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READING PASSAGE 1

Learning to Walk

These days the feet of a typical city dweller rarely encounter terrain any more uneven than a crack in the pavement. While that may not seem like a problem, it turns out that by flattening our urban environment we have put ourselves at risk of a surprising number of chronic illnesses and disabilities. Fortunately, the commercial market has come to the rescue with a choice of products. Research into the idea that flat floors could be d etrimental to our health was pioneered back in the late 1960s in Long Beach, California. Podiatrist Charles Brantingham and physiologist Bruce Beekman were concerned with the growing epidemic of high blood pressure, varicose veins and deep-vein thromboses and reckoned they might be linked to the uniformity of the surfaces that we tend to stand and walk on. The trouble, they believed, was that walking continuously on flat floors, sidewalks and streets concentrates forces on just a few areas of the foot. As a result, these surfaces are likely to be far more conducive to chronic stress syndromes than natural surfaces, where the foot meets the ground in a wide variety of orientations. They understood that the anatomy of the foot parallels that of the human hand - each having 26 bones, 33 joints and more than 100 muscles, tendons and ligaments - and that modern lifestyles waste all this potential flexibility.Brantingham and Beekman became convinced that the damage could be rectified bymaking people wobble. To test their ideas, they got 65 factory workers to try standing on a variable terrain floor - spongy mats with varying degrees of resistance across the surface. This modest irregularity allowed the soles of the volunteers' feet to deviate slightly from the horizontal each time they shifted position. As the researchers hoped, this simple intervention made a huge difference, within a few weeks. Even if people were wobbling slightly, it activated a host of muscles in their legs, which in turn helped pump blood back to their hearts. The muscle action prevented the pooling of blood in their feet and legs, reducing the stress on the heart and circulation. Yet decades later, the flooring of the world's largest workplaces remains relentlessly smooth. Earlier this year, however, the idea was revived when other researchers in the US announced findings from a similar experiment with people over 60. John Fisher and colleagues at the Oregon Research Institute in Eugene designed a mat intended to replicate the effect of walking on cobblestones*. In tests funded by the National Institute of Aging, they got some 50 adults to walk on the toots in their bare feet for less than an hour, three times a week. After 16 weeks, these people showed marked improvements in mobility, and even a significant reduction in blood pressure. People in a control group who walked on ordinary floors also improved but not as dramatically. The mats are now available for purchase and production is being scaled up. Even so, demand could exceed supply if this footstimulating activity really is a 'useful nonpharmacological approach for preventing or controlling hypertension of older adults, asthe researchers believe. They are not alone in recognising the benefits of cobblestones. Reflexologists have long advocated walking on textured surfaces to stimulate so-called 'acupoints' on the soles of the feet. They believe that pressure applied to particular spots on the foot connects directly to particular organs of the body and somehow enhances their function. In China, spas, apartment blocks and even factories promote their cobblestone paths as healthful amenities. Fisher admits he got the concept from regular visits to the country. Here, city dwellers take daily walks along cobbled paths for five or ten minutes, perhaps several times a day, to improve their health. The idea is now taking off in Europe too.People in Germany, Austria and Switzerland can now visit 'barefoot parks' and walkalong 'paths of the senses - with mud, logs, stone and moss underfoot. And it is not difficultto construct your own path with simple everyday objects such as stones or bamboo poles.But if none of these solutions appeal, there is another option. A new shoe on the market claims to transform flat, hard, artificial surfaces into something like uneven ground. 'Theseshoes have an unbelievable effect,' says Benno Nigg, an exercise scientist at

CalgaryUniversity in Canada.Known as the Masai Barefoot Technology, the shoes have rounded soles that cause you torock slightly when you stand still, exercising the small muscles around the ankle that are responsible for stability. Forces in the joint are reduced, putting less strain on thesystem, Nigg claims.Some of these options may not appeal to all consumers and there is a far simpler alternative.If the urban environment is detrimental to our health, then it is obvious where we shouldturn. A weekend or even a few hours spent in the countryside could help alleviate asufferer's aches and pains, and would require only the spending of time.However, for many modern citizens, the countryside is not as accessible as it once wasand is in fact a dwindling resource. Our concrete cities are growing at a terrifying rate -perhaps at the same rate as our health problems.

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..... Brantingham and Beekman were the first researchers to investigate

the relationship between health problems and flat floors.

2..... The subjects in Fisher's control group experienced a decline in their physical condition.

3..... The manufacturers are increasing the number of cobblestone mats they are making.

4..... Fisher based his ideas on what he saw during an overseas trip.

5..... The Masai Barefoot Technology shoes are made to fit people of all ages.

Questions 6-8

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

Write the correct letter in boxes 6-8 on your answer sheet.

6.The writer suggests that Brantingham and Beekman's findings were

A .ignored by big companies.

B .doubted by other researchers.

C .applicable to a narrow range of people.

D .surprising to them.

7.What claim is made by the designers of the cobblestone mats"?

A. They need to be used continuously in order to have a lasting effect.

B. They would be as beneficial to younger people as to older people.

C. They could be an effective alternative to medical intervention.

D. Their effects may vary depending on individual users.

8.Which of the following points does the writer make in the final paragraph?

A. People should question new theories that scientists put forward.

B. High prices do not necessarily equate to a quality product.

C. People are setting up home in the country for health reasons.

D. The natural environment is fast disappearing.

Questions 9-14

Complete the summary below.

ChooseONE WORD ONLY from the passage for each answer.Write your answers in boxes 9-14 on your answer sheet.

In their research, Brantingham and Beekman looked at the complex physical 9.....of the foot and noted that the surfaces of modem environments restrict itsmovement. They invented a mat which they tried out on factory workers. Whenever theworkers walked on it, the different levels of10.....in the mat would encouragegreater muscle action. In turn, this lessened the effect of11.....on thecardiovascular system.Similar research was undertaken by John Fisher and colleagues in Oregon. As a result oftheir findings, they decided to market cobblestone mats to the elderly as a means ofdealing with12.....Reflexologists claim that by manipulating specific parts of thefeet, the performance of certain13.....will also improve. Finally, Benno Nigg atCalgary University believes that specially shaped14.....on shoes should givehealth benefits.

READING PASSAGE 2

Mind Music

Scientists investigate 'earworms', the music we can't get out of our head

A

Ever had a song stuck in your head, playing on an endless loop? Scientists call them'involuntary musical images', or 'earworms, and a wave of new research is shining light onwhy they occur and what can be learned from them. Some neuroscientists and cognitivepsychologists are studying earworms to explore the mysteries of memory and the part ofthe brain that is beyond our conscious control. The idea that we have full control over ourthought processes is an illusion,' says psychologist Lauren Stewart, who founded themaster's program in music, mind and brain at Goldsmiths, University of London, UK, whererecent research has taken place. Researchers haven't been able to watch what happens inthe brain when earworms occur, because they happen unpredictably. Much of what isknown about them comes from surveys, questionnaires, diaries and lab experiments.

B

A Goldsmiths study published in the journal Memory and Cognition this year showed thatthe singing we hear in our heads tends to be true to actual recordings. Researchers had 17volunteers tap to the beat of any earworm they heard during a four-day period while adevice attached to their wrist recorded their movements. The tapping tempos were within10% of the tempos of the original recordings. Another Goldsmiths study, published thisyear in Consciousness and Cognition, found that people who report hearing earwormsoften, and find them most intrusive, have slightly different brain structures, with more graymatter in areas associated with processing emotions.

C

Studies also show that the music in our heads often starts playing during times of 'lowcognitive load', such as while showering, getting dressed, walking, or doing chores. DrStewart likens earworms to 'sonic screen savers' that keep the mind entertained while it isotherwise unoccupied. She and her colleagues tested that theory by having volunteerslisten to songs and giving them various tasks afterwards. The volunteers who sat idly forthe next five minutes were the most likely to report hearing the music m their heads. DrStewart observed that the more challenging the activity, the less likely the volunteers wereto hear the music. Diary studies also show songs tend to match people's moods andtherefore they are not random. If you are energized and upbeat, an earworm that occurs islikely to be uptempo too.

D

Songs the brain fixates on are usually those it has been exposed to recently, surveysshow, which is why tunes getting heavy radio play frequently top the earworm charts. Eventunes you may have heard but didn't pay attention to can worm their way into yoursubconscious, says Ira Hyman, a psychologist at Western Washington University inBellingham, USA. In an unpublished study there, participants who listened to music whiledoing other tasks were more likely to report that the songs returned as earworms later on,compared with participants who simply listened.

E

Some earworms are just fragments of a song that repeat like a broken record. So, whenthe mind hits a part of a song it can't remember, it loops back rather than moving on. Thatcould make an earworm even more entrenched, Dr Hyman says. According to a theoryknown as the Zeigarik effect, named for a Soviet psychologist, Bluma Zeigarnik, unfinishedthoughts and activities weigh on the mind more heavily than those that are completed,although experiments exposing students to interrupted songs have yielded mixed results.

F

Researchers say they can't pinpoint a spot in the brain where earworms live. Imagingstudies by Andrea Halpern at Bucknell University, in Lewisburg, USA, have shown thatdeliberately imagining music and actually listening to music activate many of the sameneurological networks. Dr Halpern's earlier studies showed that when subjects listened tothe first few notes of familiar music, areas in the right frontal and superior temporal portionsof the brain became activated, along with the supplementary motor area at the top, which istypically involved in remembering sequences. When the same subjects listened tounfamiliar music and were asked to recall it, there was activity in the left frontal portions ofthe brain instead.

G

One factor that makes some songs stick might be repetition. 'Repetition leads tofamiliarity which leads to anticipation, which is satisfied by hearing the song,' says JohnSeabrook, author of The Song Machine: Inside the Hit Factory, about how producers pumppop songs full of aural "hooks', the punchy melodic phrases designed to target the brainand leave it wanting more. The researchers are comparing the melodic structure of 100 often-mentioned songs with 100 similarly popular songs that weren't cited as earworms, toassess the difference. Songs with earworm potential appear to share certain features: arepeating pattern of ups and downs in pitch, and an irregular musical interval.

H

The researchers plan next to test their results in reverse, and play ringtones from songsof both the earworm and non earworm variety for volunteers several times a day to seewhich ones get stuck. Drs Stewart and Halper are now working together to recruit surveyparticipants for a study looking at whether people at different stages of life experienceearworms differently. 'You can argue that older people might get them more often becausethey know more songs,' Dr Halpern says. 'But the few responses we have so far indicatethat they have earworms less often. It could be that they don't play music as often asyounger people do

Questions 1-4

The 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 the characteristics common to songs with earworms

2..... a justitication for research into earworms

3..... a description of the brain's reaction to known and unknown songs

4..... details of proposed research into the frequency with which earwormsoccur indifferent age groups

Questions 5-8

Complete the summary below.

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

Write your answers in boxes **5-8** on your answer sheet.

Goldsmiths studyResearchers from Goldsmiths concluded that the music we imagine in our minds is quitesimilar to recordings. They proved this by asking volunteers to record the rhythm of musicusing a monitor on their 5.....Further research has demonstrated that those whohear earworms more frequently have brains that may deal with6.....differentlyfrom other people, Dr Stewart also believes that the brain is7.....by earwormswhen it is not focused on a task. In fact, a reduction in the occurrence of earworms wasfound to be directly related to how8.....the task was Interestingly, volunteers'diaries revealed that the songs they heard inside their head reflected their moods, so thechoice of music is not accidental.

Questions 9-13

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

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

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

NB You may use any letter more than once.

9..... Some musicians create music that is intentionally memorable.

10..... People are unable to completely regulate how they think.

11..... We can remember songs without knowing that we have heard them.

12.....Thinking about music has a similar effect on the brain to hearing music.

13.....Earworms are more persistent when only a short section of the song is constantly replayed.

List of Researchers

A Lauren Stewart

B Ira Hyman

C Andrea Haiper

D John Seabrook

READING PASSAGE 3

A Decibel Hell (The Effects of Living in a Noisy World)

Section A decibel Hell:

It's not difficult for a person to encounter sound at levels that can cause adverse healtheffects. During a single day, people living in a typical urban environment can experience awide range of sounds in many locations, even once-quiet locales have become pollutedwith noise. In fact, it's difficult today to escape sound completely. In its 1999 Guidelines forCommunity Noise, the World Health Organization (WHO) declared, "Worldwide, noiseinduced hearing impairment is the most prevalent irreversible occupational hazard, and it isestimated that 120 million people worldwide have disabling hearing difficulties." Growingevidence also points to many other health effects of too much volume.

Mark Stephenson, a Cincinnati, Ohio-based senior research audiologist at the NationalInstitute for Occupational Safety and Health (NIOSH), says his agency's definition ofhazardous noise is sound that exceeds the time-weighted average of 85 dBA, meaning theaverage noise exposure measured over a typical eight-hour workday. Other measures anddefinitions are used for other purposes.

Section B Growing Volume

In the United States, about 30 million workers are exposed to hazardous sound levels onthe job, according to NIOSH. Industries having a high number of workers exposed to loudsounds include construction, agriculture, mining, manufacturing, utilities, transportation,and the military.

Noise in U.S. industry is an extremely difficult problem to monitor, acknowledges CraigMoulton, a senior industrial hygienist for the Occupational Safety and Health Administration(OSHA). "Still," he says, "OSHA does require that any employer with workers overexposedto noise provide protection for those employees against the harmful effects of noise.Additionally, employers must implement a continuing, effective hearing conservationprogram as outlined in OSHA's Noise Standard."

Section C Scary Sound Effects

Numerous scientific studies over the years have confirmed that exposure to certain levelsof sound can damage hearing. Prolonged exposure can actually change the structure ofthe hair cells in the inner ear, resulting in hearing loss. It can also cause tinnitus, a ringing,roaring, buzzing, or clicking on the ears.

NIOSH studies from the mid to late 1990s show that 90% of coal miners have hearingimpairment by age 52 – compared to 9% of the general population – and 70% of malemetal/nonmetal miners will experience hearing impairment by age 60 (Stephenson notesthat from adolescence onward, females tend to have better hearing than males). Neitzelsays nearly half of all construction workers have some degree of hearing loss. "NIOSHresearch also reveals that by age twenty-five, the average carpenter's hearing is equivalentto an otherwise healthy fifty-year-old male who hasn't been exposed to noise," he says.

William Luxford, medical director of the House Ear Clinic of St. Vincent Medical Center inLos Angeles, points out one piece of good news: "It's true that continuous noise exposure will lead to the continuation of hearing loss, but as soon as the exposure is stopped, thehearing loss stops. So a change in environment can improve a person's hearing health."

Research is catching up with this anecdotal evidence. In the July 2001 issue of Pediatrics,researchers from the Centers for Disease Control and Prevention reported that, based onaudiometric testing of 5,249 children as part of the Third National Health and Nutrition,Examination Survey, an estimated 12.5% of American children have noise-induced hearingthreshold shifts – or dulled hearing – in one or both ears. Most children with noise-inducedhearing threshold shifts have only limited hearing damage, but continued exposure toexcessive noise can lead to difficulties with high-frequency sound discrimination. The reportlisted stereos, music concerts, toys (such as toy telephones and certain rattles),lawnmowers, and fireworks as producing potentially harmful sounds.

Section D Beyond the Ears

The effects of sound don't stop with the ears. Nonauditory effects of noise exposure arethose effects that don't cause hearing loss but still can be measured, such as elevatedblood pressure, loss of sleep, increased heart rate, cardiovascular constriction, laboredbreathing, and changes in brain chemistry.The nonauditory effects of noise were noted as early as 1930 in a study published by E.L.Smith and D.L. Laird in volume 2 of the Journal of the Acoustical Society of America. Theresults showed that exposure to noise caused stomach contractions in healthy humanbeings. Reports on noise's nonauditory effects published since that pioneering study havebeen both contradictory and controversial in some areas.Bronzaft and the school principal persuaded the school board to have acoustical tileinstalled in the classrooms adjacent to the tracks. The Transit Authority also treated thetracks near the school to make them less noisy. A follow-up study published in theSeptember 1981 issue of the Journal of Environmental Psychology found that children'sreading scores improved after these interventions were put in place.

Section E Fighting for Quiet

Anti-noise activists say that Europe and several countries in Asia are more advanced thanthe United States in terms of combating noise. "Population pressure has prompted Europeto move more quickly on the noise issue that the United States has," Hume says. In theEuropean Union, countries with cities of at least 250,000 people are creating noise maps ofthose cities to help leaders determine noise pollution policies. Paris has already preparedits first noise maps. The map data, which must be finished by 2007, will be fed intocomputer models that will help test the sound impact of street designs or new buildingsbefore construction begins.Activists in other countries say they too want the United States to play a more leading roleon the noise issue. But as in other areas of environmental health, merely having a morepowerful government agency in place that can set more regulations is not the ultimateanswer, according to other experts. Bronzaft stresses that governments worldwide need toincrease funding for noise research and do a better job coordinating their noise pollutionefforts so they can establish health and environmental policies based on solid scientificresearch. "Governments have a responsibility to protect their citizens by curbing noisepollution," she says.

Questions 1-5

Complete the summary below

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

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

Nowadays it seems difficult for people to avoid the effects of living in a noisy world. Noise isthe sound beyond the average of 1.....referring to the agency's definition.Scientific studies over the years from the mid to late 1990s have confirmed that exposureto certain levels of sound can cause damage 2.....on certain senior age.

From the testing of 5,249 children, those who are constantly exposed to excessive noisemay have trouble in 3.....sound discrimination. The effects of sound don't stopwith the ears, exposure to noise may lead to the unease of 4.....##a in healthypeople. Europe has taken steps on the noise issue, big cities of over 250,000 people arecreating 5.....to help to create noise pollution policies.

Questions 6-10

Look at the following researchers and the list of findings below.

Match each researcher withthe correct finding.

Write the correct letter in boxes **6-10** on your answer sheet.

List of people or organisations

A. WHO

B. William Luxford (the House Ear Clinic),

C. Craig Moulton (OSHA)

D. Arline Bronzaft

E. Centers for Disease Control and Prevention

6.....People can change the environment to improve hearing health.

7.....The government should continue the research on anti-noise researcheswith the fund.

8.....companies should be required to protect the employees to avoid noise
9.....Noise has posed an effect on American children's hearing ability

10.....noise has seriously affected human being where they live worldwide

Questions **11-13**

Choose the corrct answer

11. The board of schools built close to the tracks are convinced to

A. moved the classrooms away from the noisy track

B. regulated the track usage to a less extent

C. utilised a special material into classroom buildings lessening the effect of outside noise

D. organised a team for a follow-up study

12. In European countries, the big cities' research on noise focuses on

A. How to record pollution details of the city on maps

B. the impact of noise on population shift in the European cities

C. how wide can a city be to avoid noise pollution

D. helping the authorities better make a decision on management of the city

13. What is the best title in paragraph 1?

A. How people cope with noise pollutions

B. the fight against the noise with the powerful technology

C. The Effects of Living in a Noisy World

D. The Effects of noise on children's learningorrect letterA,B,CorD

READING PASSAGE 4

THE ROLE OF ACCIDENTS IN BUSINESS

In 1894 Dr John Kellogg and his brother. Will, were supervising a hospital and health spa inMichigan. The patients were on a restricted diet. One day, the brothers left cooked wheatuntended for more than 24 hours. When they returned, they saw what they had done. Itwas no good to eat, but they decided to run the stale wheat through rollers, just to see howit would turn out. Normally, the process produced long sheets, but they were surprised todiscover that this time the rollers created flat flakes. They baked them, and then tried thesame thing with corn. From this accidental discovery came the cornflakes that generationshave now been eating for breakfast.

Accidents happen; there is nothing predictable and orderly about innovation. Nobellaureate Sir Alan Hodgkin, who discovered how nerve cells transmit electrical impulsesbetween the skin and the brain, commented: 'I believe that the record of my publishedpapers conveys an impression of directedness and planning which does not at all coincidewith the actual sequence of events.'

The same rule applies in business. The mistake that gave US cornflakes keeps repeatingitself in the history of disruptive innovation, the kind that transforms markets. LouisDaguerre, for, instance, discovered the technique that gave US photography in the 1830s,when drops of mercury from a shattered thermometer produced a photographic image. Themicrowave was discovered when Peroy Spender, a scientist with Raytheon, was testing anew vacuum tube and discovered that the sweet in his pocket had melted. The artificialsweetener, saccharin, was the unintentional result of a medical scientist's work on achemical treatment for gastric ulcers. While working for the firm 3M, researcher Art Fry hadno idea he was taking the first steps towards Post- It Notes when he used bits of adhesiveoffice paper that could be easily lifted off the page to replace the scrap paper bookmarksthat kept falling out of his hymn book.

Breakthrough and disruptive innovation are rarely driven by orderly process. Usually theycome out of a chaotic, haphazard mess, which is why big companies, full of managersschooled in business programmes designed to eliminate random variation and mistakes,struggle with them. In these sorts of environments, accidents are called failures and arediscouraged.

It is no surprise then that research from the late British economist Paul Geroski and LondonBusiness School's Constantinos Markides found that companies that were skilled atinnovation were usually

not that skilled when it came to commercialisation, and vice versa.Their book,Fast Second,divides businesses into 'colonists' and 'consolidators'. Small andnimble, colonists are adept at creating market niches but are terrible institution builders.Consolidators, with their strong cultures of discipline and cost control, know how to takeclever ideas from other firms and turn them into massmarket items. Microsoft is a primeinstance of this.

With companies spending hundreds of billions of dollars on research and development, USacademics Robert Austin and Lee Devin examined how managers can encourageproductive slip-ups. In their articleAccident, Intention and Expectation in the InnovationProcess,they argue that business processes actually prevent helpful mis-steps fromoccurring. According to their catalogue of accidents, not all false steps and mishaps areequal. Accidents, they say, come from unlikely mental associations such as memories andvague connections, looking for something and finding it in an unexpected way, looking forone thing and finding something else, and not looking for anything but finding somethingvaluable.

Accident-prone innovation, they say, requires companies to get outside the 'cone ofexpectation'. It means throwing together groups from diverse backgrounds, and combiningideas in unpredictable ways, other strategies also include having systems that watch out for accidents and examine them for value, generating them when they do not happen often enough, seizing oil the useful ones, capturing their valuable features, and building on themto add value and give potential for useful accidents.

All this, however, requires thinking that is often counter-intuitive to the way businessesoperate. In other words, it is the kind of thinking that goes against the beliefs of mostbusiness managers. It runs counter to the notion frequently pushes by consultants that youcan 'harness' creativity and direct it to line up with intention. 'The cost of accidentsbusiness, people tend to call such efforts failure.'

There are tentative signs that more companies are starting to realise that failure can lead tocommercial gain, and that this is part or the risk-talking that underpins innovation.Australia's largest brewing company, for example, made a bad error when it launched anew beer called Empire Lager, pitched at younger consumers. Having spent a fortunecreating a beer with a sweeter taste, designing a great-looking bottle and a televisioncampaign, Foster's was left with a drink that no-one wanted to buy. The target market wasmore interested in brands built up by word of mouth.

Instead of wiping the unsuccessfull product launch, Fosters used this lesson learned to goon and develop other brands instead. One of them, Pure Blonde, is now ranked asAustralia's fifth-largest beer brand. Unlike Empire Lager, there has been almost nopromotion and its sales are generated more by word of mouth.

Other companies are taking similar steps to study their own slip-ups. Intuit, the companybehind financial tools such as Quicken, holds regular 'When Learning Hurts' sessions. Butthis sort of transformation is never easy. In a market that focuses on the short-term,convincing employees and shareholders to tolerate failure and not play it safe is a big thingto ask.

Questions **1-5**

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

Inboxes **1-5** 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.....The delay in the process used by the Kellogg brothers affected the finalproduct.

2.....Sir Alan Hodgkin is an example of someone whose work proceeded in alogical and systematic way.

3.....Daguerre is an exception to the general rule of innovation.

4.....The discovery of saccharin occurred by accident during drug research.

5.....The company 3M should have supported Art Fry by funding his idea of PostIt Notes.

Questions 6-9

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

Write the correct letter, A-H, in boxes **6-9** on your answer sheet.

6.....The usual business environment

7.....Geroki and Markides's book

8.....Microsoft is an example of a company which

9.....The origin of useful accidents

A can be found in unusual thoughts and chance events.

B can be taught in business schools.

C has made a success from someone else's invention.

D is designed to nurture differences.

E is unlikely to lead to creative innovationFsays that all mistakes are the same.

G shows that businesses are good at either inventing of selling.

H suggests ways of increasing the number of mistakes

Questions 10-14

Choose the correct letter, A, B, c or D

Write the correct letter in boxes 10-14 on your answer sheet.

10. How do Austin and Devin advise companies to get out of the 'cone of expectation'?

A by decreasing the number of company systems

B by forming teams of different types of people

C by hiring new and creative people

D by holding regular brainstorming meetings

11.In recommending 'counter-intuitive' thinking, what do Austin and Devin imply?

A that failing at business is bad for staff morale

B that innovation cannot be planned for

C that most businesses should be devoted to avoiding mistakes

D that the cost of mistakes is an important consideration

12. The writer describes the Empire Lager disaster in order to show that

A success can come out of a business failure

B the majority of companies now value risk-talking

C TV advertising works better on older people

D young beer drinkers do not like a sweet taste

13. Pure Blonde has been more successful than Empire Lager because

A digital media other than TV were used.

B it was advertised under a different brand name.

C it was launched with very little advertising.

D the advertising budget was larger

14. The writer concludes that creating a culture that learns from mistakes

A brings short-term financial gains.

B can be very difficult for some companies.

C holds no risk for workers.

D is a popular move with shareholders.

READING PASSAGE 5

You should spend about 20 minutes on Questions 1-13, which are based on Reading Passage 1 on pages 2 and 3.

The Pyramid of Cestius

A 2000-year-old pyramid in the city of Rome has been restored by archaeologists

Though Rome draws tourists from around the world to its many impressive sites, one notable monument there has never attracted nearly as much interest: The Pyramid of Cestius. But why would there be a pyramid in Italy? After the Roman conquest of Egypt in 30 B.C., Egyptian architectural style became the fashion in Rome.

Though obelisks and other monuments inspired by Egypt's great pyramids sprung up around the city, only two actual pyramids are known to have been built. The only one left standing, the Pyramid of Cestius, was designed as the burial pyramid for a Roman politician named Caius Cestius, who ordered that the building work be completed within a period of 330 days.

Construction took place at some point between 18 B.C. and 12 B.C. Cestius pyramid had a layer of white Carrara marble on the outside, and was constructed from brick held together by a basic kind of cement on the inside. One of the things that strikes you when you look at the pyramid is how steep it is, so that the shape of Cestius' pyramid is quite unlike that of typical Egyptian ones. This is a difference that could have been the result of inaccurate information sent back to Rome by soldiers who saw the pyramids in person in Egypt. Alternatively, Roman builders could have drawn inspiration from the pyramids in Nubia, a region located in what is today northern Sudan and southern Egypt.

At the time of its construction, since there was a strict Roman law prohibiting the placement of tombs within the city itself, the Pyramid of Cestius would have stood in countryside. Rome grew enormously during the next two centuries, and, by the 3rd century A.D., the pyramid would have been surrounded by buildings. We also know that in the 3rd century A.D., the Pyramid of Cestius was hidden behind a high wall on the orders of Emperor Aurelian; this probably helped it survive throughout the centuries to come, even as other ancient monuments disappeared.

By the Middle Ages, the pyramid was covered in vegetation and thick dirt, and popular myth had developed that it might be a tomb for one of the twin brothers Romulus and Remus, who were regarded as the men who had established the city of Rome. Cestius actual tomb within the pyramid and the inscription identifying the pyramid as his, weren't rediscovered until the 1660s when the pyramid underwent restoration. During excavations, when trees and plants were cleared away, two marble bases were found in front of the pyramid, as well as fragments of bronze statues that had once stood on them on either side of the pyramid. The people employed to excavate the pyramid did not find the urn that would have contained Cestius" remains, but they did come across a tunnel. It was quite possible, therefore, that robbers had at some earlier time removed the contents of the tomb. But while some of the features of Cestius' tomb no longer exist, at least the pyramid itself has survived.

Today, the foundations of Cestius pyramid rest below street level near an intersection with heavy traffic, so that passing tourists and residents could easily fail to notice its full height of 119 feet. Across the intersection is the Pirámide station, located on Line B of the Rome Metro. In 2011, the Japanese clothing company entrepreneur Yuzo Yagi, president of Yagi Tsusho Ltd, announced his

intention to help the Italian government pay for an ambitious renovation of the Pyramid of Cestius. 'It's an act of gratitude,' he later told journalists. "Our company has grown thanks to Italy.' Work began at the site shortly after Yagi signed an official agreement with the Special Superintendency for the Archaeological Heritage of Rome, and was completed ahead of schedule thanks to his 2-million-euro contribution.

As archaeologist Leonardo Guarnieri explained to journalists, officials are now conducting tours of the newly renovated pyramid twice a month by reservation. Visitors who take advantage of the tour can make their way through a narrow corridor in order to enter the burial chamber itself. It is within these walls that they can admire the frescoes: watercolour paintings typical of the time. In the chamber, it is possible to make out four frescoes of the winged Roman goddess of war, Victoria, a figure from Roman legend, as well as of a series of vases, the type that would have been used for special rituals and purification purposes. We know from the writings of earlier visitors that there used to be more here, but the majority have disappeared over time.

Only one problem remains now that the restoration is complete. The white exterior of the Pyramid of Cestius will have to be cleaned every few months to remove the layer of urban pollution. A team of free-climbers will be employed to do the job, in order to avoid placing builder's scaffolding around the newly welcoming monument. Questions 1-7

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

In boxes **1-7** on your answer sheet, write

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

1 The Pyramid of Cestius has always been one of Rome's most popular tourist attractions.

2 The construction of the Pyramid was completed before Cestius' death.

3 In the Middle Ages, people thought an original founder of Rome was buried in the Pyramid of Cestius.

4 Today the height of the Pyramid is something that tourists and residents immediately notice.

5 Japanese businessman Yuzo Yagi was an admirer of both Italian and Egyptian architecture.

6 The restoration of the Pyramid of Cestius, which was funded by Yuzo Yagi, finished earlier than expected.

7 Most of the original frescoes inside Cestius' tomb have survived to this day.

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.

History of the Pyramid of Cestius

Construction of Cestius' pyramid

- it was made from 8_____ marble and cement
- its 9_____ is different to the pyramids found in Egypt
- it was originally built in the 10_____ as building tombs in the city

was forbidden

- Emperor Aurelian ordered that a wall had to be built around it

Restoration of Cestius' pyramid in the 1660s

- in the 1660s. some broken 11 _____were found next to it
- the 12_____ inside the tomb suggests that robbers had been

there

- the frescoes show mythological scenes, and images of vases Restoration of Cestius' pyramid today
- a Japanese businessman paid for its restoration
- climbers are helping to get rid of signs of 13 _____

READING PASSAGE 6

You should spend about 20 minutes on Questions 1-13, which are based on Reading on pages 2 and 3.

Chocolate for the masses

For almost three thousand years, chocolate was a drink of the elite and the wealthy, originally in South America and later on in Europe. In the early 19th century, however, chocolate became far more widely available, and consumption shot up dramatically across the populations of Europe in particular.

It was 1828 that marked the beginning of the modem era in chocolate making and production. Chocolate as a drink had been known for centuries, but in 1828 a Dutch chemist named Van Houten developed a process for the manufacture of a new kind of powdered chocolate using a hydraulic press. Untreated chocolate 'liquor' - the end result of grinding the cacao beans from which chocolate is obtained - contains about 53 per cent cacao butter, but this machine removed nearly half of this, leaving a 'cake' that could be pulverized into a fine powder - what is now known as 'cocoa*.

In 1847, the British firm Fry and Sons found a way to mix a blend of cocoa powder and sugar with melted cacao butter to produce a thin paste which could be cast into various shapes. This was the world's first true solid chocolate. Thanks to immediate high demand for this product, the price of cacao butter escalated, so the new solid chocolate was only accessible for the elite. But this would eventually change, because of the introduction of cost-cutting methods and mass production.

By the latter half of the 19th century, many manufacturers had begun making their own chocolate, and using cocoa powder to hand-coat sugar confections. Cocoa powder also reached wide use in many other products, like ice creams and biscuits. Entrepreneurial families like the Frys and Cadburys in Britain had a social conscience in the midst of all this money-making, unlike many other 19th-century captains of industry. In the Birmingham suburb of Boumville, where they had established their chocolate factory, the Cadburys created a model town with adequate housing for their workers, and even dining and reading rooms so that their employees had no need to spend anything on entertaining themselves.

However, the rising demand for chocolate also made it a target for unscrupulous producers and merchants. Sometimes the expensive cacao butter was completely extracted and replaced with olive or almond oil, or egg yolks. Alternatively, cheaper materials such as potato starch or flour were added. In 1850, a health commission was created in Britain for the analysis of foods. Suspicions about chocolate proved well-founded - most of the samples contained starch grains from potatoes or other plants. The investigation inspired the British Food and Drug Act of 1860 and the Adulteration of Food Act of 1872.

The invention of milk chocolate took place in Switzerland, and was a collaboration between two men. The first was Henri Nestle, a chemist who in 1867 discovered a process to make powdered milk by evaporation, when mixed with water, this could be fed to infants and small children. The second man, Daniel Peter, came up with the idea of using Nestle's milk powder in the manufacture of a new kind of chocolate, and, in 1879, the first milk chocolate bar was produced.

Also in 1879 another Swiss. Rodolphe Lindt, invented the conche machine, which vastly improved the quality of Chocolate confectionery. Before Lindt, solid chocolate was usually coarse and gritty.

Now, however, it achieved such a degree of smoothness that Lindt named it ‘fondant’, after the smooth sugar creams of that name. People on both sides of the Atlantic developed a taste for fondant chocolate, and the use of the conche machine for solid chocolate became universal in the business.

In the USA, Milton Hershey dominated the chocolate industry. In 1893, after seeing examples of the machinery used in Europe in action at an international exhibition in Chicago, he bought some and began turning out chocolate coatings for the caramels he was already producing. But after a trip to the chocolate centers of Europe, he sold his caramel business for a million dollars, bought a farm in Pennsylvania, and built a chocolate factory there.

This became the nucleus of ‘Hershey. the Chocolate Town’, which contained amongst other things Hershcy’s imposing mansion, the Hershey Department Store and the Hershey Bank. There was, however, no elected mayor or indeed any democratic system in place. The whole town was in essence Milton Hershcy's private kingdom, and he ran it as he wanted.

This was not the only Hershey town in existence. During a trip which he made to the island of Cuba in 1915, Hershey was inspired to build a new model town centered round a mill for grinding sugar. To transport the refined sugar so that it could be shipped by sea to his chocolate and cocoa factory, Hershey built modem electric railroads too.

To help advertise his products, Hershey employed nutritionists to proclaim their health qualities, and his chocolate bars and cocoa soon commanded the American market. Everything was mechanized - a true assembly-line operation. Hershey’s best-selling bar contained almonds imported from southern Europe, dropped by machines into the waiting molds. Another popular product was 'Hershcy's Kisses' bite-sized, flat-bottomed drops of chocolate, individually wTapped.

Nowadays so many tourists visit Hershey that the company no longer offers tours of its factory Rather, visitors are whisked along on automated carts through an exhibition called ‘Chocolate World', where they can see how their favorite products are produced.

Questions 1 - 6

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

In boxes **1-6** on your answer sheet, write

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

1 Chocolate was consumed by greater numbers of people in the nineteenth century than in previous times.

2 Fry's chocolate became more affordable because of the fall in price of one ingredient.

3 Entrepreneurial British chocolate manufacturers paid their employees well.

4 Customers were made ill through die practices of unscrupulous chocolate producers.

5 Fresh milk was used in the production of milk chocolate in Switzerland.

6 Lindt's conche machine was adopted by other manufacturers.

Questions **7-13** Complete the notes below.

Choose ONE WORD ONLY from the passage for each answer.

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

Milton Hcrshcy and the chocolate industry

- Hershey bought some 7..... after visiting a trade fair
- After selling his caramel business. Hershey purchased a 8.....
- The inhabitants of Hershey could not vote for a 9.....
- Hershey set up o new town in Cuba around a mill.
- Hershey constructed 10.....to transport material.
- Hershey brought in 11.....to improve the image of his chocolate.
- One popular chocolate product had 12.....added to it.
- Because of the huge demand, tourists can only visit the 13.....at Hershey.

READING PASSAGE 7

You should spend about 20 minutes on Questions 1-13, which are based on Reading Passage I on pages 2 and 3.

A SURVIVOR'S STORY.

One native bird in New Zealand that has managed to survive the introduction of non-native species.

As an island country with a fauna dominated by birds, New Zealand was once home to an owl species which is now extinct, the 'laughing owl', named for its distinctive cry. This bird was widespread throughout the islane s when European settlers arrived in the middle of the 19th century, and it remained in good nui bers for some years thereafter. Where other native birds suffe ed from predation by the Polynesian rat, the laughing owl turned the tables and adapted its diet to include the rodent. It was also capable of catching and killing the other New Zealand owl, the morepork, and even larger birds, such as the weka. However, the laughing owl was wiped our around the beginning of the 20th century, its demise caused by specimen collectors, habitat changes, and non-native predators including cats and stoats. Surprisingly, it is the smaller owl, the morepork, that has managed to survive until this day.

Speckled dark brown, with yellow eyes and long tails, they are around 29 centimetres long from head to tail and 175 grams in weight. Moreporks have fringes on the edge of their feathers, so they can fly almost silently and no t alert potential prey. They have acute hearing, and their large eyes are very sensitive to light.

Moreporks nest in tree hollows, in clumps of plants, or in cavities among rucks and roots, hi the wild, moreporks usually start nesting in October, although zoo specimens have been recorled nesting in midwinter, possibly stimulated by an ample food supply. The female lays up to three white eggs, which she incubates for 20 to 30 days. During this time, she rarely hunts, and the male brings food to her. Once the chicks hatch, she stays mainly on the nest until the young owls are fully feathered. When hatched, chicks are covered in light grey down, and have their eyes closed. The eves do not open until the eighth day after hatching. They can fly at around 35 days.

By day, moreporks sleep in roosts. By night, they hunt a variety of animals mainly large invertebrates, including scarab and huhu beetles, moths, caterpillars and spiders. They also take small birds and mice. They can find suitable food in pine forests as well as native forest. A morepork uses its sharp talons to catch or stun its prey, which it then carries away in its bill. Moreporks are clever hunters, and birds such as robins, grey warblers and fantails can end up as their prey. In the day, these small birds sometimes mob drowsy moreporks and chase them away from their roosts. They force the sleepy predators to search for a more peaceful spot.

Moreporks have proved to be ungracious hosts. Scientists trying to establish a population of plovers on Motuora Island in New Zealand's Hauraki Gulf were mystified as to why only two birds survived out of 75 placed there. The culprits turned out to be five pairs of moreporks that ate or chased away the new arrivals.

Although moreporks are still considered to be relatively common, it is likely that numbers are in gradual decline due to predation and loss of habitat. As the female is a hole-nester, she is vulnerable to predators such as S' oats and possums during the breeding season, and eggs and chicks will also be at risk from rats. The i se of pesticides is another possible threat to the owls,

though not a direct one. As moreporks are at the top of the food chain, they could be affected by an accumulative poison by consuming prey that has ingested poison.

The New Zealand Department of Conservation is taking steps to ensure the preservation of New Zealand's only native owl. The department is involved in measuring the population of moreporks and has put transmitters on a number of birds to determine survival and mortality. As well as being New Zealand's only native owl, the morepork has symbolic and spiritual importance, so in monitoring the birds it is hoped that the morepork will continue to survive and thrive.

At dusk, the melancholy sound of the morepork can be heard in forests and parks as it calls to other moreporks and claii s territory. Its Maori name (ruru) echoes its two-part cry. In the tradition of the Maori people of New Zealand, the morepork, or ruru, was often seen as a careful guardian. A number of sayings referred to the bird's alertness. As a bird of the night, it was associated with the spirit world. Moreporks were believed to act as messengers to the gods in the heavens, flying along spiritual paths in the sky. They were the mediums used to communicate with the gods. The occasion il high, piercing call of the morepork signified bad news but the lower-pitched and more common Turn'call heralded good news.

Questions 1 - 7

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

In boxes 1-7 on your answer sheet, write

TRUE if the statement agrees with the information.

FALSE if the statement contradicts.

NOT GIVEN if there is no information on this.

1 Early European setters made detailed studies of the morepork.

2 The Polynesian rat had a negative effect on the number of laughing owls.

3 The laughing owl was larger than the morepork.

4 Rats pose a risk to young moreporks.

5 The New Zealand Department of Conservation is hoping to limit the population of moreporks

6 Other bird species are frightened when they hear the morepork's ciy.

7 In Maori tradition, the low call of the morepork had negative associations.

Questions 8-13

Complete the notes below.

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

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

The Morepork

- Appearance

- approximately 8.....in length

- large yellow eyes
- feathers with fringes to enable quiet flight

• Nesting

- nests in trees, plants or spaces in roots and 9 .....
- after about 35 days, baby moreporks are capable of leaving the nest

• Hunting

- transports its prey using its 10 .....
- can be chased away by other birds during the 11.....
- attacked 12..... that had been introduced to Motuora Island

• Threats

- predators such as..... stoats and possums
- may be exposed to 13..... in their prey

READING PASSAGE 8

You should spend about 20 minutes on Questions 14-26, which are based on Reading Passage 2 on pages 6 and 7.

THE POWER OF MUSIC

Robert Matthews looks at research into the effects of music

A Music is becoming ever more popular electronically. To meet our craving for music, internet sites are using increasingly sophisticated ways of putting us in touch with artists we may not even know we like. Most work by trawling our existing files or online listening habits and looking for patterns so they can recommend new artists for their subscribers to listen to. The search often turns up surprises. But is it possible to tease apart our likes and dislikes to identify precisely what it is about some music that thrills us or leaves us cold?

B For centuries composers have sought to create unforgettable music using accepted notions about the emotional appeal of certain combinations of sounds, yet only now are scientists starting to uncover what it is about these combinations that can have such a dramatic effect on our minds. Given that archaeologists have found musical instruments played by Neanderthals at least 50,000 years ago, why have scientists taken so long to investigate such a source of pleasure?

C 'For psychologists, who are always desperate to show that their work is rigorous, there's an image problem in tackling the emotionality of music,' says Professor Norman Cook of Kansai University in Osaka, Japan, one of the pioneers of the new science of music. 'Emotion is such a slippery topic.' The other problem, says Cook, is the long-standing principle among psychologists that our response to music is an acquired one, rather than something that is stimulated by the effect of sound on our brain cells. Yet one of the first insights to emerge from this new branch of psychology is that music affects our brains at a very basic level.

D Together with his colleague, Professor Takefumi Hayashi, Cook has been investigating one of the best-known examples of the emotional impact of music: the difference between major and minor chords. For centuries, composers have known that notes arranged to form major chords sound happy and upbeat, while those in minor chords sound mournful. In tests, even three-year- olds have been shown to link music in a major mode to happy faces and minor modes to sad faces.

E According to Cook, analysis of how people respond to notes suggests a link with how our brains interpret certain sounds in everyday life. He points out that sad-sounding minor chords can be formed by raising the pitch of any of a set of notes, while dropping the pitch produces a major chord. The same change in pitch works as an emotional telltale in communication between some mammals, where rising pitch is used to communicate weakness or defeat, while falling pitch signals social dominance. It's also present in our speech. 'A rising inflection is used to denote questions, politeness or deference, whereas a falling inflection signals dominance,' says Cook.

F This suggests that music in major and minor modes taps into some very basic features of how we relate to the world and each other - perhaps dating back millions of years. Could music in general be doing something similar? Quite possibly, according to research into how music triggers certain types of brain activity. At McGill university Canada, Professor Robert Zatorre and his colleagues have carried out studies in which volunteers listen to different types of music while their brain activity is monitored. The biggest surprise was the evidence that pleasurable music activates brain circuitry which has been in existence in the human brain for thousands of years says Zatorre. 'We share it

with rats and other distant relatives on the evolutionary tree - and it's typically associated with biological rewards, like food, for example.

G At the University of Oxford, Dr Joyce Chen has been looking into another celebrated feature of music - the irresistibility of rhythm. Her interest was sparked by studies involving patients with movement difficulties. If music that had a strong rhythm - say, a marching band - was played to these patients, they were able to improve their walking ability, says Chen. In an attempt to find out why the simple act of listening to music might help disabled patients, Dr Chen and colleagues from the International Laboratory for Brain, Music and Sound Research in Montreal carried out brain scans on volunteers who were listening to rhythmic sounds. The criteria for selecting these volunteers were that they should be in first-rate physical health but musically untrained. The results have been another revelation. Chen and her colleagues found the rhythms triggered activity in parts of the brain linked to hearing, but something even more surprising was that the rhythms also triggered activity in the motor regions of the brain, linked to active movement.

H 'Somehow, the mere act of just listening triggers motor-neural activity. Maybe this is one reason why we often tap our feet, move or dance when hearing music,' says Chen. She believes the discovery of this deep connection between music and movement may cast light on why disabled patients can benefit from listening to music - and could also prove useful with other impairments such as those involved in sound production. 'It's been shown that people who talk with a stutter might have problems in this auditory-motor loop.'

I For researchers working in this new area of science, these early discoveries hold the promise of much more to come. Zatorre and his colleagues are investigating whether some people have more musical brains than others. 'We can see certain subtle brain features that can tell us how well somebody can do things like identify a slight change in a melody,' explains Zatorre. 'This ability could be enhanced by training - just like someone born with a predisposition to building strong muscles can enhance them by taking up weightlifting.

Questions 14-18

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

Which paragraph contains the following information?

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

14 a reference to studies involving children

15 a mention of the discovery of significant artefacts

16 reasons why a particular aspect of music has not been researched

17 a mention of an unexpected discovery involving two different areas of the brain

18 a comparison of tone variations produced by certain animals and humans

Questions **19-22** Complete the summary below.

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

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

A study involving collaboration between researchers in Oxford and Montreal The participants in this study led by Dr Chen were chosen because they were not musicians, and

they demonstrated a good state of 19.....The participants were given 20..... while

music with a very noticeable rhythm was being played. Previous research had indicated that

listening to this type of music seemed to be of assistance to some 21.....people. By

listening to it, their 22.....ability had definitely got better. The findings of Dr Chen's study

proved most informative.

Questions 23 - 26

Look at the following statements (Questions 23-26) and the list of researchers below.

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

Write the corre ct letter, **A, B or C**, in boxes **23-26** on your answer sheet.

NB You may use any letter more than once.

23 Research into the brain activity set off by music may help people with speech defects.

24 It may be possible in time to improve a person's ability to recognise certain musical characteristics.

25 The way listeners react to certain musical combinations may be similar to the way they react to other noises.

26 When a person reacts positively to music, the same parts of the brain are stimulated as when certain animals react to a positive outcome.

List of Researchers

A Professor Norman Cook

B Professor Robert Zatorre

C Dr Joyc e Chen

READING PASSAGE 9

HOW DESERTS ARE FORMED

A A desert refers to a barren section of land, mainly in arid and semi-arid areas, where there is almost no precipitation, and the environment is hostile for any creature to inhabit. Deserts have been classified in a number of ways, generally combining total precipitation, how many days the rainfall occurs, temperature, humidity, and sometimes additional factors. In some places, deserts have clear boundaries marked by rivers, mountains or other landforms, while in other places, there are no clear-cut borders between desert and other landscape features.

B In arid areas where there is not any covering of vegetation protecting the land, sand and dust storms will frequently take place. This phenomenon often occurs along the desert margins instead of within the deserts, where there are already no finer materials left. When a steady wind starts to blow, fine particles on the open ground will begin vibrat¬ing. As the w ind picks up. some of the particles arc lifted into the air. When they fall onto the ground, they hit other particles which w ill then be jerked into the air in their turn, initiating a chain reaction.

C There has been a tremendous deal of publicity on how severe desertification can be, but the academic circle has never agreed on the causes of desertification. A common misunderstanding is that a shortage of precipitation causes the desertification—even the land in some barren areas will soon recover after the rain falls. In fact, more often than not, human activities arc responsible for desertification. It might be true that the explo¬sion in world population, especially in developing countries, is the primary cause of soil degradation and desertification. Since the population has become denser, the cultiva¬tion of crops has gone into progressively drier areas. It's especially possible for these regions to go through periods of severe drought, which explains why crop failures are common. The raising of most crops requires the natural vegetation cover to be removed first; when crop failures occur, extensive tracts of land are devoid of a plant cover and thus susceptible to wind and water erosion. All through the 1990s, dryland areas went through a population growth of 18.5 per cent, mostly in severely impoverished develop¬ing countries.

D Livestock farming in semi-arid areas accelerates the erosion of soil and becomes one of the reasons for advancing desertification. In such areas where the vegetation is domi¬nated by grasses, the breeding of livestock is a major economic activity. Grasses are necessary for anchoring barren topsoil in a dryland area. When a specific field is used to graze an excessive herd, it will experience a loss in vegetation coverage, and the soil will be trampled as well as be pulverised, leaving the topsoil exposed to destructive erosion elements such as winds and unexpected thunderstorms. For centuries, nomads have grazed their flocks and herds to any place where pasture can be found, and oases have offered chances for a more settled way of living. For some nomads, wherever they move to, the desert follows.

E Trees arc of great importance w hen it comes to maintaining topsoil and slowing down the wind speed. In many Asian countries, firewood is the chief fuel used for cooking and heating,

w'hich has caused uncontrolled clear-cutting of forests in dryland ecosystems. When too many trees are cut down, windstorms and dust storms tend to occur.

F What's worse, even political conflicts and wars can also contribute to desertification. To escape from the invading enemies, the refugees will move altogether into some of the most vulnerable ecosystems on the planet. They bring along their cultivation traditions, which might not be the right kind of practice for their new settlement.

G In the 20th century, one of the states of America had a large section of farmland that had turned into desert. Since then, actions have been enforced so that such a phenomenon of desertification will not happen again. To avoid the reoccurring of desertification, people shall find other livelihoods which do not rely on traditional land uses, are not as demanding on local land and natural resource, but can still generate viable income. Such livelihoods include but are not limited to dryland aquaculture for the raising of fish, crustaceans and industrial compounds derived from microalgae, greenhouse agriculture, and activities that are related to tourism. Another way to prevent the reoccurring of desertification is bringing about economic prospects in the city centres of drylands and places outside drylands. Changing the general economic and institutional structures that generate new chances for people to support themselves would alleviate the current pres-sures accompanying the desertification processes.

H In nowadays society, new technologies are serv ing as a method to resolve the problems brought by desertification. Satellites have been utilised to investigate the influence that people and livestock have on our planet Earth. Nevertheless, it doesn't mean that alterna-tive technologies are not needed to help with the problems and process of desertification.

Questions 14-20

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

Which paragraph contains the following information?

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

MB You may use any letter more than once.

14 a reference to the irregular movement of particles

15 mention of a productive land turning into a desert in the 20th century

16 types of deserts

17 mention of technical methods used to tackle the problems of deserts

18 the influence of migration on desertification

19 lack of agreement among the scientists about the causes of desertification

20 a description of the fatal effects of farming practice

Questions 21-26

Do the following statements agree with the information given in Reading Passage 2? In boxes 21-26 on your answ er sheet, w rite

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 It is difficult to ascertain where the deserts end in some areas.

22 Media is uninterested in the problems of desertification.

23 The most common cause of desertification is the lack of rainfall.

24 Fanning animals in semi-arid areas w ill increase soil erosion.

25 People in Asian countries no longer use firewood as the chief fuel.

26 Technology studying the relationship of people, livestock and desertification has not yet been invented.

READING PASSAGE 10

You should spend about 20 minutes on **Questions 1-13,** which are based on Reading Passage 1 on pages 2 and 3.

How to find your way out of a food desert

Ordinary citizens have been using the internet to draw attention to the lack of healthy eating options in inner cities

Over the last few months, a survey has been carried out of over 200 greengrocers and consenience stores in Crown Heights, a neighborhood in Brooklyn, New York. As researchers from the Brooklyn Food Association enter the details, colorful dots appear on their online map, which display the specific location of each of the food stores in a handful of central Brooklyn neighborhoods. Clicking on a dot will show you the store's name and whether it carries fresh fruit and vegetables, wholegrain bread, low-fat dairy and other healthy option.

The researchers plan eventually to survey the entire borough of Brooklyn. "We want to get to a more specific and detailed description of what that looks like,' says Jeffrey Heehs, who leads the project. He hopes it will help residents find fresh food in urban areas where the stores sell mostly packaged snacks or fast food, areas otherwise known as food deserts. The aim of the project is also to assist government officials in assessing food availability, and in forming future policies about what kind of food should be sold and where.

In fact, the Brooklyn project represents the intersection of two growing trends: mapping fresh food markets in US cities, and private citizens creating online maps ot local neighborhood features. According to Michael Goodchild, a geographer at the University of California at Santa Barbara, citizen map makers may make maps because there is no good government map, or to record problems such as burned-out traffic lights.

According to recent studies, people at higher risk of chronic disease and who receive minimal incomes for the work they do, frequentlys live in neighborhoods located in food deserts. But hows did these food deserts arise? Linda Alwitt and Thomas Donley, marketing researchers at DePauI University in Chicago, found that supernarkets often can't afford the amount of land required for their stores in cities. City planning researcher Cliff Guy and colleagues at the University of Leeds in the UK found in 2004 that smaller urban groceries tend to close due to competition from suburban supermarkets.

As fresh food stores leave a neighborhood, residents find it harder to eat well ane stay healthy. Food deserts are linked with lower local health outcomes, and they may be a driving force in the health disparities between lower-income and affluent people in the US. Until recently, the issue attracted little national attention, and received no ongoing funding for research.

Now, more cities are becoming aware of their food landscapes. Last year, the United States Department of Agriculture launched a map of where food stores are located in all the US counties. Mari Gallagher, who runs a private consulting Finn, says her researchers have mapped food stores and related them to health statistics for the cities of Detroit, Chicago,
Cincinnati and Washington, D.C. These maps help cities identify where food deserts are and, occasionally, have documented that people living in food deserts have higher rates of diet- related diseases.

The Brooklyn project differs in that it's ran by a local core of five volunteers who have worked on the Project for the past year, rather than trained, academic researchers. To gather data, they simply go to individual stores with pre-printed surveys in hand, and once the storekeeper's permission has heen obtained, cheek off boxes on their list against the products for sale in the store. Their approach to data collection and research has been made possible by technologies such as mapping software and GPS-enabled smart phones, Google Maps and OpenStteetMap, an open-source online map with a history of involvement in social issues. Like the Brooklyn Food Association volunteers, many citizen online map makers use maps to bring local problems to official attention, Goodchild says. Heehs, the mapping project leader, says that after his group gathers more data, it will compare neighborhoods, come up with solutions to address local needs, and then present them to New York

City officials. Their website hasn't caught much local or official attention yet, however. It was launched only recently, but its creators haven't yet set up systems to see who's looking at it.

Experts who visited the Brooklyn group's site were optimistic but cautious. 'This kind of detailed information could be very useful,' says Michele Ver Ploeg, an economist for the Department af Agriculture. To make the map more helpful to both residents and policy makers, she would like to see price data for healthy products, too. Karen Ansel, a registered dietician and a spokesperson for the American Dietetic Association, found the site confusing to navigate. 'That said, with this infornation in place the group has the tools to build a more user-friendly site that could be ... very helpful to consumers,' she says, 'The group also should ensure their map is available to those who don't have internet access at home,' she adds. In fact, a significant proportion of Brooklyn residents don't have internet at home, and 8 percent rely on dial-up service, instead of high-speed internet access, according to Gretchen Maneval, director of Brooklyn College's Center for the Study of Brooklyn. 'It's still very much a work in progress,' Heehs says of the online map. They'll start advertising it online and by email to other community groups, such as urban food garden associations, next month. He also hopes warmer days in the spring will draws out fresh volunteers to spread awareness and to finish surveying, as they have about two-thirds of Brooklyn left to cover.

Questions 1 - 6 .Complete the notes below.

Choose **ONE WORD ONLY** from the passage for each answer. Write your answers in boxes 1-6 on your answer sheet.

Data on food deserts and their effects on health

The Brooklyn Food Association

- The online map provides users with a store's name, 1 ..... and details of its produce
  - .....One goal of the mapping project is to help authorities develop new 2.....On food.
- Citizen maps are sometimes made when 3 ..... maps are unsatisfactory.

Reasons for the development of food deserts

- New research suggests that people living in food deserts often have low 4

- Some supermarkets are unable to buy enough 5..... inside cities for their stores
- Small grocery stores in cities offten cannot cope with supermarket 6.....

Questions 7-13

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

In boxes 7-13 on your answer sheet, write

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

7 A group of professional researchers are in charge of the Brooklyn project.

8 The Brooklyr project team caries out their assessment of stores without the owner's knowledge.

9 The Brooklyn project has experienced technical difficulties setting up the website.

10 The city government has taken a considerable interest in the Brooklyn project website.

11 Michele Ver Ploeg believes the Brooklyn project website should contain additional information.

12 The rate of internet use in Brooklyn is unlikely to increase in the near future.

13 Jeffrey Heehs would like more people to assist with the Brooklyn project research.

READING PASSAGE 11

You should spend about 20 minutes on **Questions 14-26,** which are based on Reading Passage 2 on pages 6 and 7.

The dingo debate

Graziers see them as pests, and poisoning is common, but some bitlogists think Australia's dingoes are the best weapon in a war against imported cats and foxes

A. A plans flies a slow pattern over Carlton Hill station, a 3,600 square kilometre ranch in the Kimberley region in northwest Australia. As the plane Circles, those aboard drop 1,000 small pieces of meat, one by one, onto the scrubland below, each piece laced with poison; this practice is known as baiting. Besides 50.000 head of cattle, Cariton Hill is home to the dingo, Australia's largest mammalian predator and the bane of a grazier's (cattle farmer's) life. Stuart Mckechnie, manager of Carlton Hill, complain that graziers' livelihoods are threatened when dingoes prey on cattle. But one man wants the baiting to end, and for dingoes to once again roam Australia's wide-open spaces. According to Chris Johnson of James Cook University, 'Australia needs more dingoes to protect our biodiversity.'

B. Aboult 4.000 years ago, Asian sailors introduced dingoes to Australia. Throughout the ensuing millennia, these descendants of the wolf spread across the continent and, as the Tasmanian tiger disappeared completely from Australia, dingoes became Australia's top predators. As agricultural development took place, the European setter found that they could not safely keep their livestock where dingoes roamed. So began one of the most sustained efforts at pest control in Australia's history. Over the last 150 years, dingoes have been shot and poisoned, and fences have been used in attempt to keep them away from livestock. But at the same time, as the European settlers tried to eliminate one native pest from Australia, they introduced more of their own.

C. In 1860, the rabbit was unleashed on Australia by a wealthy landowner, and by 1980, rabbits bad covered most of the mainland. Rabbits provided a huge prey base for two other introduced species; the feral (wild) cat and red fox.

The interation between foxes, cats and rabbits is a huge problem for native mammals. In good years, rabbit numbers increase dramaticaly, and fox and cat populations grow quickly in response to the abundance of this prey. When bad seasons follow, rabbit numbers are significantly reduced - and the dwindling but still large fox and cat populations ace left with little to eat besides native mammals.

D. Australian mammals generally reproduce much more slowly than rabbits, cats and foxes - an adaptation to prevent overpopulation in the arid environment, where food can be scarce and unreliable - and populations decline because they can't grow fast enough to animals killed by the predators. Johnson says dingoes are the solution to this problem because they keep cat and fox populations under control. Besides regularly eating the smaller predators, dingoes will kill them simply to lessen competition.

Dingo packs in large, stable territories and generally have only one fertile female, which limits their rate of increase. In the 4,000 years that dingoes have been in Australia, they have contributed to few, if any, extinctions, Johnson says.

E. Reaching out from a desolate spot where three states meet, for 2,500 km in ether direction, is the world's longest fence, two metres high and stretching from the coast in Queensland to the Great Australian Bight in South Australia; it is there to keep dingoes out of southeast Australia. Though it has been only partly successful in excluding dingoes from the southeast, the fence separates the main types of livestock found in Australia. To the northwest of the fence, cattle predominate; to the southeast, sheep fill the landscape. In fact, Australia is a land dominated by these animals - 25 million cattle, 100 million sheep and just over 20 million people.

F. While there is no argument that dingoes will prey on sheep if given the chance, they don't hunt cattle once the calves are much past two or three weeks old, according to Mckechnie. And a study in Queensland suggests that dingoes don't even prey heavily on the newborn calves unless their staple prey disappears due to deteriorating conditions like drought.

This study, co-authored by Lee Allen of the Robert Wicks Researct Centre in Queensland, suggests that the aggressive baiting programs used against dingoes may actually be counter- productive for graziers. When dingoes are removed from an area by baiting, the area is recolonised by younger, more solitary dingoes. These animals aren't capable of going after the large prey like kangaroos, so they turn to calves. In their study, some of the higrest rates of calf predation occurred in areas that had been baited.

G. Mark Clifford, general manager of a firm that manages over 200,000 head of cattle, is not convinced by Allen's assertion, Clifford says, 'It's obvious if we drop or loosen control on dingoes, we are going to lose more calves. He doesn't believe that dingoes will go after kangaroos when calves are around. Nor is he pessuaded of
dingoes'supposed ecological benefits, saying he is not convinced that they manage to catch that often, believing they are more likely to catch small native animals instead.

H. McKechnie agrees that dingoes kill the wallabjes (small native animals) that compete with his cattle for food, but points out that in parts of Western Austratia, there are no foxes, and not very many cats. He doesn't see how relaxing controls on dingoes in his area will improve the ecological balance. Johnson sees a need for a change in philosophy on the part of graziers. 'There might be a number of different ways of thinking through dingo management in cattle country,' he says.'At the moment, though, that hasn't got through to graziers. There's still just one prescription, and that is to bait as widely as possible.

,

Questions 14-20

Reading Passage 2 has eight sections, A-H.

Which section contains the following information?

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

NB You May use any letter more than once

14 a depscription of a barrier designed to stop dingoes, which also divides two kinds of non-native animals

15 how dingoes ensure that rival species do not dominate

16 a reference to a widespread non-native species that other animals feed on

17 a mention of the dingo's arrival in Australia

18 reasearch which has proved that dingoes have resorted to eating young livestock

19 a description of a method used to kill dingoes

20 the way that the structure of dingo grougs affects how quickly their numbers grow

Questions 21-23

Look at the following statements (Questions 21-23) and the list of people below.

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

Write the correct letter, **A, B, C or D,** in boxes 21-23 on your answer sheet.

21 Dingoes tend to hunt native animals rather than hunting other non-native predators.

22 The presence of dingoes puts the income of some people at risk.

23 Dingoes have had little impact on the dying out of animal species in Australia.

List of People

A Stuart McKechnie
B Chris Johnson
C Lee Allen
D Mark Clifford

Questions 24 - 26 Complete the Sentences

below.

Choose **NO MORE THAN TWO WORDS** from the passage for each answer. Write your answers in boxes 24-26 on your answer sheet.

24 The dingo replaced the .....as the main predatory animal in Australia.

25 Foxes and cats are more likely to hunt native animals when there are fewer……

26 Australian animals reproduce at a slow rate as a natural way of avoiding……

READING PASSAGE 12

What Lucy Taught Us

A scientific finding in east Africa has changed our understanding of how humans have developed

On a Sunday morning, in late November 1974, a team of scientists were digging in an isolated spot in the Afar region of-Ethiopia. Surveying the area, palaeoanthropologist Donald Johanson spotted a small piece of bone. Straight away, he recognised it as coming from the elbow of a human ancestor. And there were plenty more. 'As I looked up the slopes to my left, I saw bits of the skull, a chunk of jaw, a couple of vertebrae,' says Johanson.

It was immediately obvious that the skeleton was a significant find, because the sediments at the site were known to be 3.5 million years old. 'I realised this was part of a skeleton that was older than three million years,' says Johanson. It was the most ancient early human ever found. Later it became apparent that it was also the most complete - 40% of the skeleton had been preserved.

At the group's campsite that night, Johanson played a Beatles song called 'Lucy in the Sky with Diamonds', and, as the feeling was that the skeleton was female due to its size, someone suggested calling it Lucy. The name stuck and Johanson says, 'All of a sudden, she became a person.' But the morning after the discovery, the discussion was dominated by questions.
How old was Lucy when she died? Did she have children? And might she be our direct ancestor? Nowadays, we're starting to get the answers to some of these questions.

According to Johanson, Lucy had an incredible combination of primitive and derived features, which had not been seen before. Her skull and jaws were more ape-like than those of other groups of early humans. Her braincase was also very small, no bigger than that of a chimp.
She had a hefty jaw, a low forehead and long dangly arms.

For Johanson, it was immediately apparent that Lucy walked upright. That's because the shape and positioning of her pelvis reflected a fully upright gait. Lucy's knee and ankle also preserved and seemed to reflect bipedal walking. Later studies of feet offer even more evidence. As an upright walker, Lucy strengthened the idea that walking was one of the selective pressures driving human evolution forwards. Early humans did not need bigger brains to take defining steps away from apes. Extra brainpower only came over a million years later with the arrival of the species *Homo erectus*, meaning upright man. Though big brains would clearly he important later, walking remains one of the traits that makes us uniquely human.

She may have walked like a human, but Lucy spent at least some of her time up in the trees as chimpanzees and orangutans still do today. It may be that upright walking evolved in the trees, as a way to walk along branches that would otherwise be too flexible. It's not clear why Lucy left the safety of the trees. It is thought that savannahs were gradually opening up, so trees were spaced further apart. But hunting for food may have been the real reason for heading to the ground, says Chris Stringer of the Natural History Museum in London. In line with this idea, recent evidence suggests that the diet of early humans was changing at that time.

Studies of the remains of food trapped on preserved human teeth indicate that several species, including Lucy's, were expanding their diet around 3.5 million years ago. Instead of mostly eating fruit from trees, they began to include grasses and possibly meat. This change in diet may have allowed them to range more widely, and to travel around more efficiently in a changing environment. Fossilised crocodile and turtle eggs were found near her skeleton, suggesting that Lucy died while foraging for them in a nearby lake.

How did early humans process all these new foods? Later species, like *Homo erectus*, are known to have used simple stone tools, but no tools have ever been found from this far back. However, in 2010 archaeologists uncovered animal bones with scratches that seem to have been made by stone tools. This suggests that Lucy and her relatives used stone tools to eat meat. There have since been heated debates over whether or not the

marks were really made by tools. But if they were, it is not surprising, says Fred Spoor of the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany.

It also seems that Lucy's childhood was much briefer than ours and that she had to fend for herself from a young age. We know that Lucy was a full-grown adult because she had wisdom teeth and her hones had fused. But unlike modern humans, she seems to have grown to full size very quickly, and time of death was when she was around 12 years old. In line with that, a recent study of a 3-year-old early human suggested that their brains matured much earlier than ours do.

Questions 1 - 5

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

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 Donald Johanson was uncertain about the nature of the elbow bone he found in Afar.

2 Several bones were found by Donald Johanson at the same site in Afar.

3 The experts realised the importance of the discovery at Afar.

4 It was the upper part of the skeleton that had suffered the least damage.

5. The skeleton's measurements helped Johanson's team to decide if it was male or female

Questions 6-13 Complete the notes below.

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

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

Lucy

Physical features

- jaws and skull like those of an ape
- braincase similar in size to that of a chimp
- long anus

Movement

- the positioning and shape of her pelvis made it clear that she walked like a human
- ..... upright movement possibly started among the 6..... of trees
- probably moved to the **7** ..... in search of food

Diet and eating habits

- analysis of food in the 8 ..... of the skeletons of early humans shows changes in their diet
- it is likely that meat and grasses were substituted for 9 .....
- **10** ..... that were located close to Lucy suggest these were also part of her diet

- **11**..... that were found had marks on them, possibly made by tools used for eating

Comparisons with modern-day humans

- modem-day humans have a longer **12**..... than Lucy did

the 13 **……**of modern-day humans appear to develop later than Lucy's did

READING PASSAGE 13

You should spend about 20 minutes on **Questions 14-26,** which are based on Reading Passage 2 on pages 6 and 7.

The gender gap in New Zealand's high school examination results

Results from New Zealand's new national examinations for secondary schools *are giving that* country' some cause for concern

A. The issue is the difference in pass rates between the sexes: at each level of the examination and across all school types, the difference is about 10 percentage points. Girls are doing better in every subject, and those in girls-only schools are taking top honours. The results are not a surprise: high school girls have been outperforming boys academically for more than a decade. It is an international phenomenon, and within Australia was the subject of much debate and controversy. Within New Zealand back in the 1980s, there was a concerted campaign, called 'Girls Can Do Anything', which was aimed at lifting girls' participation rates, achievement levels and aspirations. This was so successful that the pendulum has now swung to the other extreme. Views differ on how worried people should be. After all, for much of history, girls were excluded from any form of education, an this new phenomenon could be seen as a temporary over-correction before the balance is righted.

B. However the New Zealand State Ministry of Education says it is taking the issue seriously. It is working with a reference group on boys' education which has been set up, and it has commissioned an Australian academic to report on interventions that have been found to work for boys, drawing particularly on Australia's experience. But some, such as former prison manager Celia Lashlie, the author of a book for parents of teenage boys, believe there is still resistance within the Education Ministry towards doing anything about the problem.

C. Education Ministry learning policy manager Steve Benson says that the 'National Certificate in Educational Achievement', or NCEA, as New Zealand's high school exams are called, is useful to employers and to universities because it provides a fine-grained picture of pupils' performance in every aspect of a subject, rather than just a pass or fail in an overall area. 'In most parts of the curriculum, for example in maths, there isn't really a gender gap. But literacy is a different matter. Even boys who are good at writing tend not to write so much. There's actually a quantity issue.'

D. The discrepancy in reading and writing skills between males and females shows up as early as preschool, and the difference is clear by the time these children enter high school. Not being good at literacy was not such a problem in the old days when many students left school for manual jobs after Year 11. But nowadays many more stay on to higher education, and almost all jobs require literacy skills. Roger Moses, the headmaster of Wellington College, says that the written content of NCEA papers is more demanding than the previous system of secondary school qualifications in New Zealand, even in subjects such as statistics and accounting.

E. New Zealand 15-year-olds do very well in international reading tests, but beneath this average lies a wide variance, with New Zealand European girls most represented at the top and New Zealand Pacific Island boys at the bottom. Yet some European girls drop out, and some Pacific Island boys excel. In other words, the range in performance within each gender group is much greater than the gender differences. Ethnic differences, and differences in socio-economic status, may be more significant than the simple boy/girl explanation.

F. This makes the Education Ministry nervous about pushing solutions that emphasise stereotyped gender

differences, rather than looking at under-achievement as a whole. Rob Burroughs, principal of Linwood High School in Christchurch, agrees. For three years his school ran separate boys' classes to try to address the disparity in performance, before abandoning them. The research showed that the boys did better in their own class than in the co-educational environment. But when he looked at which teachers they had, and how well those teachers' other classes did, it became clear that the difference was, instead, to do with the quality of instruction.

G. At Onslow College, Dr Stuart Martin would do away with the NCEA Level 1 exam if he could.

He says that in Year 11, aged 15, boys are simply not mature enough to cope. 'They tend to think that just passing is enough, and that it's not necessary to work hard for a Merit or an Excellence grade. Often they are busy with other activities and part-time jolts. Boys' competitive instinct tends to come out later in their schooling years, especially if there is money attached or other tangible rewards. By 17, boys are catching up academically with the girls, and by the end of Year 13, boys are again winning the top prizes.'

H. Boys in single-sex schools do better in NCEA across all levels, something economist Brian Easton reported after analysing data from the first year of NCEA's implementation. He said the results were valid, even when socio-economic status was taken into account. Dr Paul Baker, head of Waitaki Boys' High School in Oamaru, agrees. He thinks that although it is possible for all schools to do more to boost boys' performance, it is easier in a boys' school, where activities cannot be 'captured by girls'.

Questions 14-16 Complete the summary below.

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

Write your answers in boxes 14-16 on your answer sheet

High school assessment in New Zealand

New Zealanders are worried at the outcomes of their high school assessment system, because the **14**……..of girls are higher than those of boys by 10%. A gender gap has been apparent for over a **15**..... This situation is not unique to New Zealand, and has been noticed in **16** ..... also.

Questions 17-20

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

Which paragraph contains the following information[9]

Write the correct letter, **A-H,** in boxes 17-20 on your answer sheet.

17 an advantage of New Zealand's secondary school tests

18 a mention of current government initiatives to boost male achievement

19 when gender difference in literacy skills first becomes evident

findings that relate academic achievement to raceQuestions 21-26

Look at the following people (Questions 21-26) and the list of statements below. Match each person with the correct statement, A-H.

Write the correct letter, A-H, in boxes 21-26 on your answer sheet

21 Celia Lashlie

22 Steve Benson

23 Roger Moses

24 Rob Burroughs

25 Stuart Martin

26 Paul Baker

List of Statements

A. Boys gain lower marks on NCEA if they attend an all-boys' school.
B. Boys are disadvantaged by girls tending to take over at school.
C. Good teaching is more important than whether classrooms are singlesex or mixed.
D. Mathematical skills were not so important in the past.
E. The difference in achievement between school boys and girls is only evident in some subjects.
F. Older boys are more motivated to study than younger boys.
G. The NCEA exams have higher literacy standards than past exams did.
H. The New Zealand government is reluctant to take action on behalf of boys.

READING PASSAGE 14

You should spend about 20 minutes on **Questions 27-40,** which are based on Reading Passage 3 on pages 10 and 11.

The strange world of sight

Seeing is believing, it is said. But, asks Richard Gregory, could it be the other way round?

Two of the great British men of the 17th century, the philosopher John Locke and the physicist Isaac Newton, were both aware that objects are not coloured, and that against all appearances light is not coloured either. This is still not generally recognised even now, 400 years later, because it seems to implausible. Yet it tells us something very important - that perceptions are not identical with what we perceive, and may be very different.

The most accurate historical account of perception is that date 19th-century German scientist Hermann von Helmholtz. However, it was ridiculed at the time. Von Helmholtz thought that perceptions are unconscious inferences we make based on a combination of clues provided by the eyes and other senses, and knowledge of the world. This idea of unconscious inference for perception preceded, by several years, the psychoanalyst Freud's notion of the unconscious, which was also initially treated with derision because it undermined the notion of humans as pre-eminently rational beings who could he held responsible for their actions and awarded blame or praise accordingly.

Crucially, perception of the present depends on rich, though of course not always correct or appropriate, knowledge from the past. We interpret sense data (what we hear, touch, taste, see and smell) from the present according to what we already know. This raises the question: if we see the present through memory, why aren't past and present confused? The pioneering Russian neurologist Alexander Luria described the case of Mr S, who had a remarkable memory. However, he was prone to just such confusions, for example mistaking seeing his clock for remembering it, and so failing to get up in the morning. This suggests that perhaps an important function of perception is to underline the present. Individual perceptions have a vividness that is rare for memories, which might be how we are able to separate them. Try this: look at something for a few seconds, and then shut your eyes and visualise it in memory. You will almost certainly find that the memory is pale by comparison with the perception. Perhaps this is why past and present are not normally confused. Luria's Mr S had exceptionally vivid memories, and rich synaesthesia (experiencing perceptions from another sense as well as the one being stimulated, such as musical notes experienced as colours), which may be why he confused seeing with having seen.

The complexity of processes involved in how we see first impressed itself on me 45 years ago. With my colleague Jean Wallace, I studied the rare case of Sydney Bradford, a man who had been born blind but, through a comeal graft at the age of 52, suddenly found himself able to see. Almost immediately after the operation he was able to 'see' but he could only see those things that he already knew about, having experienced theta through touch. It was his touch memories that enabled him to perceive them with his eyes. When Bradford was first taken to the zoo, he proved utterly unable to see an elephant as he had no knowledge to make sense of his perceptions.

The more recent case in California of Mike May, who was also bom blind, is similar.
Since his operation, his sight has gradually improved as he learns to see, for example, by understanding how shadows represent depth and tell us about the shape of things. Some of the consequences of May's new-found vision were less happy. He had been a champion blind skier, but following the operation, he would have to shut his eyes while skiing to block out what he now found was a terrifying sight.

But acceptance of this intimate connection between memory and perception, even though it was first noticed in the 17th century, has been slow in brain science. Despite the fact that state-of-the-art brain imaging shows that perception animates parts of the brain associated with both present information and memory, most research on memory and perception is still undertaken as if these were separate processes. Seeing used to be thought of

as taking place only in the eyes, and in quite specialised brain regions; but now it seems that half the brain is occupied with seeing, requiring a lot of energy. Perhaps this is why we shut our eyes for a rest.

It is not just extreme cases like Mike May, but also much more common errors of seeing - illusions - that can reveal the crucial role of memory in governing what we (think we) see. Perception depends on specific knowledge and probabilities. Our brains calculate the likelihood of what is out there, and when too far-fetched, perceptions are rejected.

A dramatic and discomforting example is looking at the two sides of a face-mask. From the front it is a convex shape with the nose sticking out. Then if the mask is rotated, the back of the mask will be seen as convex, though we know that it must be concave. It is almost, if not quite, impossible to sketch the back of a hollow mask to look as it is - hollow. Science often learns from what does not happen: people not seeing a hollow face as hollow is the most revealing experiment on perception. The unsettling truth from brain science is that even people with no visual impairment see what, at some level, they expect to see, and often miss things as they really are.

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 Why does the writer refer to Locke and Newton in the first paragraph?

A to indicate that his article will cover several scientific fields

B to stress how much physics has changed in 400 years

C to persuade the reader to take him seriously

D to point out that his notions are not new

28 According to the writer, why was Freud's theory of the unconscious mocked?

A It was too complex for his contemporaries to understand.
B It involved criticism of the way people behaved in society.
C People felt that it devalued the accepted concept of humanity.
D People assumed that it was intended as a joke

29 The writer describes Mr S failing to get up in order to demonstrate

A how realistic most people's memories are.
B how hard it is to tell dreaming and waking apart.
C how unusual it is to mistake a perception for a memory.
D how valuable knowledge of the past can be.

30 What point is the writer making in the text as a whole?

A. Perception involves much more than the data collected by the eyes.
B. Learning to see as an adult can be a time-consuming process.
C. Science is failing to devote enough attention to sight.
D. Human perception is remarkably reliable.

Questions 31-36

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

In boxes 31-36 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*

31 Sydney Bradford relied on recollections of objects he had been told about to help him see after his operation.

32 People who only start to see as adults can learn to see as other people do in time.

33 People who have gained their sight as adults find certain activities harder to do than before.

34 It is evident now that sight involves the eyes and one particular area of the brain.

35 The mask experiment is particularly useful in training people who are regaining their sight.

36 People with perfect vision can fail to interpret objects correctly under certain circumstances.

Questions 37-40

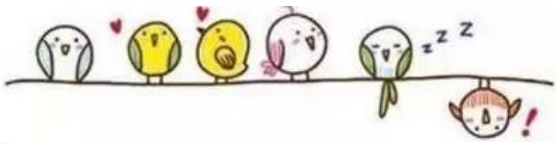
Complete the summary using the list of words, A-J, below.

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

The mask experiment

In this experiment, having looked at the front of a simple face-mask, subjects look at the reverse. However, the subjects are convinced that they are still looking at a mask which is 37 .....in shape. They believe that the **38**.....is poking out in the nonnal manner because that is what they are used to seeing. Attempting to make a 39..... of the mask in this orientation leads to the same problem. The subjects fail to see a concave form because of the **40** .....they have that the features of a face stick out.

A	back	**B**	brain	**C**	view
D	convex	E	sight	F	nose
G	round	**H**	hollow	**I**	drawing
J	preconception				



READING PASSAGE 15

You should spend about 20 minutes on **Questions 1-13,** which are based on Reading Passage 1 on pages 2 and 3.

MULTIPLE INTELLIGENCES

The first intelligence test was developed in France by Alfred Binet early in the 20th century. By the 1920s and 1930s, intelligence tests and their product, an individual's IQ (Intelligence Quotient), had become widely used in many societies around the world. Tests of this type, however, have now fallen into disrepute. All they test is linguistic and logical- mathematical intelligence and this traditional definition of intelligence is now regarded as too narrow. We now know that 75% of teachers are sequential, analytical presenters but 70% of students do not actually learn this way. A number of investigators now believe that the mind consists of several independent modules or 'intelligences'. The educational psychologist most responsible for this change of attitude is Howard Gardner, professor of education at Harvard University in the United States and the creator of the Multiple Intelligence theory.

Multiple Intelligence theory, according to Gardner, is an endorsement of three key propositions: we are not all the same, we do not all have the same kinds of minds, and education works most effectively if these differences are taken into account. Gardner argues that there are at least eight kinds of intelligence that are important to fuller human development and that are available for almost everyone to develop. These intelligences are:

1. Linguistic intelligence
2. Logical-mathematical intelligence
3. Musical intelligence
4. Spatial intelligence
5. Bodily-kinesthetic intelligence
6. Interpersonal intelligence
7. Intrapersonal intelligence
8. Naturalist intelligence

Gardner also speculates on the possibility of there being both a spiritual intelligence and an existential intelligence but comes to no definite conclusions.

Following are some characteristics of the different intelligences, along with ways to exercise and develop them:

Linguistic intelligence:

Involves reading, writing, speaking, and conversing in one's own or foreign languages. It may be exercised through reading interesting books, listening to recordings, using various kinds of computer technology, and actively participating in discussions. **Logical-mathematical intelligence:**

Involves number and computing skills, developing an awareness of patterns, and the ability to solve different kinds of problems through logic. It may be exercised through playing number and logic games, and solving various kinds of puzzles.

Musical intelligence:

Involves understanding and expressing oneself through music and rhythmic movements or dance. It may be exercised through exposure to a variety of recordings, engaging in rhythmic activities, and singing, dancing, or playing various instruments.

Spatial intelligence:

Involves the ability to create and manipulate mental images, and the orientation of the body in space. It may be developed through sharpening observation skills, solving mazes and other spatial tasks, and using imagery and active imagination.

Bodily-kinesthetic intelligence:

Involves physical coordination through the use of fine and gross motor skills. It may be exercised by manipulating construction materials, dancing and playing various active sports and games.

Interpersonal intelligence:

Involves understanding how to communicate with and understand other people and how to work collaboratively. It may be exercised through cooperative games, group projects and discussions, and dramatic activities or role-playing.

Intrapersonal intelligence:

Involves comprehending our emotions, and growing in the ability to control and work with them consciously. It may be exercised through participating in independent projects, journal- writing, and finding quiet places for reflection.

Naturalist intelligence:

Involves understanding the natural world of plants and animals. It may be exercised by exploring nature, making collections of objects, studying and grouping them.

Applying Multiple Intelligence theory to the classroom

Gardner proposes that the eight intelligences he has identified are independent, in that they develop at different times and to different degrees in different individuals. They are, however, closely related, and many teachers and parents are finding that when an individual develops proficiency in one area, the whole constellation of intelligences may be enhanced.

Gardner refers to intelligences as potentials that will or will not be activated, depending upon the values of a particular society, and the personal decisions made by individuals and/or their families. A student who believes that intelligence can be developed is likely to be persistent and adventurous. However, a learner who thinks they have no control over their ability level is more likely to get upset when faced with failure, as it can only be construed as evidence of inadequate ability. The fluid theory of intelligence advocated by Gardner encourages students to stretch themselves.

Does the fact that we each have a unique profile mean that teachers should plan individual lessons for every student in the class to take this into account? Clearly, this would be impractical and the solution lies in including classroom activities designed to appeal to each of the intelligence types.

Gardner suggests that the challenge of the coming decades is to stop treating everyone in a uniform way. He proposes 'individually configured education' - an education that takes individual differences seriously and creates practices that serve different kinds of minds equally well.

Questions 1 - 4

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

In boxes 1-4 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 Intelligence tests became popular worldwide in the early 20th century.

2 Traditional intelligence tests focused on assessing language and mathematical ability.

3 New types of intelligence tests have now been developed to assess the potential of schoolchildren.

4 Research has shown that the majority of students benefit when information is taught in a sequential manner.

Questions 5-10

Complete the table below.

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

answers in boxes 5-10 on your answer sheet.

Intelligence type	Characteristics	Examples of ways to develop the intelligence
Linguistic	language ability	• taking part in 5..... • reading
Logical-mathematical	numeracy/logic skills	• number games • solving puzzles
Musical	expression through music and dance	• playing musical instruments • performing • listening to different **6**
Spatial	manipulation of mental images of objects in space	• tasks requiring imagination • improving 7 .....
Bodily-kinesthetic	physical skills	• working with **8.....** • playing sports
Interpersonal	communication skills	• group work • drama
Intrapersonal	understanding and controlling 9	• working alone • reflection
Naturalist	understanding nature	• exploration of nature • organising **10**..... of items

Questions 11-13 Complete the sentences below.

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

Write your answers in boxes 11-13 on your answer sheet.

11 In the experience of teachers and parents, when..... in one intelligence is improved, other areas may also develop.

12 If a learner feels their level of intelligence is fixed, they may not cope with

as well as a learner who believes intelligence is flexible.

13. Gardner believes that in the future educational programmes need to cater for the ……..between students.

READING PASSAGE 16

You should spend about 20 minutes on Questions 14-26 , which are based on Reading passage on pages 7 and 8.

Question 14-19

Reading passage 2 has six paragraphs A-F

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

White the correct number , i-ix, in boxes 14-19 on your answer sheet.

List of Headings

i Experimenting with an old idea

ii Life cycle of Madeagascar spiders

iii Advances in the textile industry

iv Resources needed to meet the project's demands

v The physical properties of spider silk

vi A scientific analysis of spider silk

vii A unique work of art

viii Importance of the silk textile market

ix Difficulties of raising spiders in captivity

13 Paragraph A

14 Paragraph B

15 Paragraph C

16 Paragraph D

17 Paragraph E

18 Paragraph F

A unique golden textile

A two-man project to use spider silk is achieved after 4 years

A A rare textile made from the silk of more than a million wild spiders has been on display at the American Museum of Natural History in New York City. To produce this golden cloth, 70 people spent four years collecting golden orb spiders from telephone poles in Madagascar, while another dozen workers carefully extracted about 80 feet of silk filament from each of the arachnids. The resulting 11-foot by 4-foot textile is the only large piece of cloth made from natural spider silk existing in the world today.

B Spider silk is very elastic and strong compared with steel or Kevlar, said textile expert Silom Peers, who co-led the project. Kevlar is a lightweight synthetic fabric which is chemically related to nylon. It is very tough and durable and used in bullet-proof vest. Kevlar is also resistant to wear, tear, and heat and has absolutely no

melting point. But the tensile strength of spider silk is even greater than Kevlar's aramid filaments, and greater than that of high-grade steel. Most importantly, spider silk is extremely lightweight: a strand of spider silk long enough to circle the Earth would weigh less than 500 grams (18 oz). Spider silk is also especially ductile, able to stretch up to 140 per cent of its length without breaking. It can hold its strength below-40c. This gives it a very high toughness, which equals that of commercial fibers.

C Researchers have long been intrigued by the unique properties of spider silk. Unfortunately, spider silk is extremely hard to mass produce. Unlike silk worms, which are easy to raise in captivity, spiders have a habit of chomping off each other's heads when housed together. According to Peers, there's scientific research going on all over the world right now trying to replicate the tensile properties of spider silk a apply it to all sorts of areas in medicine and industry, but no one up until now has succeeded in replicating 100 per cent of the properties of natural spider silk.

D Peers came up with the idea of weaving spider silk after learning about the French missionary Jacob Paul Camboue, who worked with spiders in Madagascar during the 1880s and 1890s. Camboue built a small, hand-driven machine to extract silk from up to 24 spiders at once, without harming them. The spiders were temporarily restrainer their silk extracted, and then let go, Peers managed to build a replica of this 24-spider silking machine that was used at the turn of the century, said Nicholas Godley, who co-led the project with Peers. As an experiment, the pair collected an initial batch of about 20 spiders. When we stuck them in the machine and started turning it, lo and behold, this beautiful gold-colored silk started coming out', Godley said.**E** But to make a textile of any significant size, the silk experts had to drastically scale up their plan. Fourteen thousand spiders yield about an ounce of silk, Godley said, and the textile weighs about 2.6 pounds. The numbers are overwhelming. To get as much silk as they needed, Godley and Peers began hiring dozens of spider handlers to collect wild arachnids and carefully harness them to the silk-extraction machine. We had to find people who were willing to work with spiders, Godley said, because they bite ' By the end of the project, Godley and Peers extracted silk from more than 1 million female golden orb spiders, which are abundant throughout Madagascar and known for the rich golden color of their silk, Because the spiders only produce silk during the rainy season , workers collected all the spiders between October and June. Then an additional 12 people used hand-powered machines to extract the silk and where it into 96-filament thread. Once the spiders had been silked, they were released back into the wild, where Godley said it takes them about a week to regenerate their skill. We can go back and re-silk the same spiders, he said. It's like the gift that never stops giving.

F Of course, spending four years to produce a single textile of spider silk isn't very practical for scientists trying to study the properties of spider silk, or companies that want to manufacture the fabric for the use as a biomedical product, or an alternative to Kevlar armor. Several groups have tried inserting spider genes into bacteria or even cows and goats to produce silk, but so far, the attempts have been only moderately successful. Part of the reason it's so hard to generate spider silk in the lab is that it starts out as a liquid protein that's produced by a special gland in the spider's abdomen. Using their spinneret, spiders apply force to rearrange the protein's molecular structure and transfonn it into solid silk. When we talk about a spider spinning silk, we're talking about how the spider applies forces to produce a transformation from liquid to solid, said spider silk expert Todd Blackledge of the University of Akron , Ohio , US, who was not involved in creating the textile. Scientists simply can't replicate the efficiency with which a spider produces silk. Every year we're getting

closer and closer to being able to mass-produce it, but we're not there yet. For now, it seems we'll have to be content with one incredibly beautiful cloth, graciously provided by more than a million spiders.Questions 20-23 Look at the following statements (Questions 20-23) and the list of researchers below Match each statement with the correct researcher, A ,B or C Write the correct letter A, B or C in boxes 20-23 on your answer sheet

NB You may use any letter more than once

20 It takes a tremendous number of spiders to make a small amount of silk

21 Scientists want to use the qualities of spider silk for medical purposes

22 Scientists are making some progress in their efforts to manufacture spider silk

23 Spider silk compares favourably to materials known for their strength

List of Researchers

A Simon Peers

B Nicholas Godley

C Todd Blackledge

Questions 24-26 Complete the summary below

Choose **ONE WORD ONL Y** from the passage for each answer Write your answers in boxes 24-26 on your answer sheet

Producing spider silk in the lab

Both scientists and manufacturers are interested in producing silk for many different purposes. Some researchers have tried to grow silk by introducing genetic material into

24..... and some animals. But these experiments have been somewhat disappointing. It is difficult to make spider silk in a lab setting because the silk comes from a liquid protein made in a 25.....inside the spiders body. When a spider spins silk, it causes a 26.....that turns this liquid into solid silk Scientists cannot replicate this yet.

READING PASSAGE 17

You should spend about 20 minutes on Questions 27-40 ,which are based on Reading Passage 3 on page 10 and 11.

THE POWER OF PERSUASION

A new Zealand restaurateur assesses some recent research from the USA

Some scientists peer at things through high-powered telescopes, others tempt rats through mazes, or mix bubbling fluids in glass beakers. Then there is Robert Cialdini, whose unorthodox research involves such mundane items as towels and chocolates. Nonetheless, Cialdini believes he is discovering important insights into how society works, because he is donducting research into why some people are more persuasive than others.

Cialdini hopes that, by applying a little science, we should all be able to get our own way more often. This is in part a personal quest with its origins in his own experience : Cialdini claims that for his whole life he has been easy prey for salespeople and fundraisers who have managed to persuade him to buy things he did not want or give to charities he had never heard of.

His research methodology has certainly raised a few eyebrow. Having concluded that laboratory experiments on the psychology of persuasion were telling only a part of the story, Cialdini began to probe influence in the real world, enrolling in sales-training programmes. In this way, he believes he learned first hand a great deal about how to sell automobiles from a car lot, insurance from an office ,and even encyclopaedias door to door . Most recently his research has involved the now famous experiments with towels. Many hotels leave a little card in each bathroom asking guests to reuse towels and thus conserve water and reduce pollution. Cialdini and his colleagues wanted to test the relative effectiveness of different text on those cards. Could hotels best motivate their guests to co-operate simply because it would help save the planet, or were other factors more compelling ?

To test this ,the researchers redesigned the cards, replacing the environmental message with the simple (and truthful) statement tha the majority of guests at the hotel had reused their towel at least once. Those guests who received this message were found to be 26% more likely to reuse their towel than those given the original message, and 74% more likely than those receiving no message at all.

This was just one study that has enabled Cialdini to identify his Six Principles of Persuasion. The phenomenon revealed by the towel experiment he calls " social proof": the idea that our decisions are influenced by what other people like us are doing . More perniciously , social
proof is the force underpinning some people's anxiety not to be left behind by their neighbours, thus the desire for a bigger house or a faster car. Afurther principle, which he names " reciprocity ,was tested in a restaurant by measuring how patrons would respond to after-dinner chocolates. When the chocolates were dropped individually in front of each diner, tips went up 14%. This is reciprocity in action: we want to return favours done to us, often without bothering to accurately calculate whether what we are giving is proportionate to what we have received.

Cialdini's research has established four more such principles. 'Searcity' is the idea that people want more of

things they can have less of, a notion that advertisers ruthlessly exploit- limit of four per customer" , Parents can also make use of scarcity by telling their little ones that this is a very unusual chance so they should seize it immediately. The principle of 'authority' states that we trust people who know what they are talking about. Cialdini maintains that many professional don't display their credentials , fearing it is boastful or arrogant to publicise their expertise. The principle he labels[4] consistency' suggests that we want to act in ways that are consistent with undertaking we have already made. For example , if you are soliciting charitable donations, first ask colleagues if they think they will sponsor you. Later, return with a sponsorship form to those who said yes and remind them of their earlier undertaking . The final principle is 'likeness' : we are more easily persuaded by those who seem similar to ourselves. In one study, people were sent survey forms and asked to return them to a named researcher. When the researcher falsely identified herself (e.g Cynthia Johnson is sent a survey by Cindy Johansen'), surveys were twice as likely to be completed.

Many of Cialdini's claims about persuasion are just that- highly persuasive-and I can readily see evidence for some of them in my own workplace. But Cialdini's experiments were conducted in the United Stateds and I wonder how well all of his findings can be applied here in New Zealand or elsewhere around the world. For instance, I do understand the general principle of ' reciprocity' but cannot imagine New Zealand waiting staff using his cynical chocolate trick in their restaurants because the culture of tipping in this country is so different, But it is true that the way to a diner's heart is to give them something they are not expecting in the way of service and in this country reciprocation would more likely take the form of a return visit to the restaurant and not a tip. It may be that age is also a factor and that different generations would react differently to say , the ' consistency' principle . I suspect that younger people in this country would respond quite positively to this sort of approach, where as their parents might be put off by any hint of a hard sell, Perhaps in the end we must accept that some of us are simply bom with more persuasion skills than others and that we have less control over such matters than Cialdini might like to think.

Question 27-31

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

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

27 What point is the writer making about Robert Cialdini in the first paragraph?

A He wants to change the way society operates.

B He uses a wide variety of research techniques.

C He has an unconventional approach to this work.

D He refuses to make use of animals in his experiments.

28 What is the writer doing in the second paragraph?

A identifying a motivation for the research

B assessing on aspect of Cialdini's character

C questioning Cialdini's scientific research techniques

D applauding researchers who examine their own experience

29 What are we told about Cialdini's research methodology?

A it was conducted in a laboratory

B it involved him taking courses of study .

C it was focused on one particular product.

D it was based on interviews with salespeople

30 What was Cialdini's research question for the towel experiment?

A is it more effective not to use a card?

B Does the message make any difference?

C Why is the threat of pollution so persuasive ?

D Can hotels be persuaded to provide more towels?

31 The results of the towel experiment suggest that guests

A were disinclined to tell the truth about towel use

B preferred not to receive a message with their towels

C were more receptive to messages about other guests.

D responded more positively to an environmental message

Questions 32-36

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

White the correct letter, A-J , in boxes 32-36 on your answer sheet.

The six principles of persuasion

Cialdini's towel experiment demonstrated the principle he named ' social proof, which can result in competitive materialism . His research using chocolates suggests that people don't always assess the 32 ..... of transaction . A further principle recommends that advertisers and parents should claim that something is a 33 .....In order to be more persuasive. The authority principle is often ignored when some professionals are concerned their actions might be considered 34 .....

He similarly suggests that people will give more to charity if they can be reminded of 35.....Lastly , even something like a 36..... Has been shown to result in move surveys being completed.

A	rare opportunity	**B**	previous commitments	**C**	generous response
D	true qualification	E	similar name	F	ruthless exploitation
G	social obligation	**H**	relative value	**I**	bad behavior
J	small favor				

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 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*

37 The writer sees evidence of the reciprocity principle in his own family

38 Persuasion may operate in different ways in different countries.

39 New Zealand diners are likely to leave tips if they are given chocolate

40 Oder New Zealanders would be more attracted to consistency

READING PASSAGE 18

You should spend about 20 minutes on Questions 1-13, which are based on Reading Passage 1 on pages 2 and 3.

Dyes and fabric dyeing

When primitive people began using their hands to be creative, they began to add color to their lives. They used natural materials like ochre to stain animal hides, decorate shells and feathers, and paint on the walls of caves. Ochre is a naturally occurring brownish yellow earth containing iron oxide. Scientists have been able to date the black, white, yellow and reddish pigments made from ochre, used in cave paintings, to over 15,000 BCE. With the development of fixed settlements and agriculture, around 7,000 to 2,000 BCE, people began to produce fabrics, and used natural substances such as ochre to color them.

Natural dyes, or dyes made from substances found in nature, can be broken down into two categories: substantive and adjective. Substantive, or direct dyes, become fixed to fibers to without the aid of any other chemicals or additives. Adjective dyes require a mordant (usually a metal salt) which acts as a fixative and prevents the color from washing out or being bleached by sunlight. Most natural dyes are adjective dyes, and require the application of a mordant solution to the fibers at some point in the dyeing process.

Historically, three natural fibers were used in making fabrics: wool, silk and cotton. Wool fabric remains have been found in Europe dating back to 2,000 BCE. It was a common medieval fabric worn in both dyed and natural colors and was processed by both professional manufacturers and by people in their own homes. Silk was imported from China to Europe, and in the 14th to 16th centuries major silk manufacturing centers were set up in France, Spain and Italy. These silk production centers also became centers of dye technology, as most silk was dyed and required the highest quality dyes available. Cotton was considered a luxury fabric in Europe, as it was imported all the way from India and was dyed before it was shipped. Cotton was also valued because of the brightness and colorfastness of the dyes used to color it.

Dyes that gave fabrics a good bright color and were able to withstand washing and exposure to sunlight without losing their color were highly prized. The names of some of these valued and traded colors are still familiar today. The color known as Tyrian purple, for example, originated in the Mediterranean 2,000 years ago, and cochineal is the name given to the red dye from Latin America. Both of these colors came from animals; the mucus found in certain species of shellfish produced the deep rich Tyrian purple and cochineal was extracted from insects. Two other natural sources of color were saffron and indigo. Saffron, the base of yellow dyes, comes from the flowers of a particular kind of crocus which is thought to have first been cultivated on Crete in the eastern Mediterranean. The leaves of a plant native to India were used to produce indigo, which was the main source of the color blue.

As societies developed over the centuries the demand for dyes and dyed fabric grew, and by the 17th century a world-wide shipping and trading network was in place, allowing dyestuffs from all parts of the world to be brought to Europe. This meant that numerous dyestuffs could be blended to create a variety of colors for the rich and powerful. Fiber dyeing in the lower classes was a bit more restrictive. Without the money to buy exotic imported dyes, clothing in the countryside tended to be

black, brown, grey and tan. Country people had some resources they could use to get a wider range of colors. They had always used local plants as food, and many of these plants were also used as medicines and in some cases as sources of dyes. Home dyers used any plants they could find that would give a good color. People who picked blackberries to make jam soon recognized this wild fruit as a source for a blue dye. Washing beehives in preparation for making mead (a popular drink containing honey) yielded a liquid that could be used as a yellow dye. The mosses which grow in many parts of Europe were used to produce green dye.

With the tremendous rise of interest in chemistry in the mid-19th century, several important innovations in dyeing came about. WH Perkin, a student of celebrated European scientist Wilhelm von Hofmann, accidentally discovered the first synthetic dye, later called mauve. The color was so popular that Perkin was able to open a factory of his own and went on to develop more synthetic dye colors. Synthetic dye production grew in Europe, and hardly a year passed until the end of the century without a new synthetic dye being patented.

Eventually, the old natural dyes lost popularity in favor of the newer synthetic ones and now the use of natural dyes on a commercial scale only exists in a few remote areas where people have either little access to synthetic dyes or a vested interest in retaining their ancient dyeing customs.

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 Ochre was used in paintings before it was used in fabric dyes.

2 Natural dyes that need a mordant are rare.

3 In medieval times people sometimes wore fabric made of undyed wool.

4 Silk has always been more expensive than cotton and wool.

5 Cotton imported from India was dyed upon arrival in Europe.

6 Perkin became more famous than his teacher, von Hofmann.

7 Very few synthetic dyes were produced in Europe in the second half of the 19th century.

8 Today the commercial production of natural dyes is limited to a small number of isolated communities.

Questions 9-13

Complete the notes below.

Choose ONE WORD ONLY from the passage for each answer.

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

The history of some dyes

Highly valued dyes

Tyrian purple

- mucus from 9..... found in the Mediterranean

cochineal (a red dye)

- made from 10..... found in Latin America

saffron (a yellow dye)

- initially made from crocuses found on the island of Crete indigo (a blue dye)
- made from plant leaves from India 17th century Europe

dyes made by country people:

- 11..... had two uses

- jam

blue dye

- liquid from cleaning 12.....had two uses

making mead yellow dye

19th century Europe

- progress in study of 13..... led to synthetic dyes

READING PASSAGE 19

*You should spend about 20 minutes on **Questions 14-26,** which are based on Reading Passage 2 on pages 6 and 7.*

A mechanical friend for children

A The development of robots that interact socially with people and assist them in everyday life has been an elusive goal of modern science. Despite impressive advances in the mechanical aspects of this problem, producing robots that bond and socialize with people for sustained periods of time has proven difficult. The most successful robots so far have been storytellers, but they have only been able to maintain human interest for a limited time and typically rely on the robot telling stories that change over time. In practice, commercially available robots seldom cross the 10-hour barrier (i.e. individual users tend to spend less than a combined total of 10 hours with the robots before losing interest). This observation is in sharp contrast to the long-term interactions and bonding that commonly develop between humans and their pets.

B In a recent study, researchers from the Institute for Neural Computation in California introduced a state-of- the-art social robot into a classroom of 18- to 24-month-olds for five months as a way of studying human/robot interactions. The researchers, including Fumihide Tanaka and Javier R Movellan, introduced a toddlersized humanoid robot into a classroom at a childhood education center. One of the QRIO series of robots, the 58cm machine, was originally developed by Sony. 'Children of toddler age were chosen because they have no preconceived notions of robots, according to Tanaka. One of the goals of the study was to establish $_2o_2$W^ther it was possible for social robots to maintain the interest of children beyond the 10-hour barrier

C The researchers sent instructions to the robot about every two minutes to do things like giggle, dance, sit down, fall down or walk in a certain direction. The 45 sessions were videotaped, and interactions between toddlers and the robot were later analyzed. The results showed that the quality of those interactions improved steadily over 27 sessions. The interactions deteriorated quickly over the next 15 sessions, when the robot was ordered to behave in a more limited, predictable manner. Finally, the human/robot relations improved in the last three sessions, after the robot had been instructed to display its full range of behaviors

D 'Initially the children treated the robot very differently from the way they treated each other,' Tanaka said. 'Early in the study some children cried when QRIO fell. But a month into the study, the toddlers helped QRIO stand up by pushing its back or pulling its hands.' The most important aspect of interaction was touch, Tanaka said. At first the toddlers would touch the robot on its face, but later on they would touch it only on its hands and arms, like they would with other humans. Another robot-like toy named Robby, which resembled QRIO but did not move, was used as a control in the study. While hugging of QRIO increased, hugging of Robby decreased throughout the study. Furthermore, when QRIO laid down on the floor as its

Care- taking behaviors were frequently observed toward QRIO but seldom toward Robby.

The study concluded that after 45 days of immersion in a childcare center over a period of five months, long-term bonding and socialization occurred between toddlers and a state-of-the-art social robot. Overall, the interaction between children and the robot improved over time and the children progressively treated it more as a peer than a plaything. To my knowledge, this is the first long-term study of this sort,' said Ronald Arkin, a roboticist at po the Georgia Institute of Technology in the US.

Tanaka and Movellan are now developing autonomous robots for the toddler classroom. 'It could have great potential in educational settings assisting teachers and enriching the classroom environment,' Tanaka said. The researchers hope that more advanced versions of robots like QRIO could become personalized tutors to assist teachers in classrooms. A robotic tutor could react on the spot to social wed totoo an cues and approximate social skills like facial expression and eye gaze, they said. 'It is becoming clear that, to achieve this goal, we are going to [need to] endow machines with something similar to emotion, not just traditional forms of intelligence,' said Movellan.

G Associate professor David Powers, an to sel expert in artificial intelligence and cognitive science at Flinders University in South Australia, commented, 'In this study it is clearly demonstrated that a limited range of robot behaviors, however impressive, is nowhere near as important to human/robot interaction as being able to make appropriate responses from a broad repertoire of behaviors. Ronald Arkin A was not surprised by the affection demonstrated by the toddlers toward the robot. 'Humans have a tremendous propensity to bond with artifacts, whether it be a car, a doll, or a robot,' he said. But he also cautioned that researchers do not yet understand the consequences of increased human/robot interaction. 'Studying how robots and humans work together can give us insight into whether this is a good thing or a bad thing for society,' Arkin said. "We need to find out what the consequences are of introducing a robot into a cadre of children. How will that enhance, or potentially interfere with, their social development? Do we really understand the long-term impact of having a robot as a childhood friend?'

Questions 14-18

Reading Passage 2 has seven paragraphs, A-G

Which paragraph contains the following information?

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

NB You may use any letter more than once.

14 a comparison of children's reactions towards different robots

15 a speculation about ways robots may be able to communicate

16 a description of changes in the way the children physically handled a robot

17 a comparison between people's connections with animals and their connections with robots

18 an account of the way one robot was programmed

Questions 19-23

Look at the following statements (Questions 19-23) and the list of people below. Match each statement with the correct person, A, B, C or D.

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

NB You may use any letter more than once.

19 In future, robots will not only have to think, but also to show feelings.

20 It is uncertain whether more contact between people and robots will be beneficial.

21 Very young children have not yet developed ideas about robots.

22 Robots need to perform a wide variety of actions for people to relate to them.

23 Using robots as an aid in schools may have many benefits.

List of People

A Fumihide Tanaka

B Javier R Movellan

C Ronald Arkin

D David Powers

Questions 24-26

Complete the sentences below.

Choose ONE WORD ONLY from the passage for each answer.

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

24 Until recently, robots that were best at holding people's attention were those that acted as .....

25 The children responded to the QRIO robot as a friend or a..... , rather than as a toy.

26 Arkin expected that the children would show..... towards the QRIO robot.

READING PASSAGE 20

*You should spend about 20 minutes on **Questions 27-40,** which are based on Reading Passage 3 on pages 10 and 11.*

Animals predicting earthquakes?

Surely it is too much to believe that animals can predict earthquakes when we haven't worked out how to do it ourselves?

On 26 December 2004, villagers from Bang Koey in Thailand noticed buffalo on the beach lift their heads, look out to sea, then stampede to the top of a nearby hill. Minutes later, the tsunami* struck. Could these creatures have been sensing early warning signs of the earthquake that triggered the Asian tsunami? It is a strange assertion but the possibility that animals might hold the answer cannot be ignored, as a warning system could save many lives.

The idea that animals can predict earthquakes has ancient origins. From 373 BC there are stories of rats, dogs and snakes deserting the Greek city of Helice before an earthquake hit. It was the first in a long line of such anecdotes. What has been lacking is any real scientific data linking animal behaviour with earthquakes.

In late 2000, however, Stanley Coren from the University of British Columbia started a study to discover whether dogs suffer from 'seasonal affective disorder.'** Twice weekly, he emailed 200 dog owners in Vancouver, asking them to rate their pets' activity and anxiety levels using a nine-point scale. In general there was little daily variability; Coren's initial analysis of many months' worth of information strongly refuted his suspicion that dogs become depressed during winter, and he abandoned the project. When he finally went through the figures in detail several years later however, he noticed that on 27 February 2001, nearly 50 per cent were well above their usual baseline for activity and anxiety. The likelihood of such a difference was remote and Coren searched through the newspaper archives for a cause. He found that on 28 February a quake of magnitude 6.8 shook the Pacific northwest, with an epicentre at Nisqually about 240 kilometres south of Vancouver. Coren wondered what the dogs could have sensed. There was little to guide him.

Even the most comprehensive earthquake research project in the world, the Parkfield experiment in California, couldn't help. Since 1985, researchers from the US Geological Survey (USGS) have monitored a section of the San Andreas fault near the town of Parkfield. They have analysed every tremor, and measured tiny movements of the fault at 10- minute intervals, but to date the project has revealed nothing that would reliably indicate that an earthquake is imminent.

There is still much speculation about animals predicting earthquakes. For example, one idea is that some animals detect changes in the Earth's electrical field. Another theory is that animals are responding to gas such as radon released from rocks before a quake, despite the fact that few experts accept such gas is produced. Rupert Sheldrake, a British researcher, suggests that 'people notice unusual animal behaviour before disasters. I think animals are picking up on something that we can't, perhaps by using a sixth sense.'

Coren, however, had read about rescue dogs hearing avalanche victims under the snow, and suspected the dogs in his study might also be hearing vibrations. So he returned to his data to

shown any significant increase in anxiety on 27 February, and it was living with a hearing dog that had become anxious. Dogs with floppy ears showed only half the change in activity and one-third the change in anxiety level of dogs with pricked ears. Not only would an ear flap reduce the amount of sound reaching the inner ear; Coren also realised that it would weaken high frequency sounds more than low frequency ones. Further, dogs with smaller heads were significantly more likely to behave strangely than those with larger heads, which was interesting, given that smaller-headed dogs are more sensitive to higher frequencies.

Taken together, Coren's results present an alluring hypothesis. He suggests that the kind of high frequency sounds that many dogs can hear are emitted before an earthquake, perhaps from rocks scraping underground. Admittedly this is only one study. Even if Coren is right, is it still possible that other animals could predict quakes in different ways? Eric Wikramanayake, a conservation scientist who used radio collars and happened to be studying elephants in Sri Lanka when the tsunami struck, is entirely sceptical.

What he found was precisely nothing. One herd was only 100 metres away from the beach when the tsunami arrived and they just took cover behind a large sand dune when the wave came in sight. The other herd was safely located about 5 kilometres inland and did not show any unusual movements.

Even if some quakes are preceded by high- frequency vibrations, is it feasible that dogs in Vancouver could detect sounds emitted near Nisqually? USGS seismologist Andy Michael points out that the epicentre was over 240 kilometres south of Vancouver. 'It is physically implausible for seismic waves in the kilohertz range to travel that far,' he says. Although unconvinced by Coren's ideas, Michael adds a cautionary tale. 'When Alfred Wegener presented his theory of continental drift, his core ideas about tectonics were right but nobody listened because the mechanisms were wrong.'

So if animals are able to foretell earthquakes, does it matter how? In fact, while western society has been reluctant to use animals as earthquake predictors, China has already embraced the idea. Experts there use a video link to keep a 24-hour watch on snakes in farms nationwide. If they try to escape from their enclosure, observers raise a

g-

Other governments may not be willing to go that far just yet, but Coren believes that a centre that people could call when they see unusual things would be useful. 'We would be able to collect much more data and give warnings when we get hundreds of calls from a single area,' he says. It could cost little more than the price of setting up a phone line. Put that way, what have we got to lose?

* tsunami: large, destructive wave caused by earthquakes
** seasonal affective disorder, emotional and psychological changes created by changes in the amount of daylight in winter

Questions 27-30

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

In boxes 27-30 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

27 There is historical scientific evidence to support stories of animals predicting earthquakes.

28 Coren's decision to investigate the possibility that dogs can anticipate an earthquake was based on some archive information.

29 Dogs may be more sensitive to changes in the Earth's electrical field than other animals.

30. Coren's findings from his original study of dogs clearly prove they can hear high ofrequencies which signal earthquakes.

Questions 31-35

Write the correct letter in boxes 31-35 on your answer sheet.

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

31 What is the writer's main point in paragraph 4?

A The strength of the next earthquake along the San Andreas fault is unpredictable.

B It is not the first time that the theory of animal prediction has been investigated.

C Experts have never identified any reliable predictors for earthquakes.

D The Parkfield project depended on unreliable methods for earthquake detection.

32 When Coren re-analysed his data for 27 February he found that on that day

A dogs with either poor or good hearing were equally anxious.

B the shape of a dog's ear seemed to correlate with its behaviour.

C dogs with larger heads were the most sensitive to tremors

D the level of activity amongst dogs reduced as the earthquake occurred.

33 Seismologist Andy Michael refers to Alfred Wegener in order to

A suggest there may be an aspect of Coren's theory which is correct.

B dismiss the idea that dogs are capable of sensing earthquakes.

C demonstrate how data can be falsified by subjective researchers.

D criticise certain scientists for not being careful in their research.

34 What is the writer doing in the penultimate paragraph?

A explaining why western researchers do not trust animal behaviour

B arguing how animal prediction is superior to science-based prediction

C suggesting a more reliable animal than the dog for predictive purposes

D illustrating how animal behaviour is already exploited by some researchers

35 What point is the writer making by using the phrase 'what have we got to lose' in the final paragraph?

A The cost of setting up a data collection centre needs to be considered.

B It is worth setting up a call centre to record animal behaviour.

C The pros and cons of different data collection methods must be weighed up.

D There is a danger that existing data may be lost if not stored carefully.

Questions 36-40

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

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

36 The belief in the ability of animals to predict earthquakes

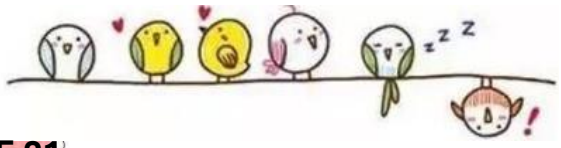
37 Experts think it is unlikely that gas

38 Sheldrake says that an animal's ability to predict disasters

39 Coren speculated that a dog's ability to predict earthquakes

40 The behaviour of the elephant herds in Wikramanayake's

A is released during earthquakes.
B showed little variation during the tsunami.
C would have an effect on most dogs.
D could be linked to their ability to detect move
E was based on Chinese data-collection methods
F could be explained by extra-sensory perception
G dates back to before modern civilisation.
H derived from poorly conducted research.



READING PASSAGE 21

Foot Pedal Irrigation

A Until now, governments and development agencies have tried to tackle the problem through large-scale projects: gigantic dams, sprawling, irrigation canals and vast new fields of high-yield crops introduced during the Green Revolution, the famous campaign to increase grain harvests in developing nations. Traditional irrigation, however, has degraded the soil in many areas, and the reservoirs behind dams can quickly fill up with silt, reducing their storage capacity and depriving downstream farmers of fertile sediments. Furthermore, although the Green Revolution has greatly expanded worldwide farm production since 1950, poverty stubbornly persists in Africa, Asia and Latin America. Continued improvements in the productivity of large farms may play the main role in boosting food supply, but local efforts to provide cheap, individual irrigation systems to small farms may offer a better way to lift people out of poverty.

B The Green Revolution was designed to increase the overall food supply, not to raise the incomes of the rural poor, so it should be no surprise that it did not eradicate poverty or hunger. India,for example, has been self-sufficient in food for 15 years, and its granaries are full, but more than 200 million Indians – one fifth of the country's population – are malnourished because they cannot afford the food they need and because the country's safety nets are deficient. In 2000, 189 nations committed to the Millennium Development Goals, which called for cutting world poverty in half by 2015. With business as usual, however, we have little hope of achieving most of the Millennium goals, no matter how much money rich countries contribute to poor ones.

C The supply-driven strategies of the Green Revolution, however, may not help subsistence farmers, who must play to their strengths to compete in the global marketplace. The average size of a family farm is less than four acres in India, 1.8 acres in Bangladesh and about half an acre in China. Combines and other modern farming tools are too expensive to be used on such small areas. An Indian farmer selling surplus wheat grown on his one-acre plot could not possibly compete with the highly efficient and subsidized Canadian wheat farms that typically stretch over thousands of acres. Instead subsistence farmers should exploit the fact that their labor costs are the lowest in the world, giving them a comparative advantage in growing and selling high-value, intensely farmed crops.

D Paul Polak saw firsthand the need for a small-scale strategy in 1981 when he met Abdul Rahman, a farmer in the Noakhali district of Bangladesh. From his three quarter-acre plots of rain-fed rice fields, Abdul could grow only 700 kilograms of rice each year – 300 kilograms less than what he needed to feed his family. During the three months before the October rice harvest came in, Abdul and his wife had to watch silently while their three children survived on one meal a day or less. As Polak walked with him through the scattered fields he had inherited from his father, Polak asked what he needed to move out of poverty. "Control of water for my crops," he said, "at a price I can afford."

E Soon Polak learned about a simple device that could help Abdul achieve his goal: the treadle pump. Developed in the late 1970s by Norwegian engineer Gunnar Barnes, the pump is operated by a person walking in place on a pair of treadles and two handle arms made of bamboo. Properly adjusted and maintained, it can be operated several hours a day without tiring the users. Each treadle pump has two cylinders which are made of

engineering plastic. The diameter of a cylinder is 100.5mm and the height is 280mm. The pump is capable of working up to a maximum depth of 7 meters. Operation beyond 7 meters is not recommended to preserve the integrity of the rubber components. The pump mechanism has piston and foot valve assemblies. The treadle action creates alternate strokes in the two pistons that lift the water in pulses.

F The human-powered pump can irrigate half an acre of vegetables and costs only $25 (including the expense of drilling a tube well down to the groundwater). Abdul heard about the treadle pump from a cousin and was one of the first farmers in Bangladesh to buy one. He borrowed the $25 from an uncle and easily repaid the loan four months later. During the five-month dry season, when Bangladeshis typically farm very little, Abdul used the treadle pump to grow a quarter-acre of chili peppers, tomatoes, cabbage and eggplants. He also improved the yield of one of his rice plots by irrigating it. His family ate some of the vegetables and sold the rest at the village market, earning a net profit of $100. With his new income, Abdul was able to buy rice for his family to eat, keep his two sons in school until they were 16 and set aside a little money for his daughter's dowry. When Polak visited him again in 1984, he had doubled the size of his vegetable plot and replaced the thatched roof on his house with corrugated tin. His family was raising a calf and some chickens. He told me that the treadle pump was a gift from God.

G Bangladesh is particularly well suited for the treadle pump because a huge reservoir of groundwater lies just a few meters below the farmers' feet. In the early 1980s IDE initiated a campaign to market the pump, encouraging 75 small private-sector companies to manufacture the devices and several thousand village dealers and tube-well drillers to sell and install them. Over the next 12 years one and a half million farm families purchased treadle pumps, which increased the farmers' net income by a total of $150 million a year. The cost of IDE's market-creation activities was only $12 million, leveraged by the investment of $37.5 million from the farmers themselves. In contrast, the expense of building a conventional dam and canal system to irrigate an equivalent area of farmland would be in the range of $2,000 per acre, or $1.5 billion.

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 view of the writer*
FALSE *if the statement contradicts the view of the writer*
NOT GIVEN *if it is impossible to say what the writer thinks about this*

1..... It is more effective to resolve poverty or food problem in large scale rather than in small scale.

2..... Construction of gigantic dams costs more time in developing countries.

3..... Green revolution foiled to increase global crop production from the mid of 20th century.

4..... Agricultural production in Bangladesh declined in last decade.

5..... Farmer Abdul Rahman knew how to increase production himself.

6..... Small pump spread into big project in Bangladesh in the past decade.

Questions 7 – 10

Filling the blanks in diagram of treadle pump's each parts.

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

7.....

8.....

9.....

10.....

Questions 11 – 13

Answer the questions below.

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

11 How large area can a treadle pump irrigate the field at a low level of expense?
11.....

12 What is Abdul's new roof made of?**12**.....

13 How much did Bangladesh farmers invest by IDE's stimulation?**13**.....

READING PASSAGE 22

Biology of Bitterness

To many people, grapefruit is palatable only when doused in sugar. Bitter Blockers like adenosine monophosphate could change that.

A.
There is a reason why grapefruit juice is served in little glasses: most people don't want to drink more than a few ounces at a time. aringin, a natural chemical compound found in grapefruit, tastes bitter. Some people like that bitterness in small doses and believe it enhances the general flavor, but others would rather avoid it altogether. So juice packagers often select grapefruit with low naringin though the compound has antioxidant properties that some nutritionists contend may help prevent cancer and arteriosclerosis.

B.
It is possible, however, to get the goodness of grapefruit juice without the bitter taste. I found that out by participating in a test conducted at the Linguagen Corporation, a biotechnology company in Cranbury, New Jersey. Sets of two miniature white paper cups, labeled 304and 305, were placed before five people seated around a conference table. Each of us drank from one cup and then the other, cleansing our palates between tastes with water and a soda cracker. Even the smallest sip of 304 had grapefruit 's unmistakable bitter bite. But 305 was smoother; there was the sour taste of citrus but none of the bitterness of naringin. This juice had been treated with adenosine monophosphate, or AMP, a compound that blocks the bitterness in foods without making them less nutritious.

C.
Taste research is a booming business these days, with scientists delving into all five basics-sweet, bitter, sour, salty, and umami, the savory taste of protein. Bitterness is of special interest to industry because of its untapped potential in food. There are thousands of bitter -tasting compounds in nature. They defend plants by warning animals away and protect animals by letting them know when a plant may be poisonous. But the system isn't foolproof. Grapefruit and cruciferous vegetable like Brussels sprouts and kale are nutritious despite-and sometimes because of-their bitter-tasting components. Over time, many people have learned to love them, at least in small doses. "Humans are the only species that enjoys bitter taste," says Charles Zuker, a neuroscientist at the University of California School of Medicine at San Diego. "Every other species is averse to bitter because it means bad news. But we have learned to enjoy it. We drink coffee, which is bitter, and quinine [in tonic water] too. We enjoy having that spice in our lives." Because bitterness can be pleasing in small quantities but repellent when intense, bitter blockers like AMP could make a whole range of foods, drinks, and medicines more palatable-and therefore more profitable.

D.
People have varying capacities for tasting bitterness, and the differences appear to be genetic. About 75 percent of people are sensitive to the taste of the bitter compounds phenylthiocarbamide and 6-n-propylthiouracil. and 25 percent are insensitive. Those who are sensitive to phenylthiocarbamide seem to be less likely than others to eat cruciferous

vegetables, according to Stephen Wooding, a geneticist at the University of Utah. Some people, known as supertasters, are especially sensitive to 6-n-propylthiouraci because they have an unusually high number of taste buds. Supertasters tend to shun all kinds of bitter-tasting things, including vegetable, coffee, and dark chocolate. Perhaps as a result, they tend to be thin. They're also less fond of alcoholic drinks, which are often slightly bitter. Dewar's scotch, for instance, tastes somewhat sweet to most people. " But a supertaster tastes no sweetness at all, only bitterness," says Valerie Duffy, an associate professor of dietetics at the University of Connecticut at Storrs.

E.

In one recent study, Duffy found that supertasters consume alcoholic beverages, on average, only two to three times a week, compared with five or six times for the average nontasters. Each taste bud, which looks like an onion, consists of 50 to 100 elongated cells running from the top of the bud to the bottom. At the top is a little clump of receptors that capture the taste molecules, known as tastants, in food and drink. The receptors function much like those for sight and smell. Once a bitter signal has been received, it is relayed via proteins known as G proteins. The G protein involved in the perception of bitterness, sweetness, and umami was identified in the early 1990s by Linguagen's founder, Robert Margolskee, at Mount Sinai School of Medicine in New York City. Known as gustducin, the protein triggers a cascade of chemical reactions that lead to changes in ion concentrations within the cell. Ultimately, this delivers a signal to the brain that registers as bitter. "The signaling system is like a bucket brigade," Margolskee says. "It goes from the G protein to other proteins."

F.

In 2000 Zuker and others found some 30 different kinds of genes that code for bitter-taste receptors. "We knew the number would have to be large because there is such a large universe of bitter tastants," Zuker says. Yet no matter which tastant enters the mouth or which receptor it attaches to, bitter always tastes the same to us. The only variation derives from its intensity and the ways in which it can be flavored by the sense of smell. "Taste cells are like a light switch," Zuker says. "They are either on or off."

G.

Once they figured put the taste mechanism, scientists began to think of ways to interfere with it. They tried AMP, an organic compound found in breast milk and other substances, which is created as cells break down food. Amp has no bitterness of its own, but when put it in foods, Margolskee and his colleagues discovered, it attaches to bitter-taste receptors. As effective as it is, AMP may not be able to dampen every type pf bitter taste, because it probably doesn't attach to all 30 bitter-taste receptors. So Linguagen has scaled up the hunt for other bitter blockers with a technology called high-throughput screening. Researchers start by coaxing cells in culture to activate bitter-taste receptors. Then candidate substances, culled from chemical compound libraries, are dropped onto the receptors, and scientists look for evidence of a reaction.

H.

Tin time, some taste researchers believe, compounds like AMP will help make processed foods less unhealthy. Consider, for example, that a single cup of Campbell's chicken noodle soup contains 850 milligrams of sodium chloride, or table salt-more than a third of the recommended daily allowance. The salt masks the bitterness created by the high

temperatures used in the canning process, which cause sugars and amino acids to react. Part of the salt could be replaced by another salt, potassium chloride, which tends to be scarce in some people's diets. Potassium chloride has a bitter aftertaste, but that could be eliminated with a dose of AMP. Bitter blockers could also be used in place of cherry or grape flavoring to take the harshness out of children's cough syrup, and they could dampen the bitterness of antihistamines, antibiotics, certain HIV drugs, and other medications.

I.

A number of foodmakers have already begun to experiment with AMP in their products, and other bitter blockers are being developed by rival firms such as Senomyx in La Jolla, California. In a few years, perhaps, after food companies have taken the bitterness from canned soup and TV dinners, they can set their sights on something more useful: a bitter blocker in a bottle that any of us can sprinkle on our brussels sprouts or stir into our grapefruit juice.

Questions 1-8

The reading Passage has seven paragraphs A-I.
Which paragraph contains the following information?
Write the correct letter A-I, in boxes 1-8 on your answer sheet.

1..... Experiment on bitterness conducted

2..... Look into the future application

3..... Bitterness means different information for human and animals

4..... Spread process of bitterness inside of body

5.....How AMP blocks bitterness

6.....Some bitterness blocker may help lower unhealthy impact

7.....Bitterness introduced from a fruit

8.....Genetic feature determines sensitivity

Question 9-12

Summary
Complete the following summary of the paragraphs of Reading Passage, using no more than two words from the Reading Passage for each answer. Write your answers in boxes 9-12 on your answer sheet.

The reason why grapefruit tastes bitter is because a substance called **9**..... contained in it. However, bitterness plays a significant role for plants. It gives a signal that certain plant is **10**.....For human beings, different person carries various genetic abilities of tasting bitterness. According to a scientist at the University of Utah, **11**.....have exceptionally plenty of **12**....., which allows them to perceive bitter compounds.

Questions 13-14

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

Write your answers in boxes 13-14 on your answer sheet.

13 What is the main feature of AMP according to this passage?

A offset bitter flavour in food

B only exist in 304 cup

C tastes like citrus

D chemical reaction when meets biscuit

14 What is the main function of G protein?

A collecting taste molecule

B identifying different flavors elements

C resolving large molecules

D transmitting bitter signals to the brain

READING PASSAGE 23

Coastal Archaeology of Britain

A The recognition of the wealth and diversity of England's coastal archaeology has been one of the most important developments of recent years. Some elements of this enormous resource have long been known. The so-called 'submerged forests' off the coasts of England, sometimes with clear evidence of human activity, had attracted the interest of antiquarians since at least the eighteenth century but serious and systematic attention has been given to the archaeological potential of the coast only since the early 1980s.

B It is possible to trace a variety of causes for this concentration of effort and interest. In the 1980s and 1990s scientific research into climate change and its environmental impact spilled over into a much broader public debate as awareness of these issues grew; the prospect of rising sea levels over the next century, and their impact on current coastal environments, has been a particular focus for concern. At the same time, archaeologists were beginning to recognize that the destruction caused by natural processes of coastal erosion and by human activity was having an increasing impact on the archaeological resource of the coast.

C The dominant process affecting the physical form of England in the post- glacial period has been the rise in the altitude of sea level relative to the land, as the glaciers melted and the landmass readjusted. The encroachment of the sea, the loss of huge areas of land now under the North Sea and the English Channel, and especially the loss of the land bridge between England and France, which finally made Britain an island, must have been immensely significant factors in the lives of our prehistoric ancestors. Yet the way in which prehistoric communities adjusted to these environmental changes has seldom been a major theme in discussions of the period. One factor contributing to this has been that, although the rise in relative sea level is comparatively well documented, we know little about the constant reconfiguration of the coastline. This was affected by many processes, mostly quite, which have not yet been adequately researched. The detailed reconstruction of coastline histories and

the changing environments available for human use will be an important theme for future research.

D So great has been the rise in sea level and the consequent regression of the coast that each of the archaeological evidence now exposed in the coastal zone, whether being eroded or exposed as a buried land surface, is derived from what was originally terres-trial occupation. Its current location in the coastal zone is the product of later unrelated processes, and it can tell us little about past adaptations to the sea. Estimates of its significance will need to be made in the context of other related evidence from dry land sites. Nevertheless, its physical environment means that preservation is often excellent, for example in the case of the Neolithic structure excavated at the Stumble in Essex.

E In some cases these buried land surfaces do contain evidence for human exploitation of what was a coastal environment, and elsewhere along the modem coast there is similar evidence. Where the evidence does relate to past human exploitation of the resources and the opportunities offered by the sea and the coast, it is both diverse and as yet little understood. We are not yet in a position to make even preliminary estimates of answers to such fundamental questions as the extent to which the sea and the coast affected human life in the past, what percentage of the population at any time lived within reach of the sea, or whether human settlements in coastal environments showed a distinct character from those inland.

F The most striking evidence for use of the sea is in the form of boats, yet we still have much to learn about their production and use. Most of the known wrecks around our coast are not unexpectedly of post-medieval date, and offer an unparalleled opportunity for research which has as yet been little used. The prehistoric sewn-plank boats such as those from the Humber estuary and Dover all seem to belong to the second

millennium BC; after this there is a gap in the record of a millennium, which cannot yet be explained, before boats reappear, but built using a very

different technology. Boatbuilding must have been an extremely important activity around much of our coast, yet we know almost nothing about it, Boats were some of the most complex artefacts produced by pre-modem societies, and further research on their production and use make an important contribution to our understanding of past attitudes to technology and technological change.

G Boats needed landing places, yet here again our knowledge is very patchy In many cases the natural shores and beaches would have sufficed, leaving little or no archaeological trace, but especially in later periods, many ports and harbors, as well as smaller facilities such as quays, wharves, and jetties, were built. Despite a growth of interest in the waterfront archaeology of some of our more important Roman and medieval towns, very little attention has been paid to the multitude of smaller landing places. Redevelopment of harbor sites and other development and natural pressures along the coast are subjecting these important locations to unprecedented threats, yet few surveys of such sites have been undertaken.

H One of the most important revelations of recent research has been the extent of industrial activity along the coast. Fishing and salt production are among the better documented activities, but even here our knowledge is patchy Many forms of fishing will leave little archaeological trace, and one of the surprises of recent survey has been the extent of past investment in facilities for procuring fish and shellfish. Elaborate wooden fish weirs, often of considerable extent and responsive to aerial photography in shallow water, have been identified in areas such as Essex and the Severn estuary. The production of salt, especially in the late Iron Age and early Roman periods, has been recognized for some time, especially in the Thames estuary and around the Solent and Poole Harbor, but the reasons for the decline of that industry and the nature of later coastal salt working are much less well understood. Other industries were also located along the coast, either because the raw materials outcropped there or for ease of working and transport: mineral resources such as sand, gravel, stone, coal, ironstone, and alum were all

exploited. These industries are poorly documented, but their remains are sometimes extensive and striking.

I Some appreciation of the variety and importance of the archaeological remains preserved in the coastal zone, albeit only in preliminary form, can thus be gained from recent work, but the complexity of the problem of managing that resource is also being realised. The problem arises not only from the scale and variety of the archaeological remains, but also from two other sources: the very varied natural and human threats to the resource, and the complex web of organisations with authority over, or interests in, the coastal zone. Human threats include the redevelopment of historic towns and old dockland areas, and the increased importance of the coast for the leisure and tourism industries, resulting in pressure for the increased provision of facilities such as marinas. The larger size of ferries has also caused an increase in the damage caused by their wash to fragile deposits in the intertidal zone. The most significant natural threat is the predicted rise in sea level over the next century especially in the south and east of England. Its impact on archaeology is not easy to predict, and though it is likely to be highly localized, it will be at a scale much larger than that of most archaeological sites. Thus protecting one site may simply result in transposing the threat to a point further along the coast. The management of the archaeological remains will have to be considered in a much longer time scale and a much wider geographical scale than is common in the case of dry land sites, and this will pose a serious challenge for archaeologists.

Questions 1-3

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

Write your answers in boxes **1-3** on your answer sheet.

1 What has caused public interest in coastal archaeology in recent years?

A Golds and jewelleries in the ships that have submerged

B The rising awareness of climate change

C Forests under the sea

D Technological advance in the field of sea research

2 What does the passage say about the evidence of boats?

A We have a good knowledge of how boats were made and what boats were for prehistorically

B Most of the boats discovered was found in harbors

C The use of boats had not been recorded for a thousand years

D The way to build boats has remained unchanged throughout human history

3 What can be discovered from the air?

A Salt mines

B Shellfish

C Ironstones

D Fisheries

Questions 4-10

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

In boxes **4-10** on your answer sheet, write

TRUE if the statement is true

FALSE if the statement is false

NOT GIVEN if the information is not given in the passage

4 England lost much of its land after the ice-age due to the rising sea level.

5 The coastline of England has changed periodically.

6 Coastal archaeological evidence may be well-protected by seawater.

7 The design of boats used by pre-modern people was very simple.

8 Similar boats were also discovered in many other European countries.

9 There are a few documents relating to mineral exploitation.

10 Large passenger boats are causing increasing damage to the seashore.

Questions 11-13

Choose **THREE** letters **A-G**

Write your answer in boxes **11-13** on your answer sheet

Which **THREE** of the following statements are mentioned in the passage?

A Our prehistoric ancestors adjusted to the environmental change caused by the rising sea level by moving to higher lands.

B It is difficult to understand how many people lived close to the sea.

C Human settlements in the coastal environment were different from that inland

D Our knowledge of boat evidence is limited.

E The prehistoric boats were built mainly for collecting sand from the river.

F Human development threatens the archaeological remains.

G The reason for the decline of the salt industry was the shortage of laborers.

SE - ANSWER KEY

1.Learning to Walk 1. True 2. True 3. False 4. True 5. Not Given 6. A 7. C 8. D 9. Anatomy 10. Resistance 11. Stress 12. Hypertension 13. Organs 14. Soles	**2.Mind Music** 1. A 2. E 3. D 4. H 5. WRIST 6. EMOTIONS 7. UNOCCUPIED 8. CHALLENGING 9. C 10. A 11. B 12. C 13. B
3.A Decibel Hell (The Effects of Living in a Noisy World) 1. 85 dBa 2. hearing 3. high-frequency 4. stomach 5. noise map 6. B 7. D 8. C 9. E 10. A 11. C 12. D 13. C	**4.The role of accidents in business** 1. YES 2. NO 3.NO 4. YES 5. NOT GIVEN 6. F 7. G 8. C 9 . A 10. B 11. D 12. A 13. C 14. B

5. The Pyramid of Cestius

1. The Pyramid of Cestius has always been one of Rome's most popular tourist attractions. -NOT GIVEN (There is no information in the passage about the popularity of the Pyramid of Cestius)
2. The construction of the Pyramid was completed before Cestius' death. - TRUE (The passage states that Caius Cestius ordered the construction to be completed within a specific time frame)
3. In the Middle Ages, people thought an original founder of Rome was buried in the Pyramid of Cestius. - TRUE (The passage mentions that a popular myth developed during the Middle Ages)
4. Today the height of the Pyramid is something that tourists and residents immediately notice. - FALSE (The passage states that the pyramid's full height of 119 feet may be easily missed by passing tourists and residents)
5. Japanese businessman Yuzo Yagi was an admirer of both Italian and Egyptian architecture. - TRUE (The passage mentions that Yuzo Yagi announced his intention to help fund the renovation of the pyramid as an act of gratitude towards Italy)
6. The restoration of the Pyramid of Cestius, which was funded by Yuzo Yagi, finished earlier than expected. - TRUE (The passage states that the restoration was completed ahead of schedule)
7. Most of the original frescoes inside Cestius' tomb have survived to this day. - FALSE (The passage mentions that some of the frescoes have disappeared over time)
8. Construction of Cestius' pyramid - brick
9. its shape is different to the pyramids found in Egypt
10. it was originally built in the countryside as building tombs in the city was forbidden
11. in the 1660s, some broken statues were found next to it
12. the tunnel inside the tomb suggests that robbers had been there
13. climbers are helping to get rid of signs of urban pollution

6. Chocolate for the masses

1 TRUE
2 FALSE
3 NOT GIVEN
4 NOT GIVEN
5 FALSE
6 TRUE
7 MACHINERY
8 FARM
9 MAYOR
v10 RAILROADS
11 NUTRITIONISTS
12 ALMONDS
13 EXHIBITIONS

7. Survivors' stories

1 not given
2 false
3 true
4 true
5 false
6 not given
7 true
8 29cm
9 rocks
10 bill
11 day
12 plovers
13 poison

8.The power of music **14. D** **15. B** **16. C** **17. G** **18. E** **19. Physical health** **14. Brain scans** **21. disabled** **22. Walking** **23. C** **24. B** **25. A** **26. B**	**9. How deserts are formed** 14.B 15.G 16.A 17. H 18.D 19.C 20 C 21.True 22.False 23.False 24.True 25.Not Given 26.False
10.How to find your way out of a food desert 1. location 2. policies 3. government 4. incomes 5. land 6. competition 7. False 8. False 9. Not given 10. False 11. True 12. Not given 13. True	**11.The dingo debate** 14. E 15. D 16. C 17. B 18. F 19. A 20. D 21. D 22. A 23. B 24. Tasmanian tiger 25. rabbits 26. over population

12.What lucy Taught Us	**13.The gender gap in New Zealand's high school examination results**	**14.The strange world of Sight**
l.F		27. D
2.T		28. C
3.NG	14. Points	29. A
4.NG	15. Decade	30. A
5.T	16. Australia	31.NO
6.Branches	17. C	32. YES
7. Ground	18. B	33. YES
8.Teeth	19. D	34. NO
9.Fruit	20. H	35. NG
10-Eggs	21. H	36. YES
11.Bones	22. E	37. D
12.Childhood	23. G	38. F
13. Brains	24. C	39.1
	25. F	40. J
	26. B	

15.Multiple Intelligences	**16.A unique golden textile**	**17.The power of persuasion**
1. True	14.vii	27.C
2. True	15.v	28.A
3. Not given	16.ix	29.B
4. False	17.i	30.B
5. discussions	18.iv	31.C
6.recordings	19.vi	32.H
7. observation skills	20.B	33.A
8. construction materials	21. A	34.1
9. emotions	22.C	35.B
10. collections	23 .A	36.E
11. proficiency	24.bacteria	37.NOT GIVEN
12. failure	2 5. gland	38.YES
13. individual differences	26.force	39.NO
		40.NO

18. Dyes and fabric dyeing

1. T
2. F
3. T
4. NG
5. F
6. NG
7. F
8. T
9. shellfish
10. insects
11 blackberries
12 beehives
13 chemistry

19. A machanical friend for children

14 D
15 F
16 D
17 A
18 C
19 B
20 C
21 A
22 D
23 A
24 stotrytellers
25 peer
26 affection

20. Animals predicting earthquakes

27 N
28 Y
29 NG
30 N
31 C
32 B
33 A
34 D
35 B
36 G
37 A
38 F
39 D
40 B

21. Foot Pedal Irrigation

1. FALSE
2. NOT GIVEN
3. FALSE
4. NOT GIVEN
5. TRUE
6. TRUE
7. bamboo
8. cylinders
9. Piston
10. 7
11. 1/2 an acre/half an acre
12. corrugated tin
13. $37.5 million/37.5 million dollars

22.Biology of bitterness	23. Coastal archaeology of Britain
1. B 8. D 2. I 9. NARINGIN 3. C 10. POISONOUS 4. E 11. SUPERTASTERS 5. G 12. TASTEBUDS 6. H 13. A 7. A 14. D	1. B 2. C 3. D 4. T 5. F 6. T 7. F 8. NG 9. T 10. T 11. B 12. D 13. F