阅读讲义

**AIR TRAFFIC CONTROL IN THE USA**

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

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

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

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

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

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

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

#### Questions 20-26

Do the following statements agree with the information given in Reading Passage 2? *In boxes 20-26 on your answer sheet, write*

***TRUE***  *if the statement agrees with the information*

***FALSE*** *if the statement contradicts the information*

***NOT GIVEN*** *if there is no information on this in the passage*

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

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

**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 field1. 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 minimizing human involvement, the idea was to minimize 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 entanglement1, 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 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). |

## READING PASSAGE 3

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

#### Questions 27-32

Reading Passage 3 has seven paragraphs, **A–F**.

Choose the correct heading for each paragraphfrom the list of headings below.

Write the correct number, Ⅰ–Ⅷ, in boxes 27 - 32 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 Smelt 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**

**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 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 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 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 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 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 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 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.

**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.

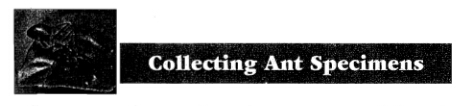
I Geniuses are natural leaders.

J Gifted people develop their greatness through difficulties.

K Genius will always reveal itself.

## READING PASSAGE 3

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



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 in the passage*

27 Taxonomic research involves comparing members of one group of ants.

28 New species of ant are frequently identified by taxonomists.

29 Range is the key criterion for ecological collections.

30 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.

**READING PASSAGE 2**

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

**Gifted children and learning**

1. Internationally, 'giftedness' is most frequently determined by a score on a general intelligence test, known as an IQ test, which is above a chosen cutoff point, usually at around the top 2-5%. Children's educational environment contributes to the IQ score and the way intelligence is used. For example, a very close positive relationship was found when children's IQ scores were compared with their home educational provision (Freeman, 2010). The higher the children's IQ scores, especially over IQ 130, the better the quality of their educational backup, measured in terms of reported verbal interactions with parents, number of books and activities in their home etc. Because IQ tests are decidedly influenced by what the child has learned, they are to some extent measures of current achievement based on age-norms; that is, how well the children have learned to manipulate their knowledge and know-how within the terms of the test. The vocabulary aspect, for example, is dependent on having heard those words. But IQ tests can neither identify the processes of learning and thinking nor predict creativity.
2. Excellence does not emerge without appropriate help. To reach an exceptionally high standard in any area very able children need the means to learn, which includes material to work with and focused challenging tuition -and the encouragement to follow their dream. There appears to be a qualitative difference in the way the intellectually highly able think, compared with more average-ability or older pupils, for whom external regulation by the teacher often compensates for lack of internal regulation. To be at their most effective in their self-regulation, all children can be helped to identify their own ways of learning - metacognition - which will include strategies of planning, monitoring, evaluation, and choice of what to learn. Emotional awareness is also part of metacognition, so children should be helped to be aware of their feelings around the area to be learned, feelings of curiosity or confidence, for example.
3. High achievers have been found to use self-regulatory learning strategies more often and more effectively than lower achievers, and are better able to transfer these strategies to deal with unfamiliar tasks. This happens to such a high degree in some children that they appear to be demonstrating talent in particular areas. Overviewing research on the thinking process of highly able children, (Shore and Kanevsky, 1993) put the instructor% problem succinctly: 'If they [the gifted] merely think more quickly, then we need only teach more quickly. If they merely make fewer errors, then we can shorten the practice'. But of course, this is not entirely the case; adjustments have to be made in methods of learning and teaching, to take account of the many ways individuals think.
4. Yet in order to learn by themselves, the gifted do need some support from their teachers. Conversely, teachers who have a tendency to 'overdirect' can diminish their gifted pupils' learning autonomy. Although #spoon-feeding, can produce extremely high examination results, these are not always followed by equally impressive life successes. Too much dependence on the teacher risks loss of autonomy and motivation to discover. However, when teachers help pupils to reflect on their own learning and thinking activities, they increase their pupils' self-regulation. For a young child, it may be just the simple question 'What have you learned today?' which helps them to recognise what they are doing. Given that a fundamental goal of education is to transfer the control of learning from teachers to pupils, improving pupils’ learning to learn techniques should be a major outcome of the school experience, especially for the highly competent. There are quite a number of new methods which can help, such as child-initiated learning, ability-peer tutoring, etc. Such practices have been found to be particularly useful for bright children from deprived areas.
5. But scientific progress is not all theoretical, knowledge is also vital to outstanding performance: individuals who know a great deal about a specific domain will achieve at a higher level than those who do not (Elshout, 1995). Research with creative scientists by Simonton (1988) brought him to the conclusion that above a certain high level, characteristics such as independence seemed to contribute more to reaching the highest levels of expertise than intellectual skills, due to the great demands of effort and time needed for learning and practice. Creativity in all forms can be seen as expertise mixed with a high level of motivation (Weisberg, 1993).
6. To sum up, learning is affected by emotions of both the individual and significant others. Positive emotions facilitate the creative aspects of learning and negative emotions inhibit it. Fear, for example, can limit the development of curiosity, which is a strong force in scientific advance, because it motivates problem-solving behaviour. In Boekaerts’ (1991) review of emotion in the learning of very high IQ and highly achieving children, she found emotional forces in harness. They were not only curious, but often had a strong desire to control their environment, improve their learning efficiency, and increase their own learning resources.

Questions 18-22

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

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

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

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

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

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

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

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

|  |
| --- |
| **List of People**   1. Freeman 2. Shore and Kanevsky 3. Elshout 4. Simonton 5. Boekaerts |

## READING PASSAGE 1

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



**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 (ASQ. 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 teamed 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 Fricker, 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 (Swimming Analysis) 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. Fricker 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 1 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 and 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 and 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

*You should spend about 20 minutes on* ***Questions 14-26*** *which are based on Reading Passage 3 below.*

#### Questions 14-19

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

Choose the correct heading for paragraphs **A- F** from the list of headings below.

Write the correct number, Ⅰ–Ⅹ, in boxes 14-19 on your answer sheet.

**List of Headings**

Ⅰ The results of the research into blood-variants

Ⅱ Dental evidence

Ⅲ Greenberg's analysis of the dental and linguistic evidence

Ⅳ Developments in the methods used to study early population movements

Ⅴ Indian migration from Canada to the U.S.A.

Ⅵ Further genetic evidence relating to the three-wave theory

Ⅶ Long-standing questions about prehistoric migration to America

Ⅷ Conflicting views of the three-wave theory, based on non-genetic evidence

Ⅸ Questions about the causes of prehistoric migration to America

Ⅹ How analysis of blood-variants measures the closeness of the relationship between different populations

14 Section **A**

15 Section **B**

14 Section **A**

15 Section **B**

16 Section **C**

17 Section **D**

18 Section **E**

19 Section **F**

*Example Answer*

Section G Ⅷ

**Population movements and genetics**

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

**B** Recent work on the problem of when people first entered the Americas is an example of the value of these new techniques. North-east Asia and Siberia have long been accepted as the launching ground for the first human colonizers 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.

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

**D** Williams and his colleagues sampled the blood of over 5,000 American Indians in western North America during a twenty- year period. They found that their Gm allotypes could be divided into two groups, one of which also corresponded to the genetic typing of Central and South American Indians. Other tests showed that the Inuit (or Eskimo) and Aleut 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-lndian, wave more than 15,000 years ago was ancestral to all Central and South American Indians. The second wave, about 14,000-12,000 years ago, brought Na-Dene hunters, ancestors of the Navajo and Apache (who only migrated south from Canada about 600 or 700 years ago). The third wave, perhaps 10,000 or 9,000 years ago, saw the migration from North-east Asia of groups ancestral to the modern Eskimo and Aleut.

**E** How far does other research support these conclusions Geneticist Douglas Wallace has studied mitochondrial DNA in blood samples from three widely separated Native American groups: Pima- Papago Indians in Arizona, Maya Indians on the Yucatan 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-lndian) population.

**F** There are two other kinds of research that have thrown some light on the origins of the Native American population; they involve the study of teeth and of languages. The biological anthropologist Christy Turner is an expert in the analysis of changing physical characteristics in human teeth. He argues that tooth crowns and roots have a high genetic component, minimally affected by environmental and other factors. Studies carried out by Turner of many thousands of New and Old World specimens, both ancient and modern, suggest that the majority of prehistoric Americans are linked to Northern Asian populations by crown and root traits such as incisor shoveling (a scooping out on one or both surfaces of the tooth), single-rooted upper first premolars6 and triple-rooted lower first molars.

According to Turner, this ties in with the idea of a single Paleo-lndian 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.

## READING PASSAGE 2

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

**GREYING POPULATION STAYS IN THE PINK**

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

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

'It really raises the question of what should he 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