress.
 - D They are placed in a mixed-ability class.

- 13 Why do Japanese students tend to achieve relatively high rates of success in maths?
- A It is a compulsory subject in Japan.
 - B They are used to working without help from others.
 - C Much effort is made and correct answers are emphasised.
 - D There is a strong emphasis on repetitive learning.

READING PASSAGE 2--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, Neodumetiasangawani, 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 *Salviniamolesta*, 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.

A forage grass. F parthenium weed.

B rice fields. G Brazilian beetles.

C coconut trees. H grass-scale insects.

D fruit trees. I larval parasites.

E water hyacinth.

22 Disapene scale insects feed on

23 Neodumetiasangawani ate

24 Leaf-mining hispides blighted

25 An Argentinian weevil may be successful in wiping out

26 Salviniamolesta plagues

READING PASSAGE 3--Collecting ant specimens

Collecting ants can be as simple as picking up stray ones and placing them in a glass jar, or as complicated as completing an exhaustive survey of all species present in an area and estimating their relative abundances. The exact method used will depend on the final purpose of the collections. For taxonomy, or classification, long series, from a single nest, which contain all castes (workers, including majors and minors, and, if present, queens and males) are desirable, to allow the determination of variation within species. For ecological studies, the most important factor is collecting identifiable samples of as many of the different species present as possible. Unfortunately, these methods are not always compatible. The taxonomist sometimes overlooks whole species in favour of those groups currently under study, while the ecologist often collects only a limited number of specimens of each species, thus reducing their value for taxonomic investigations.

To collect as wide a range of species as possible, several methods must be used. These include hand collecting, using baits to attract the ants, ground litter sampling, and the use of pitfall traps. Hand collecting consists of searching for ants everywhere they are likely to occur. This includes on the ground, under rocks, logs or other objects on the ground, in rotten wood on the ground or on trees, in vegetation, on tree trunks and under bark. When possible, collections should be made from nests or foraging columns and at least 20 to 25 individuals collected. This will ensure that all individuals are of the same species, and so increase their value for detailed studies. Since some species are largely nocturnal, collecting should not be confined to daytime. Specimens are collected using an aspirator (often called a pooter), forceps, a fine, moistened paint brush, or fingers, if the ants are known not to sting. Individual insects are placed in plastic or glass tubes (1.5-3-0 ml capacity for small ants, 5-8 ml for larger ants) containing 75% to 95% ethanol. Plastic tubes with secure tops are better than glass because they are lighter, and do not break as easily if mishandled.

Baits can be used to attract and concentrate foragers. This often increases the number of individuals collected and attracts species that are otherwise elusive. Sugars and meats or oils will attract different species and a range should be utilised. These baits can be placed either on the ground or on the trunks of trees or large shrubs. When placed on the ground, baits should be situated on small paper cards or other flat, light-coloured surfaces, or in test-tubes or vials. This makes it easier to spot ants and to capture them before they can escape into the surrounding leaf litter.

Many ants are small and forage primarily in the layer of leaves and other debris on the ground. Collecting these species by hand can be difficult. One of the most successful ways to collect them is to gather the leaf litter in which they are foraging and extract the ants from it. This is most commonly done by placing leaf litter on a screen over a large funnel, often under some heat. As the leaf litter dries from above, ants (and other animals) move downward and eventually fall out the bottom and are collected in alcohol placed below the funnel. This method works especially well in rain forests and marshy areas. A method of improving the catch when using a funnel is to sift the leaf litter through a coarse screen before placing it above the funnel. This will

concentrate the litter and remove larger leaves and twigs. It will also allow more litter to be sampled when using a limited number of funnels.

The pitfall trap is another commonly used tool for collecting ants. A pitfall trap can be any small container placed in the ground with the top level with the surrounding surface and filled with a preservative. Ants are collected when they fall into the trap while foraging.

The diameter of the traps can vary from about 18 mm to 10 cm and the number used can vary from a few to several hundred. The size of the traps used is influenced largely by personal preference (although larger sizes are generally better), while the number will be determined by the study being undertaken. The preservative used is usually ethylene glycol or propylene glycol, as alcohol will evaporate quickly and the traps will dry out.

One advantage of pitfall traps is that they can be used to collect over a period of time with minimal maintenance and intervention. One disadvantage is that some species are not collected as they either avoid the traps or do not commonly encounter them while foraging.

Questions 27-30

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

In boxes 27-30 on your answer sheet, write

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

- | | | |
|----|----------------------|---|
| 27 | <input type="text"/> | Taxonomic research involves comparing members of one group of ants. |
| 28 | <input type="text"/> | New species of ant are frequently identified by taxonomists. |
| 29 | <input type="text"/> | Range is the key criterion for ecological collections. |
| 30 | <input type="text"/> | A single collection of ants can generally be used for both taxonomic and ecological purposes. |

Questions 31-36

Classify the following statements as referring to

- A hand collecting*
- B using bait*
- C sampling ground litter*
- D using a pitfall trap*

Write the correct letter, A, B, C or D, in boxes 31-36 on your answer sheet.

31 It is preferable to take specimens from groups of ants.

32 It is particularly effective for wet habitats.

33 It is a good method for species which are hard to find.

34 Little time and effort is required.

35 Separate containers are used for individual specimens.

36 Non-alcoholic preservative should be used.

Questions 37-40

Label the diagram below.

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

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

37

38

39

40

ANSWER FOR READING PASSAGE 21

Reading passage -1 LAND OF THE RISING SUN

1. vii	8. NOT GIVEN
2. i	9. NO
3. v	10. B
4. ii	11. C
5. viii	12. A
6. YES	13. C

7. NO	
-------	--

Reading passage –2 **Biological control of pests**

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

Reading passage –3 **Collecting ant specimens**

1. TRUE	8. D
2. NOT GIVEN	9. A
3. TRUE	10. D
4. FALSE	11. heat
5. A	12. leaf litter
6. C	13. screen
7. B	14. alcohol

Test 22

READING PASSAGE 1--William Henry Perkin

William Henry Perkin was born on March 12, 1838, in London, England.

As a boy, Perkin's curiosity prompted early interests in the arts, sciences, photography, and engineering. But it was a chance stumbling upon a run-down, yet functional, laboratory in his late grandfather's home that solidified the young man's enthusiasm for chemistry.

As a student at the City of London School, Perkin became immersed in the study of chemistry. His talent and devotion to the subject were perceived by his teacher, Thomas Hall, who encouraged him to attend a series of lectures given by the eminent scientist Michael Faraday at the Royal Institution. Those speeches fired the young chemist's enthusiasm further, and he later went on to attend the Royal College of Chemistry, which he succeeded in entering in 1853, at the age of 15.

At the time of Perkin's enrolment, the Royal College of Chemistry was headed by the noted German chemist August Wilhelm Hofmann. Perkin's scientific gifts soon caught Hofmann's attention and, within two years, he became Hofmann's youngest assistant. Not long after that, Perkin made the scientific breakthrough that would bring him both fame and fortune.

At the time, quinine was the only viable medical treatment for malaria. The drug is derived from the bark of the cinchona tree, native to South America, and by 1856 demand for the drug was surpassing the available supply. Thus, when Hofmann made some passing comments about the desirability of a synthetic substitute for quinine, it was unsurprising that his star pupil was moved to take up the challenge.

During his vacation in 1856, Perkin spent his time in the laboratory on the top floor of his family's house. He was attempting to manufacture quinine from aniline, an inexpensive and readily available coal tar waste product. Despite his best efforts, however, he did not end up with quinine. Instead, he produced a mysterious dark sludge. Luckily, Perkin's scientific training and nature prompted him to investigate the substance further. Incorporating potassium dichromate and alcohol into the aniline at various stages of the experimental process, he finally produced a deep purple solution. And, proving the truth of the famous scientist Louis Pasteur's words 'chance favours only the prepared mind', Perkin saw the potential of his unexpected find.

Historically, textile dyes were made from such natural sources as plants and animal excretions. Some of these, such as the glandular mucus of snails, were difficult to obtain and outrageously expensive. Indeed, the purple colour extracted from a snail was once so costly that in society at the time only the rich could afford it. Further, natural dyes tended to be muddy in hue and fade quickly. It was against this backdrop that Perkin's discovery was made.

Perkin quickly grasped that his purple solution could be used to colour fabric, thus making it the world's first synthetic dye. Realising the importance of this breakthrough, he lost no time in patenting it. But perhaps the most fascinating

of all Perkin's reactions to his find was his nearly instant recognition that the new dye had commercial possibilities.

Perkin originally named his dye TyrianPurple, but it later became commonly known as mauve (from the French for the plant used to make the colour violet). He asked advice of Scottish dye works owner Robert Pullar, who assured him that manufacturing the dye would be well worth it if the colour remained fast (i.e. would not fade) and the cost was relatively low. So, over the fierce objections of his mentor Hofmann, he left college to give birth to the modern chemical industry.

With the help of his father and brother, Perkin set up a factory not far from London. Utilising the cheap and plentiful coal tar that was an almost unlimited by product of London's gas street lighting, the dye works began producing the world's first synthetically dyed material in 1857. The company received a commercial boost from the Empress Eugenie of France, when she decided the new colour flattered her. Very soon, mauve was the necessary shade for all the fashionable ladies in that country.

Not to be outdone, England's Queen Victoria also appeared in public wearing a mauve gown, thus making it all the rage in England as well. The dye was bold and fast, and the public clamoured for more. Perkin went back to the drawing board.

Although Perkin's fame was achieved and fortune assured by his first discovery, the chemist continued his research. Among other dyes he developed and introduced were aniline red (1859) and aniline black (1863) and, in the late 1860s, Perkin's green. It is important to note that Perkin's synthetic dye discoveries had outcomes far beyond the merely decorative. The dyes also became vital to medical research in many ways. For instance, they were used to stain previously invisible microbes and bacteria, allowing researchers to identify such bacilli as tuberculosis, cholera, and anthrax. Artificial dyes continue to play a crucial role today. And, in what would have been particularly pleasing to Perkin, their current use is in the search for a vaccine against malaria.

Questions 1-7

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

In boxes 1-7 on your answer sheet, write

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

1 Michael Faraday was the first person to recognise Perkin's ability as a student of chemistry.

2 Michael Faraday suggested Perkin should enrol in the Royal College of Chemistry.

3 Perkin employed August Wilhelm Hofmann as his assistant.

- 4 Perkin was still young when he made the discovery that made him rich and famous.
- 5 The trees from which quinine is derived grow only in South America.
- 6 Perkin hoped to manufacture a drug from a coal tar waste product.
- 7 Perkin was inspired by the discoveries of the famous scientist Louis Pasteur.

Questions 8-13

Answer the questions below.

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

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

- 8 Before Perkin's discovery, with what group in society was the colour purple associated?8
- 9 What potential did Perkin immediately understand that his new dye had?9
- 10 What was the name finally used to refer to the first colour Perkin invented?10
- 11 What was the name of the person Perkin consulted before setting up his own dye works?11
- 12 In what country did Perkin's newly invented colour first become fashionable?12
- 13 According to the passage, which disease is now being targeted by researchers using synthetic dyes?13

READING PASSAGE 2--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 civilizations. This search is often known by the acronym SETI [search for extraterrestrial 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 civilization 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 civilizations do survive in our galaxy, their ages will range from zero to several billion years. Thus any other civilization that we hear from is likely to be far older on average than ourselves. The mere existence of such a civilization will tell of that long-term survival is possible, and gives us some cause for optimism. It is even possible that the older civilization 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 recognize it as a life form, quite apart from whatever 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 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 neighbors are perhaps 1000 light years away. which is almost next door in astronomical terms.

D

An alien civilization 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 a high sensibility for signals in the frequency range 1000 to 3000 MHz. The other parts of the project is an undirected search which is monitoring all of the space with a lower 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 civilization. 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 civilization? 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 is 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.

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

Questions 14–17

Reading Passage 49 has five paragraphs, A-E.

Choose the correct heading for paragraphs B-E from the 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 civilizations
- III. Vast distances to Earth's closest neighbors
- 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

Question 18-20

Answer the Questions Below

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 civilizations are SETI scientists searching for?
- 20. How many stars are the world's most powerful radio telescopes searching?

Questions 21-26

In boxes 21-26 on your answer sheet, write:

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this more than once.

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

23. 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 3--The history of the tortoise

If you go back far enough, everything lived in the sea. At various points in evolutionary history, enterprising individuals within many different animal groups moved out onto the land, sometimes even to the most parched deserts, taking their own private seawater with them in blood and cellular fluids. In addition to the reptiles, birds, mammals and insects which we see all around us, other groups that have succeeded out of water include scorpions, snails, crustaceans such as woodlice and land crabs, millipedes and centipedes, spiders and various worms. And we mustn't forget the plants, without whose prior invasion of the land none of the other migrations could have happened.

Moving from water to land involved a major redesign of every aspect of life, including breathing and reproduction. Nevertheless, a good number of thoroughgoing land animals later turned around, abandoned their hard-earned terrestrial re-tooling, and returned to the water again. Seals have only gone part way back. They show us what the intermediates might have been like, on the way to extreme cases such as whales and dugongs. Whales (including the small whales we call dolphins) and dugongs, with their close cousins the manatees, ceased to be land creatures altogether and reverted to the full marine habits of

their remote ancestors. They don't even come ashore to breed. They do, however, still breathe air, having never developed anything equivalent to the gills of their earlier marine incarnation. Turtles went back to the sea a very long time ago and, like all vertebrate returnees to the water, they breathe air. However, they are, in one respect, less fully given back to the water than whales or dugongs, for turtles still lay their eggs on beaches.

There is evidence that all modern turtles are descended from a terrestrial ancestor which lived before most of the dinosaurs. There are two key fossils called *Proganochelys quenstedti* and *Palaeochersistalampayensis* dating from early dinosaur times, which appear to be close to the ancestry of all modern turtles and tortoises. You might wonder how we can tell whether fossil animals lived on land or in water, especially if only fragments are found. Sometimes it's obvious. Ichthyosaurs were reptilian contemporaries of the dinosaurs, with fins and streamlined bodies. The fossils look like dolphins and they surely lived like dolphins, in the water. With turtles it is a little less obvious. One way to tell is by measuring the bones of their forelimbs.

Walter Joyce and Jacques Gauthier, at Yale University, obtained three measurements in these particular bones of 71 species of living turtles and tortoises. They used a kind of triangular graph paper to plot the three measurements against one another. All the land tortoise species formed a tight cluster of points in the upper part of the triangle; all the water turtles cluster in the lower part of the triangular graph. There was no overlap, except when they added some species that spend time both in water and on land. Sure enough, these amphibious species show up on the triangular graph approximately half way between the 'wet cluster' of sea turtles and the 'dry cluster' of land tortoises. The next step was to determine where the fossils fell. The bones of *P. quenstedti* and *JR talampayensis* leave us in no doubt. Their points on the graph are right in the thick of the dry cluster. Both these fossils were dry-land tortoises. They come from the era before our turtles returned to the water.

You might think, therefore, that modern land tortoises have probably stayed on land ever since those early terrestrial times, as most mammals did after a few of them went back to the sea. But apparently not. If you draw out the family tree of all modern turtles and tortoises, nearly all the branches are aquatic. Today's land tortoises constitute a single branch, deeply nested among branches consisting of aquatic turtles. This suggests that modern land tortoises have not stayed on land continuously since the time of *P. quenstedti* and *P. talampayensis*. Rather, their ancestors were among those who went back to the water, and they then re-emerged back onto the land in (relatively) more recent times.

Tortoises therefore represent a remarkable double return. In common with all mammals, reptiles and birds, their remote ancestors were marine fish and before that various more or less worm-like creatures stretching back, still in the sea, to the primeval bacteria. Later ancestors lived on land and stayed there for a very large number of generations. Later ancestors still evolved back into the water and became sea turtles. And finally they returned yet again to the land as tortoises, some of which now live in the driest of deserts.

Questions 27-30

Answer the questions below.

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

Write your answers in boxes 27-30 on your answer sheet.

27 What had to transfer from sea to land before any animals could migrate?

28 Which TWO processes are mentioned as those in which animals had to make big changes as they moved onto land?

29 Which physical feature, possessed by their ancestors, do whales lack?

30 Which animals might ichthyosaurs have resembled?

Questions 31-33

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

In boxes 31-33 on your answer sheet, write

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

31 Turtles were among the first group of animals to migrate back to the sea.

32 It is always difficult to determine where an animal lived when its fossilised remains are incomplete.

33 The habitat of ichthyosaurs can be determined by the appearance of their fossilised remains.

Questions 34-39

Complete the flow-chart below.

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

Write your answers in boxes 34-39 on your answer sheet.

Method of determining where the ancestors of turtles and tortoises come from

Step 1

71 species of living turtles and tortoises were examined and a total of 34 were taken from the bones of their forelimbs



Step 2

The data was recorded on a 35 (necessary for comparing the information).

Outcome: Land tortoises were represented by a dense 36 of points towards the top.

Sea turtles were grouped together in the bottom part.



Step 3

The same data was collected from some living 37 species and

added to the other results.

Outcome: The points for these species turned out to be positioned about 38 [] up the triangle between the land tortoises and the sea turtles.



Step 4

Bones of *P. quenstedti* and *P. talampayensis* were examined in a similar way and the results added.

Outcome: The position of the points indicated that both these ancient creatures were 39 []

Questions 40

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

Write the correct letter in box 40 on your answer sheet.

According to the writer, the most significant thing about tortoises is that

- A they are able to adapt to life in extremely dry environments.
- B their original life form was a kind of primeval bacteria.
- C they have so much in common with sea turtles.
- D they have made the transition from sea to land more than once.

ANSWER FOR READING PASSAGE 21

Reading passage –1 William Henry Perkin

1. FALSE	8. (the / only) rich
2. NOT GIVEN	9. commercial (possibilities)
3. FALSE	10. mauve (was/is)
4. TRUE	11. (Robert) Pullar
5. NOT GIVEN	12. (in) France

6. TRUE	13. malaria (is)
7. NOT GIVEN	

Reading passage –2 **Is there anybody out there**

1. iv
15. vii
16. i
17. ii
18. Billion years
19. Radio (waves/signals)
20. 1000 (stars)
21. TRUE
22. TRUE
23. NOT GIVEN
24. FALSE
25. NOT GIVEN
26. FALSE

Reading passage –3 **The history of the tortoise**

1. plants	8. 3 measurements
2. breathing and reproduction	9. (triangular) graph
3. gills	10. cluster
4. dolphins	11. amphibious
5. NOT GIVEN	12. half way
6. FALSE	13. dry-land tortoises
7. TRUE	14. D

TEST- 25**READING PASSAGE 1**

YOU SHOULD SPEND ABOUT 20 MINUTES ON QUESTIONS 1-13 WHICH ARE BASED ON READING PASSAGE 1 BELOW.

A Chronicle of Timekeeping

A. According to archaeological evidence, at least 5,000 years ago, and long before the advent of the Roman Empire, the Babylonians began to measure time, introducing calendars to co-ordinate communal activities, to plan the shipment of goods and, in particular, to regulate planting and harvesting. They based their calendars on three natural cycles: the solar day, marked by the successive periods of light and darkness as the earth rotates on its axis; the lunar month, following the phases of the moon as it orbits the earth; and the solar year, defined by the changing seasons that accompany our planet's revolution around the sun.

B. Before the invention of artificial light, the moon had a greater social impact. And, for those living near the equator, in particular, its waxing and waning were more conspicuous than the passing of the seasons. Hence, the calendars that were developed at the lower latitudes were influenced more by the lunar cycle than by the solar year. In more northern climes, however, where seasonal agriculture was practiced, the solar year became more crucial. As the Roman Empire expanded northward, it organized its activity chart for the most part around the solar year.

C. Centuries before the Roman Empire, the Egyptians had formulated a municipal calendar having 12 months of 30 days, with five days added to approximate the solar year. Each period of ten days was marked by the appearance of special groups of stars called decans. At the rise of the star Sirius just before sunrise, which occurred around the all-important annual flooding of the Nile, 12 decans could be seen spanning the heavens. The cosmic significance the Egyptians placed in the 12 decans led them to develop a system in which each interval of darkness (and later, each interval of daylight) was divided into a dozen equal parts. These periods became known as temporal hours because their duration varied according to the changing length of days and nights with the passing of the seasons. Summer hours were long, winter ones short; only at the spring and autumn equinoxes were the hours of daylight and darkness equal. Temporal hours, which were first adopted by the Greeks and then the Romans, who disseminated them through Europe, remained in use for more than 2,500 years.

D. In order to track temporal hours during the day, inventors created sundials, which indicate time by the length or direction of the sun's shadow. The sundial's counterpart, the water clock, was designed to measure temporal hours at night. One of the first water clocks was a basin with a small hole near the bottom through which the water dripped out. The falling water level denoted the passing hour as it dipped below hour lines inscribed on the inner surface. Although these devices performed satisfactorily around the Mediterranean,

they could not always be depended on in the cloudy and often freezing weather of northern Europe.

E. The advent of the mechanical clock meant that although it could be adjusted to maintain temporal hours, it was naturally suited to keeping equal ones. With these, however, arose the question of when to begin counting, and so, in the early 14th century, a number of systems evolved. The schemes that divided the day into 24 equal parts varied according to the start of the count: Italian hours began at sunset, Babylonian hours at sunrise, astronomical hours at midday, and ‘great clock’ hours, used for some large public clocks in Germany, at midnight. Eventually these were superseded by ‘small clock’, or French, hours, which split the day into two 12-hour periods commencing at midnight.

F. The earliest recorded weight-driven mechanical clock was built in 1283 in Bedfordshire in England. The revolutionary aspect of this new timekeeper was neither the descending weight that provided its motive force nor the gear wheels (which had been around for at least 1,300 years) that transferred the power; it was the part called the escapement. In the early 1400s came the invention of the coiled spring or fusee which maintained constant force to the gear wheels of the timekeeper despite the changing tension of its mainspring. By the 16th century, a pendulum clock had been devised, but the pendulum swung in a large arc and thus was not very efficient.

G. To address this, a variation on the original escapement was invented in 1670, in England. It was called the anchor escapement, which was a lever-based device shaped like a ship’s anchor. The motion of a pendulum rocks this device so that it catches and then releases each tooth of the escape wheel, in turn allowing it to turn a precise amount. Unlike the original form used in early pendulum clocks, the anchor escapement permitted the pendulum to travel in a very small arc. Moreover, this invention allowed the use of a long pendulum which could beat once a second and thus led to the development of a new floor-standing case design, which became known as the grandfather clock.

H. Today, highly accurate timekeeping instruments set the beat for most electronic devices. Nearly all computers contain a quartz-crystal clock to regulate their operation. Moreover, not only do time signals beamed down from Global Positioning System satellites calibrate the functions of precision navigation equipment, they do so as well for mobile phones, instant stock-trading systems, and nationwide power-distribution grids. So integral have these time-based technologies become to day-to-day existence that our dependency on them is recognised only when they fail to work.

Questions 1-4

Reading Passage 1 has eight paragraphs, A-H.

Which paragraph contains the following information?

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

- 1.a description of an early timekeeping invention affected by cold temperatures

2.an explanation of the importance of geography in the development of the calendar in farming communities

3.a description of the origins of the pendulum clock

4.details of the simultaneous efforts of different societies to calculate time using uniform hours

Questions 5-8

Look at the following events (Questions 5-8) and the list of nationalities below.

Match each event with the correct nationality, A-F.

Write the correct letter, A-F, in boxes 5-8 on your answer sheet.

5. They devised a civil calendar in which the months were equal in length.

6. They divided the day into two equal halves.

7. They developed a new cabinet shape for a type of timekeeper.

8. They created a calendar to organize public events and work schedules.

List Of Nationality

A Babylonians

B Egyptians

C Greeks

D English

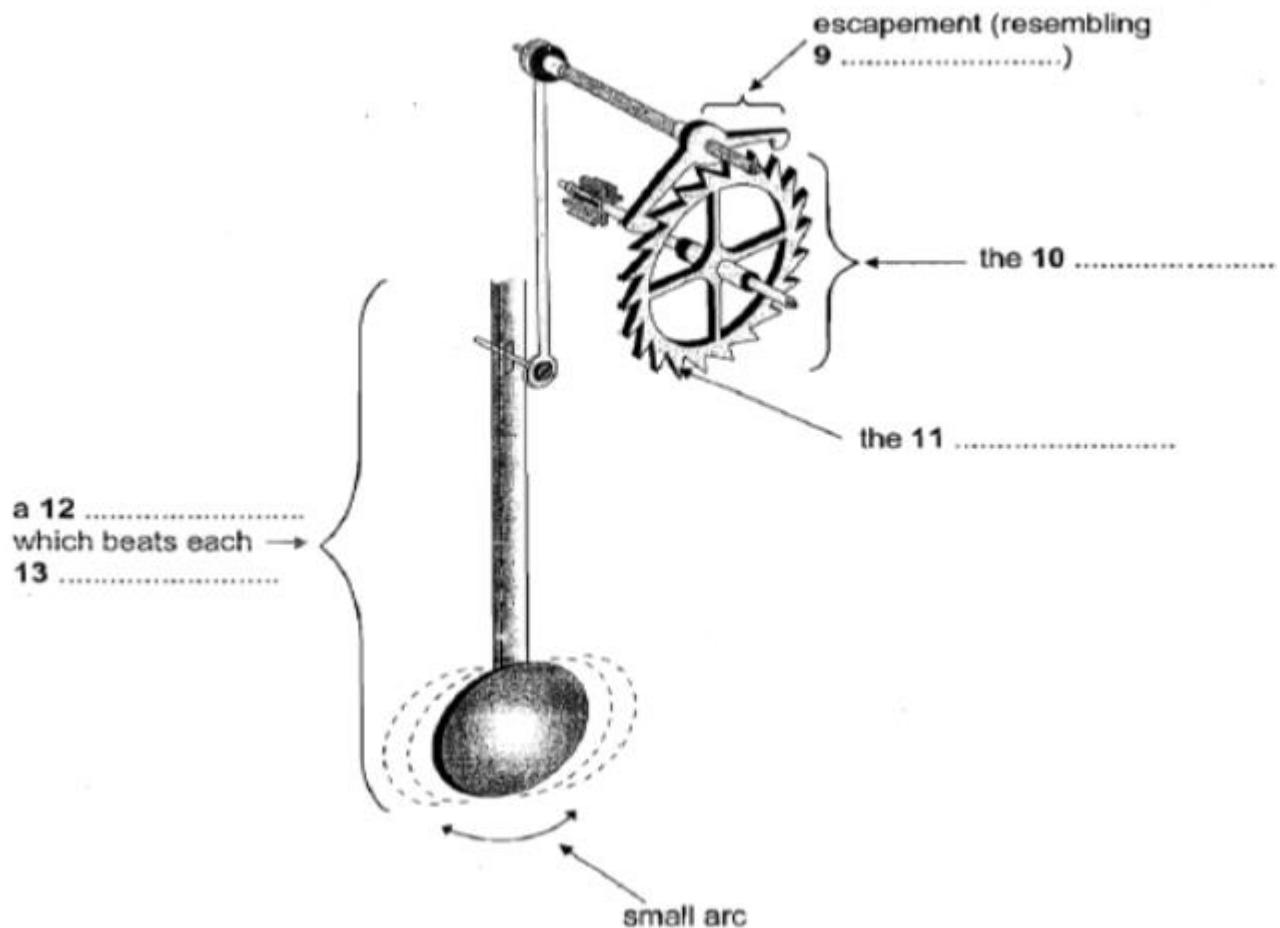
E Germans

F French

Questions9-13

Label the diagram below. Write NO MORE THAN TWO WORDS from the passage.

How the 1670 lever-based device worked



AIR TRAFFIC CONTROL IN THE USA

READING PASSAGE 2

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

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 centers 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 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
- iiAviation disaster prompts action
- iiiTwo coincidental developments
- ivSetting Altitude Zones
- vAn oversimplified view
- viControlling pilots' licence
- viiDefining airspace categories
- viiiSetting rules to weather conditions
- ixTaking of Safety
- xFirst step towards ATC

14 Paragraph A

Example – Paragraph B

Answer x

15 Paragraph C

16 Paragraph D

17 Paragraph E

18 Paragraph F

19 Paragraph G

Questions 20-26

Do the following statements agree with the given information of the reading passage? 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 the 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 3

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

Telepathy

Since the 1970s, parapsychologists at leading universities and research institutes around the world have risked the derision of sceptical colleagues by putting the various claims for telepathy to the test in dozens of rigorous scientific studies. The results and their implications are dividing even the researchers who uncovered them.

Some researchers say the results constitute compelling evidence that telepathy is genuine. Other parapsychologists believe the field is on the brink of collapse, having tried to produce definitive scientific proof and failed. Sceptics and advocates alike do concur on one issue, however: that the most impressive evidence so far has come from the so-called ‘ganzfeld’ experiments, a German term that means ‘whole field’. Reports of telepathic experiences had by people during meditation led parapsychologists to suspect that telepathy might involve ‘signals’ passing between people that were so faint that they were usually swamped by normal brain activity. In this case, such signals might be more easily detected by those experiencing meditation-like tranquility in a relaxing ‘whole field’ of light, sound and warmth.

The ganzfeld experiment tries to recreate these conditions with participants sitting in soft reclining chairs in a sealed room, listening to relaxing sounds while their eyes are covered with special filters letting in only soft pink light. In early ganzfeld experiments, the telepathy test involved identification of a picture chosen from a random selection of four taken from a large image bank. The idea was that a person acting as a ‘sender’ would attempt to beam

the image over to the ‘receiver’ relaxing in the sealed room. Once the session was over, this person was asked to identify which of the four images had been used. Random guessing would give a hit-rate of 25 per cent; if telepathy is real, however, the hit-rate would be higher. In 1982, the results from the first ganzfeld studies were analysed by one of its pioneers, the American parapsychologist Charles Honorton. They pointed to typical hit-rates of better than 30 per cent – a small effect, but one which statistical tests suggested could not be put down to chance.

The implication was that the ganzfeld method had revealed real evidence for telepathy. But there was a crucial flaw in this argument – one routinely overlooked in more conventional areas of science. Just because chance had been ruled out as an explanation did not prove telepathy must exist; there were many other ways of getting positive results. These ranged from ‘sensory leakage’ – where clues about the pictures accidentally reach the receiver – to outright fraud. In response, the researchers issued a review of all the ganzfeld studies done up to 1985 to show that 80 per cent had found statistically significant evidence. However, they also agreed that there were still too many problems in the experiments which could lead to positive results, and they drew up a list demanding new standards for future research.

After this, many researchers switched to autoganzfeld tests – an automated variant of the technique which used computers to perform many of the key tasks such as the random selection of images. By minimising human involvement, the idea was to minimise the risk of flawed results. In 1987, results from hundreds of autoganzfeld tests were studied by Honorton in a ‘meta-analysis’, a statistical technique for finding the overall results from a set of studies. Though less compelling than before, the outcome was still impressive.

Yet some parapsychologists remain disturbed by the lack of consistency between individual ganzfeld studies. Defenders of telepathy point out that demanding impressive evidence from every study ignores one basic statistical fact: it takes large samples to detect small effects. If, as current results suggest, telepathy produces hit-rates only marginally above the 25 per cent expected by chance, it’s unlikely to be detected by a typical ganzfeld study involving around 40 people: the group is just not big enough. Only when many studies are combined in a meta-analysis will the faint signal of telepathy really become apparent. And that is what researchers do seem to be finding.

What they are certainly not finding, however, is any change in attitude of mainstream scientists: most still totally reject the very idea of telepathy. The problem stems at least in part from the lack of any plausible mechanism for telepathy.

Various theories have been put forward, many focusing on esoteric ideas from theoretical physics. They include ‘quantum entanglement’, in which events affecting one group of atoms instantly affect another group, no matter how far apart they may be. While physicists have demonstrated entanglement with specially prepared atoms, no-one knows if it also exists between atoms making up human minds. Answering such questions would transform parapsychology. This has prompted some researchers to argue that the future lies not in collecting more evidence for telepathy, but in probing possible mechanisms. Some work has begun already, with researchers trying to identify people who are particularly successful in autoganzfeld trials. Early results show that creative and artistic people do much better than average: in one study at the University of Edinburgh, musicians achieved a hit-rate of 56 per cent. Perhaps more tests like these will eventually give the researchers the evidence they are seeking and strengthen the case for the existence of telepathy.

Questions 27-30

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

Write the correct letter, A—G, in boxes 27-30 on your answer sheet.

27 Researchers with differing attitudes towards telepathy agree on

28 Reports of experiences during meditation indicated

29 Attitudes to parapsychology would alter drastically with

30 Recent autoganzfeld trials suggest that success rates will improve with

- A the discovery of a mechanism for telepathy.
- B the need to create a suitable environment for telepathy.
- C their claims of a high success rate.
- D a solution to the problem posed by random guessing.
- E the significance of the ganzfeld experiments.
- F a more careful selection of subjects.
- G a need to keep altering conditions

Questions 31-40

Complete the table below.

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

Write your answers in boxes 31-40 on your answer sheet.

Telepathy Experiments			
Name/ Date	Description	Result	Flaw
Ganzfeld studies 1982	Involved a person acting as a (31)..... who picked out one (32)..... from a random selection of four and a (33)..... who then tried to identify it.	Hit rates were higher than with random guessing	Positive results could be produced by factors such as (34)..... or (35).....
Autoganzfeld studies 1987	(36)..... were used for key tasks to limit the amount of (37)..... in carrying out the tests.	The results were then subjected to a (38).....	The (39)..... Between different test results was put down to the fact that sample groups were not (40)..... (as with most ganzfeld studies).

A Chronicle of Timekeeping Reading Answers

Cambridge 8 Test 1 Reading Answers

- 1. D**
- 2. B**
- 3. F**
- 4. E**
- 5. B**
- 6. F**
- 7. D**
- 8. A**
- 9. (ships's) anchor**
- 10. (escape) wheel**
- 11. tooth**
- 12. (long) pendulum**
- 13. second**

AIR TRAFFIC CONTROL IN THE USA Reading Answers

Cambridge 8 Test 1 Reading Answers

- 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**

Telepathy Reading Answers

- 27. E**
- 28. B**
- 29. A**
- 30. F**
- 31. sender**
- 32. picture/ image**
- 33. receiver**
- 34. sensory leakage**
- 35. fraud**
- 36. computers**
- 37. human involvement**
- 38. meta-analysis**
- 39. lack of consistency**
- 40. big/ large enough**

READING

READING PASSAGE 1

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

BRINGING CINNAMON TO EUROPE

Cinnamon is a sweet, fragrant spice produced from the inner bark of trees of the genus *Cinnamomum*, which is native to the Indian sub-continent. It was known in biblical times and is mentioned in several books of the Bible, both as an ingredient that was mixed with oils for anointing people's bodies and also as a token indicating friendship among lovers and friends. In ancient Rome, mourners attending funerals burnt cinnamon to create a pleasant scent. Most often, however, the spice found its primary use as an additive to food and drink. In the Middle Ages, Europeans who could afford the spice used it to flavor food, particularly meat, and to impress those around them with their ability to purchase an expensive condiment from the 'exotic' East. At a banquet, a host would offer guests a plate with various spices piled upon it as a sign of the wealth at his or her disposal. Cinnamon was also reported to have health benefits and was thought to cure various ailments, such as indigestion.

Toward the end of the Middle Ages, the European middle classes began to desire the lifestyle of the elite, including their consumption of spices. This led to a growth in demand for cinnamon and other spices. At that time, cinnamon was transported by Arab merchants, who closely guarded the secret of the source of the spice from potential rivals. They took it from India, where it was grown, on camels via an overland route to the Mediterranean. Their journey ended when they reached Alexandria. European traders sailed there to purchase their supply of cinnamon, then brought it back to Venice. The spice then traveled from that great trading city to markets all around Europe. Because the overland trade route allowed for only small quantities of the spice to reach Europe, and because Venice had a virtual monopoly of the trade, the Venetians could set the price of cinnamon exorbitantly high. These prices, coupled with the increasing demand, spurred the search for new routes to Asia by Europeans eager to take part in the spice trade.

Seeking the high profits promised by the cinnamon market, Portuguese traders arrived on the island of Ceylon in the Indian Ocean toward the end of the 15th century. Before Europeans arrived on the island, the state had organized the cultivation of cinnamon. People belonging to the ethnic group called the Salagama would peel the bark off young shoots of the cinnamon plant in the rainy season when the wet bark was more pliable. During the peeling process, they curled the bark into the 'stick' shape still associated with the spice today. The Salagama then gave the finished product to the king as a form of tribute. When the Portuguese arrived, they needed to increase production significantly, and so enslaved many other members of the Ceylonese native population, forcing them to work in cinnamon harvesting. In 1518, the Portuguese built a fort on Ceylon, which enabled them to protect the island, so helping them to develop a monopoly in the cinnamon trade and

generate very high profits. In the late 16th century, for example, they enjoyed a tenfold profit when shipping cinnamon over a journey of eight days from Ceylon to India.

When the Dutch arrived off the coast of southern Asia at the very beginning of the 17th century, they set their sights on displacing the Portuguese as kings of cinnamon. The Dutch allied themselves with Kandy, an inland kingdom on Ceylon. In return for payments of elephants and cinnamon, they protected the native king from the Portuguese. By 1649, the Dutch broke the 150-year Portuguese monopoly when they overran and occupied their factories. By 1658, they had permanently expelled the Portuguese from the island, thereby gaining control of the lucrative cinnamon trade.

In order to protect their hold on the market, the Dutch, like the Portuguese before them, treated the native inhabitants harshly. Because of the need to boost production and satisfy Europe's ever-increasing appetite for cinnamon, the Dutch began to alter the harvesting practices of the Ceylonese. Over time, the supply of cinnamon trees on the island became nearly exhausted, due to the systematic stripping of the bark. Eventually, the Dutch began cultivating their own cinnamon trees to supplement the diminishing number of wild trees available for use.

Then, in 1996, the English arrived on Ceylon, thereby displacing the Dutch from their control of the cinnamon monopoly. By the middle of the 19th century, production of cinnamon reached 1,000 tons a year, after a lower grade quality of the spice became acceptable to European tastes. By that time, cinnamon was being grown in other parts of the Indian Ocean region and in the West Indies, Brazil, and Guyana. Not only was a monopoly of cinnamon becoming impossible, but the spice trade overall was diminishing in economic potential, and was eventually superseded by the rise of trade in coffee, tea, chocolate, and sugar.

Questions 1-9

Complete the notes below.

Choose ONE WORD ONLY from the passage for each answer.

Write your answers in boxes 1-9 on your answer sheet.

The Early History of Cinnamon

Biblical times:

added to 1.....

used to show 2..... Between people

Ancient Rome:

used for its sweet smell at 3.....

Middle-Ages:

added to food, especially meat

was an indication of a person's 4.....

known as a treatment for 5..... and other health problems

grown in 6.....

merchants used 7..... to bring it to the Mediterranean

arrived in the Mediterranean at 8.....

traders took it to 9..... and sold it to destinations around Europe.

Questions 10-13

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

In boxes 10-13 on your answer sheet, write

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

10 The Portuguese had control over the cinnamon trade in Ceylon throughout the 16th century.

11 The Dutch took over the cinnamon trade from the Portuguese as soon as they arrived in Ceylon.

12 The trees planted by the Dutch produced larger quantities of cinnamon than the wild trees.

13 The spice trade maintained its economic importance during the 19th century.

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 behavior 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 behavior first emerged in 2005. In groundbreaking experiments, 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 the 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 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-section, 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.

READING PASSAGE -3

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

MAKING THE MOST OF TRENDS

Experts from Harvard Business School give advice to managers

Most managers can identify the major trends of the day. But if the course of conducting research in a number of industries and working directly with companies, we have discovered that managers often fail to recognize the less obvious but profound ways these trends are influencing consumers' aspirations, attitudes, and behaviors. This is especially true of trends that managers view as peripheral to their core markets.

Many ignore trends in their innovation strategies or adopt a wait-and-see approach and let competitors take the lead. At a minimum, such responses mean missed profit opportunities. At the extreme, they can jeopardize a company by ceding to rivals the opportunity to transform the industry. The purpose of this article is twofold: to spur managers to think more expansively about how trends could engender new value propositions in their core markets, and to provide some high-level advice on how to make market research and product development personnel more adept at analyzing and exploiting trends.

One strategy, known as 'infuse and augment', is to design a product or service that retains most of the attributes and functions of existing products in the category but adds others that address the needs and desires unleashed by a major trend. A case in point in the Poppy range of handbags, which the firm Coach created in response to the economic downturn of 2008. The Coach brand had been a symbol of opulence and luxury for nearly 70 years, and the most obvious reaction to the downturn would have been to lower prices. However, that would have risked cheapening the brand's image. Instead, they initiated a consumer-research project which revealed that customers were eager to lift themselves and the country out of tough times. Using these insights, Coach launched the lower-priced Poppy handbags, which were in vibrant colors, and looked more youthful and playful than conventional Coach products. Creating the sub-brand allowed Coach to avert an across-the-board price cut. In contrast to the many companies that responded to the recession by cutting prices, Coach saw the new consumer mindset as an opportunity for innovation and renewal.

A further example of this strategy was supermarket Tesco's response to consumers' growing concerns about the environment. With that in mind, Tesco, one of the world's top five retailers, introduced its Greener Living program, which demonstrates the company's commitment to protecting the environment by involving consumers in ways that produce

tangible results. For example, Tesco customers can accumulate points for such activities as reusing bags, recycling cans and printer cartridges, and buying home-insulation materials. Like points earned on regular purchases, these green points can be redeemed for cash. Tesco has not abandoned its traditional retail offering but augmented its business with these innovations, thereby infusing its value proposition with a green streak.

A more radical strategy is ‘combine and transcend’. This entails combining aspects of the product’s existing value proposition with attributes addressing changes arising from a trend, to create a novel experience – one that may land the company in an entirely new market space. At first glance, spending resources to incorporate elements of a seemingly irrelevant trend into one’s core offerings sounds like it’s hardly worthwhile. But consider Nike’s move to integrate the digital revolution into its reputation for high-performance athletic footwear. In 2006, they teamed up with technology company Apple to launch Nike+, a digital sports kit comprising a sensor that attaches to the running shoe and a wireless receiver that connects to the user’s iPod. By combining Nike’s original value proposition for amateur athletes with one for digital consumers, the Nike+ sports kit and web interface moved the company from a focus on athletic apparel to a new plane of engagement with its customers.

A third approach, known as ‘counteract and reaffirm’, involves developing products or services that stress the values traditionally associated with the category in ways that allow consumers to oppose – or at least temporarily escape from – the aspects of trends they view as undesirable. A product that accomplished this is the ME2, a video game created by Canada’s iToys. By reaffirming the toy category’s association with physical play, the ME2 counteracted some of the widely perceived negative impacts of digital gaming devices. Like other handheld games, the device featured a host of exciting interactive games, a full-color LCD screen, and advanced 3D graphics. What set it apart was that it incorporated the traditional physical component of children’s play: it contained a pedometer, which tracked and awarded points for physical activity (walking, running, biking, skateboarding, climbing stairs). The child could use the points to enhance various virtual skills needed for the video game. The ME2, introduced in mid-2008, catered to kids’ huge desire to play video games while countering the negatives, such as associations with lack of exercise and obesity.

Once you have gained perspective on how trend-related changes in consumer opinions and behaviors impact on your category, you can determine which of our three innovation strategies to pursue. When your category’s basic value proposition continues to be meaningful for consumers influenced by the trend, the infuse-and-augment strategy will allow you to reinvigorate the category. If analysis reveals an increasing disparity between your category and consumers’ new focus, your innovations need to transcend the category to integrate the two worlds. Finally, if aspects of the category clash with undesired outcomes of a trend, such as associations with unhealthy lifestyles, there is an opportunity to counteract those changes by reaffirming the core values of your category.

Trends – technological, economic, environmental, social, or political – that affect how people perceive the world around them and shape what they expect from products and services present firms with unique opportunities for growth.

Questions 27-31

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

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

27 In the first paragraph, the writer says that most managers

- A fail to spot the key consumer trends of the moment.
- B make the mistake of focusing only on the principal consumer trends.
- C misinterpret market research data relating to current consumer trends.
- D are unaware of the significant impact that trends have on consumers' lives.

28 According to the third paragraph, Coach was anxious to

- A follow what some of its competitors were doing.
- B maintain its prices throughout its range.
- C safeguard its reputation as a manufacturer of luxury goods.
- D modify the entire look of its brand to suit the economic climate.

29 What point is made about Tesco's Greener Living programme?

- A It did not require Tesco to modify its core business activities.
- B It succeeded in attracting a more eco-conscious clientele.
- C Its main aim was to raise consumers' awareness of environmental issues.
- D It was not the first time that Tesco had implemented such an initiative.

- 30 What does the writer suggest about Nike's strategy?
- A It was an extremely risky strategy at the time.
 - B It was a strategy that only a major company could afford to follow.
 - C It was the type of strategy that would not have been possible in the past.
 - D It was the kind of strategy which might appear to have few obvious benefits.
- 31 What was original about the ME2?
- A It contained technology that had been developed for the sports industry.
 - B It appealed to young people who were keen to improve their physical fitness.
 - C It took advantage of a current trend for video games with colourful 3D graphic.
 - D It was a handheld game that addressed people's concerns about unhealthy lifestyles.

Questions 32-37

Look at the following statements (Questions 32-37) and the list of companies below.

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

Write the correct letter, A, B, C or D, in boxes 32-37 on your answer sheet.

NB You may use any letter more than once.

- 32 It turned the notion that its products could have harmful effects to its own advantage.
- 33 It extended its offering by collaborating with another manufacturer.
- 34 It implemented an incentive scheme to demonstrate its corporate social responsibility.
- 35 It discovered that customers had a positive attitude towards dealing with difficult circumstances.

- 36 It responded to a growing lifestyle trend in an unrelated product sector.
- 37 It successfully avoided having to charge its customers less for its core products.

List of companies

- A Coach
- B Tesco
- C Nike
- D iToys

Questions 38-40

Complete each sentence with the correct ending, A, B, C or D below.

Write the correct letter, A, B, C or D, in boxes 38-40 on your answer sheet.

- 38 If there are any trend-related changes impacting on your category, you should
- 39 If a current trend highlights a negative aspect of your category, you should
- 40 If the consumers' new focus has an increasing lack of connection with your offering you should
- A employ a combination of strategies to maintain your consumer base.
 - B identify the most appropriate innovation strategy to use.
 - C emphasise your brand's traditional values with the counteract-and-affirm strategy.
 - D use the combine-and-transcend strategy to integrate the two worlds.

READING ANSWERS

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

TEST -24**READING PASSAGE 1**

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

The coconut palm

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

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

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

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

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

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

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

Questions 1-8

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

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

THE COCONUT PALM		
Part	Description	Uses
trunk	up to 30 metres	timber for houses and the making of 1.....
leaves	up to 6 metres long	to make brushes
flowers	at the top of the trunk	stems provide sap, used as a drink or a source of 2.....
fruits	outer layer	
	middle layer (coir fibres)	used for 3....., etc
	Inner layer (shell)	a source of 4..... (when halved) for 5.....

	coconut water	a drink a source of 6..... for other plants
	coconut flesh	oil and milk for cooking and 7..... glycerine (an ingredient in 8.....)

Questions 9-13

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

In boxes 9-13 on your answer sheet, write

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

9 Coconut seeds need shade in order to germinate.

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

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

12 All the coconuts found in Asia are cultivated varieties.

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

READING PASSAGE 2

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

How baby talk gives infant brains a boost

- A. The typical way of talking to a baby – high-pitched, exaggerated, and repetitious – is a source of fascination for linguists who hope to understand how ‘baby talk’ impacts on learning. Most babies start developing their hearing while still in the womb, prompting some hopeful parents to play classical music to their pregnant bellies. Some research even suggests that infants are listening to adult speech as early as 10 weeks before being born, gathering the basic building blocks of their family’s native tongue.
- B. Early language exposure seems to have benefits to the brain – for instance, studies suggest that babies raised in bilingual homes are better at learning how to mentally prioritize information. So how does the sweet if the sometimes absurd sound of infant-directed speech influences a baby’s development? Here are some recent studies that explore the science behind the 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 Ramirez-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 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 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 vocalizing 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 specialized computer programs, to analyze 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 practice.

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 study the
babies again at age two, the found that those who had heard a lot of baby talk in infancy
had a much larger 23..... Then 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 that occurs in babies' brain activity before the end of their first year.

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

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

READING PASSAGE 3

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

Whatever happened to the Harappan Civilisation?

New research sheds light on the disappearance of an ancient society

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

- B. ‘There is plenty of archaeological evidence to tell us about the rise of the Harappan Civilisation, but relatively little about its fall,’ explains archaeologist Dr. Cameron Petrie of the University of Cambridge. ‘As populations increased, cities were built that had great baths, craft workshops, palaces and halls laid out in distinct sectors. Houses were arranged in blocks, with wide main streets and narrow alleyways, and many had their own wells and drainage systems. It was very much a “thriving” civilization.’ Then around 2100 BC, a transformation began. Streets went uncleared, buildings started to be abandoned, and ritual structures fell out of use. After their final demise, a millennium passed before really large-scale cities appeared once more in South Asia.
- C. Some have claimed that major glacier-fed rivers changed their course, dramatically affecting the water supply and agriculture; or that the cities could not cope with an increasing population, they exhausted their resource base, the trading economy broke down or they succumbed to invasion and conflict; and yet others that climate change caused an environmental change that affected food and water provision. ‘It is unlikely that there was a single cause for the decline of civilization. But the fact is, until now, we have had little solid evidence from the area for most of the key elements,’ said Petrie. ‘A lot of the archaeological debate has really only been well-argued speculation.’
- D. A research team led by Petrie, together with Dr. Ravindanath Singh of Banaras Hindu University in India, found early in their investigations that many of the archaeological sites were not where they were supposed to be, completely altering understanding of the way that this region was inhabited in the past. When they carried out a survey of how the larger area was settled in relation to sources of water, they found inaccuracies in the published geographic locations of ancient settlements ranging from several hundred meters to many kilometers. They realized that any attempts to use the existing data were likely to be fundamentally flawed. Over the course of several seasons of fieldwork, they carried out new surveys, finding an astonishing 198 settlement sites that were previously unknown.
- E. Now, research published by Dr. Yama Dixit and Professor David Hodell, both from Cambridge’s Department of Earth Sciences, has provided the first definitive evidence for climate change affecting the plains of north-western India, where hundreds of Harappan sites are known to have been situated. The researchers gathered shells of *Melanoides tuberculata* snails from the sediments of an ancient lake and used geochemical analysis as a means of tracing the climate history of the

region. ‘Like today, the major source of water into the lake is likely to have been the summer monsoon,’ says Dixit. ‘But we have observed that there was an abrupt change about 4,100 years ago when the amount of evaporation from the lake exceeded the rainfall – indicative of a drought.’ Hodell adds: ‘We estimate that the weakening of the Indian summer monsoon climate lasted about 200 years before recovering to the previous conditions, which we still see today.’

- F. It has long been thought that other great Bronze Age civilizations also declined at a similar time, with a global-scale climate event being seen as the cause. While it is possible that these local-scale processes were linked, the real archaeological interest lies in understanding the impact of these larger-scale events on different environments and different populations. ‘Considering the vast area of the Harappan Civilisation with its variable weather systems,’ explains Singh, ‘it is essential that we obtain more climate data from areas close to the two great cities at Mohenjodaro and Harappa and also from the Indian Punjab.’
- G. Petrie and Singh’s team is now examining archaeological records and trying to understand details of how people led their lives in the region five millennia ago. They are analyzing grains cultivated at the time, and trying to work out whether they were grown under extreme conditions of water stress, and whether they were adjusting the combinations of crops they were growing for different weather systems. They are also looking at whether the types of pottery used, and other aspects of their material culture were distinctive to specific regions or were more similar across larger areas. This gives us insight into the types of interactive networks that the population was involved in, and whether those changed.
- H. Petrie believes that archaeologists are in a unique position to investigate how past societies responded to environmental and climatic change. ‘By investigating responses to environmental pressures and threats, we can learn from the past to engage with the public, and the relevant governmental and administrative bodies, to be more proactive in issues such as the management and administration of water supply, the balance of urban and rural development, and the importance of preserving cultural heritage in the future.’

Questions 27-31

Reading Passage 3 has eight paragraphs, A-H.

Which paragraph contains the following information?

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

NB You may use any letter more than once

- 27 proposed explanations for the decline of the Harappan Civilisation
- 28 reference to a present-day application of some archaeological research findings
- 29 a difference between the Harappan Civilisation and another culture of the same period
- 30 a description of some features of Harappan urban design
- 31 reference to the discovery of errors made by previous archaeologists

Questions 32-36

Complete the summary below.

Choose ONE WORD ONLY from the passage for each answer.

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

Looking at the evidence of climate change

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

Petrie and Singh's team are using archaeological records to look at

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

Questions 37-40

Complete the summary below.

Look at the following statements (Questions 38-40) and the list of researchers below.

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

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

NB You may use any letter more than once.

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

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

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

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

List of Researchers

- | | |
|---|-------------------|
| A | Cameron Petrie |
| B | Ravindanath Singh |
| C | Yama Dixit |
| D | David Hodell |

READING ANSWERS

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

TEST- 26

READING PASSAGE 1

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

Cutty Sark: the fastest sailing ship of all time

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

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

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

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

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

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

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

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

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

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

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

Questions 1-8

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

In boxes 1-8 on your answer sheet, write

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

- 1 Clippers were originally intended to be used as passenger ships.
- 2 Cutty Sark was given the name of a character in a poem.
- 3 The contract between John Willis and Scott & Linton favoured Willis.
- 4 John Willis wanted Cutty Sark to be the fastest tea clipper travelling between the UK and China.
- 5 Despite storm damage, Cutty Sark beat Thermopylae back to London.
- 6 The opening of the Suez Canal meant that steamships could travel between Britain and China faster than clippers.
- 7 Steamships sometimes used the ocean route to travel between London and China.
- 8 Captain Woodget put Cutty Sark at risk of hitting an iceberg.

Questions 9-13

Complete the sentences below.

Choose ONE WORD ONLY from the passage for each answer.

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

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

10 As a captain and, Woodget was very skilled.

- 11 Ferreira went to Falmouth to repair the damage that a had caused.
- 12 Between 1923 and 1954, Cutty Sark was used for
- 13 Cutty Sark has twice been damaged by in the 21st century.

READING PASSAGE 2

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

SAVING THE SOIL

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

- A. More than a third of the world's soil is endangered, according to a recent UN report. If we don't slow the decline, all farmable soil could be gone in 60 years. Since soil grows 95% of our food and sustains human life in other more surprising ways, that is a huge problem.
- B. Peter Groffman, from the Cary Institute of Ecosystem Studies in New York, points out that soil scientists have been warning about the degradation of the world's soil for decades. At the same time, our understanding of its importance to humans has grown. A single gram of healthy soil might contain 100 million bacteria, as well as other microorganisms such as viruses and fungi, living amid decomposing plants and various minerals.

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

- C. If the soil loses its ability to perform these functions, the human race could be in big trouble. The danger is not that the soil will disappear completely, but that the

microorganisms that give it its special properties will be lost. And once this has happened, it may take the soil thousands of years to recover.

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

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

But over the past few decades, it has become clear this wasn't such a bright idea. Chemical fertilizers 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 fertilizers 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 his problem is Pius Floris, who started out running a tree-care business in the Netherlands, and now advises some of the world's topsoil scientists. He came to realize 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 fertilizer 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 a rock. The few plants that grew in the control plots, fed with traditional fertilizers, 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, lidar 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 meters, with the results freely accessible to all.

G. But this is only a first step. We need ways of presenting the problem that brings 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 the 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 unspoiled 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, the 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 fertilizers produced with Haber-Bosch process

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

21 The idea of zero net soil degradation

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

Questions 22-26

Reading Passage 2 has seven paragraphs, A-G.

Which section contains the following information?

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

NB You may use any letter more than once.

- 22 a reference to one person's motivation for a soil-improvement project
- 23 an explanation of how soil stayed healthy before the development of farming
- 24 examples of different ways of collecting information on soil degradation
- 25 a suggestion for a way of keeping some types of soil safe in the near future
- 26 a reason why it is difficult to provide an overview of soil degradation

READING PASSAGE 3

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

Book Review

THE HAPPINESS INDUSTRY: HOW THE GOVERNMENT AND BIG BUSINESS SOLD US WELL-BEING BY WILLIAM DAVIES

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

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

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

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

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

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

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

Questions 27-29

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

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

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

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

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

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

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

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

Questions 30-34

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

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

Jeremy Bentham

Jeremy Bentham was active in other areas besides philosophy. In the 1970s he suggested a type of technology to improve 30..... for different Government departments. He developed a new way of printing banknotes to increase 31..... and also designed a method for the 32 of food. He also drew up plans for a prison which allowed the 33..... of prisoners at all times, and believed the same design could be used for other institutions as well. When researching happiness, he investigated possibilities for its 34....., and suggested some methods of doing this.

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

Questions 35-40

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

In boxes 35-40 on your answer sheet, write

YES if the statement agrees with the claims of the writer

NO if the statement contradicts the claims of the writer

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

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

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

- 37 Watson's ideas on behaviorism were supported by research on humans he carried out before 1915.
- 38 Watson's ideas have been most influential in governments outside America.
- 39 The need for happiness is linked to industrialization.
- 40 The main aim of the government should be to increase the happiness of the population.

READING ANSWERS***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 1,
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 1,
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