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Department for Language Studies

ENGLISH LANGUAGE

Methodological recommendations for the first course students of all specialties for fulfillment of independent work

Almaty 2021

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This guideline is written to develop reading skills of the first course students of all specialties and fulfill independent work. The texts are in the IELTS and TOEFL exam format.

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Unit 1. Education

Exercise 1

Complete definitions 1 – 14 with words and expressions from the box. You will not need all of the words and expressions from the box.

acquire class correspondence course day release degree discipline doctorate elementary (education) elementary school enroll exam experience faculty fail fees grade grades grade school graduate (noun) graduate (verb) graduate school grant higher degree higher education high school junior high school kindergarten learn learning resources center lecture lecturer lesson literacy mature (student) middle school night class numeracy opportunity pass physical education private school professor prospectus public school qualifications quarter retake (an exam) resources secondary (education) semester seminar SAT® (Scholastic Aptitude Test) sit / take (an exam) skills study subject syllabus topic tutor tutorial undergraduate

1. A _____ is an educational course that you take at home; receiving your work and sending it back by mail or email. A _____ is a lesson in the evening for people who work during the day. People who have a job might be given _____ by their employer, which means that can take a day off work about once a week to attend a course of study.

2. The _____ is an examination that students must take before they can go to university.

3. A _____ is a period of time in which students are taught a subject in school (also called a_____.

4. A _____ is a talk given to a group of students at college or university about a particular_____. The person who gives this talk is called a _____. A _____ is a meeting at which groups of students discuss something they are studying. A _____ is a meeting at which one student, or a small group of students, discusses something he / she is studying with his / her _____.

5. _____ is the ability to read and write. _____ refers to basic skills in mathematics.

6. A _____ is a small book that provides information about a university. Once a student who has read this book decides he / she would like to study there, he must _____ (in other words, he / she puts his / her name on the official list of students).

7. A _____ is a main department at a university. This word can also be used to refer to the teaching staff of a school, college, university, etc.

8. _____ refers to sports and exercise that children do at school as a school subject.

9. A _____ is a school that is funded by taxes. A _____ is a school where the parents of the children who attend it must pay _____.

10. A _____ is school for very young children (aged 4 or 5), which prepares them for the first_____ at school. An _____ is a school for the first six or eight years of a child's education. It is also known as a _____.

11. A _____ is a list of the main subjects in a course of study (sometimes called a *curriculum*).

12. A _____ is a school for students between the ages of 12 and 14 or 15. It is also known as a _____. From the age of 14 or 15, students attend a _____.

13. A _____ is one of two periods into which the school year is divided. A _____ is one of four periods into which the school year is divided.

14. A _____ is someone who has completed a course at school, college, or university. A_____ is a college or university where students can study for a _____ such as a Master's or Ph.D.

Exercise 2

Use your dictionary to check the meanings of the other words and expressions in the box.

Exercise 3

Complete this essay with appropriate words and expressions from the box in Exercise 1. You may need to change the form of some of the words.

You are never too old to learn. Do you agree with this statement?

Education is a long process that not only provides us with basic (1) _____ such as(2) _____ and (3) _____, but is also essential in shaping our future lives. From the moment we enter (4) _____ as 5-year-olds, and as we progress through (5) _____ and(6) _____ education, we are laying the foundations for the life ahead of us. We must(7) _____ ourselves to work hard so that we can (8) _____ exams and gain the(9) _____ we will need to secure a good job. We must also (10) _____ valuable life skills so that we can fit in and work with those around us. And of course (11) _____ helps us to develop our bodies and stay fit and healthy.

For most people, this process ends when they are in their mid-to-late teens and they (12) _____ from high school. For others, however, it is the beginning of a lifetime of learning. After they finish school, many progress to (13) _____ education where they will work towards a (14)

_____ in a chosen(15) _____ at university. After that, they may work for a while before opting to study at a(16) _____ for a Master's degree, or a (17) _____. Alternatively, they may choose to attend a (18) _____ after work or, if they have a sympathetic employer, obtain (19) _____ so that they can study during the week. And if they live a long way from a college or university, they might follow a(20) _____ using mail and the Internet. In fact, it is largely due to the proliferation of computers that
many people, who have not been near a school for many years, have started to study again and can proudly class themselves as (21) _____ students.

We live in a fascinating and constantly changing world, and we must continually learn and acquire new knowledge if we are to adapt and keep up with changing events. Our schooldays are just the beginning of this process, and we should make the best of every (22) _____ to develop ourselves, whether we are
eighteen or eighty. You are, indeed, never too old to learn.

Exercise 4

Now try this essay. Use words and expressions from the vocabulary box in Exercise 1, and any other words or expressions that you think would be relevant.
Do you agree with this statement? "The most important things in life are not learnt at school or college." Use examples and details in your answer.

Text 1. The history of the biro

A. One chilly autumn morning in 1945, five thousand shoppers crowded the pavements outside Gimbels Department Store in New York City. The day before, Gimbels had taken out a full-page newspaper advertisement in the New York Times, announcing the sale of the first ballpoint pens in the United States. The new writing instrument was heralded as "fantastic … miraculous … guaranteed to write for two years without refilling!" Within six hours, Gimbels had sold its entire stock of ten thousand ballpoints at $12.50 each – approximately $130 at today's prices.

B. In fact this 'new' pen was not new after all, and was just the latest development in a long search for the best way to deliver ink to paper. In 1884 Lewis Waterman had patented the fountain pen, giving him the sole rights to manufacture it. This marked a significant leap forward in writing technology, but fountain pens soon became notorious for leaking. In 1888, a leather tanner named John Loud devised and patented the first "rolling-pointed marker pen" for marking leather. Loud's design contained a reservoir of ink in a cartridge and a rotating ball point that was constantly bathed on one side with ink. Loud's pen was never manufactured, however, and over the next five decades, 350 additional patents were issued for similar ball-type pens, though none advanced beyond the design stage. Each had their own faults, but the major difficulty was the ink: if the ink was thin,

the pens leaked, and if it was too thick, they clogged. Depending on the climate or air temperature, sometimes the pens would do both.

C. Almost fifty years later, Ladislas and Georg Biro, two Hungarian brothers, came up with a solution to this problem. In 1935 Ladislas Biro was working as a journalist, editing a small newspaper. He found himself becoming more and more frustrated by the amount of time he wasted filling fountain pens with ink and cleaning up ink smudges. What's more, the sharp tip of his fountain pen often scratched or tore through the thin newsprint paper. Ladislas and Georg (a chemist) set about making models of new pen designs and creating better inks to use in them. Ladislas had observed that the type of ink used in newspaper printing dried rapidly, leaving the paper dry and smudge-free. He was determined to construct a pen using the same type of ink. However, the thicker ink would not flow from a regular pen nib so he had to develop a new type of point. Biro came up with the idea of fitting his pen with a tiny ball bearing in its tip. As the pen moved along the paper, the ball bearing rotated and picked up ink from the ink cartridge which it delivered to the paper.

D. The first Biro pen, like the designs that had gone before it, relied on gravity for the ink to flow to the ball bearing at the tip. This meant that the pens only worked when they were held straight up, and even then the ink flow was sometimes too heavy, leaving big smudges of ink on the paper. The Biro brothers had a rethink and eventually devised a new design, which relied on capillary action rather than gravity to feed the ink. This meant that the ink could flow more smoothly to the tip and the pen could be held at an angle rather than straight up. In 1938, as World War II broke out, the Biro brothers fled to Argentina, where they applied for a patent for their pen and established their first factory.

E. The Biros' pen soon came to the attention of American fighter pilots, who needed a new kind of pen to use at high altitudes. Apparently, it was ideal for pilots as it did not leak like the fountain pen and did not have to be refilled frequently. The United States Department of War contacted several American companies, asking them to manufacture a similar writing instrument in the U.S. Thus fortune smiled on the Biro brothers in May 1945, when the American company 'Ever sharp' paid them $500,000 for the exclusive manufacturing and marketing rights of the Biro ballpoint for the North American market. Ever sharp were slow to put their pen into production, however, and this delay ultimately cost them their competitive advantage.

F. Meanwhile, in June 1945 an American named Milton Reynolds stumbled upon the Biro pen while on vacation in Buenos Aires. Immediately seeing its commercial potential, he bought several pens and returned to Chicago, where he discovered that loud's original 1888 patent had long since expired. This meant that the ballpoint was now in the public domain, and he therefore wasted no time making a copy based on the Biro design. Establishing his pen company with just $26,000, Reynolds quickly set up a factory with 300 workers who began production on 6th October 1945, stamping out pens from precious scraps of aluminum that hadn't been used during the war for military equipment or weapons. Just 23 days

later, it was Reynolds' ballpoint pen that caused the stampede at Gimbels Department Store. Following the ballpoint's debut in New York City, Ever sharp challenged Reynolds in the law courts, but lost the case because the Biro brothers had failed to secure a U.S. patent on their invention.

Questions 1-6.The reading passage has six paragraphs A-F. Choose the most suitable heading for each paragraph from the list of headings below. Write the correct number i-ix in the space provided.

List of Headings
i Fountain pens are history
ii Fame at last for the Biro brothers •
iii A holiday helps bring the biro to America
iv A second design and a new country
v War halts progress
vi Dissatisfaction leads to a new invention
vii Big claims bring big crowds
viii A government request brings a change of ownership
ix Many patents and many problems

1 Paragraph A
2 Paragraph B
3 Paragraph C
4 Paragraph D
5 Paragraph E
6Paragraph F

Questions 7-9. Choose the correct answer, A, B, C or D.

7)The problem with the ballpoint pens invented between 1888 and 1935 was that

a) they cost a great deal of money to manufacture.
b) the technology to manufacture them did not exist.
c) they could not write on ordinary paper:
d) they were affected by weather conditions.

8 The design of the Biro brothers' first pen

a) was similar to previous pens.
b) was based on capillary action,
c) worked with heavy or light inks.
d) worked when slanted slightly.

9) Milton Reynolds was able to copy the Biro brothers' design because

a) the Biro brothers' original patent was out of date.
b) it was legal to copy other designs at the time.
c) they did not have a patent for North America.

d) the Biro brothers gave him permission.

Questions 10-12. Answer the questions below using no more than two words and/or a number for each answer. Write your answers in the spaces provided.

10) What material was the first ballpoint pen designed to write on?_____

11) Where did the Biro brothers open their first factory?_____

12) In what year did the first American biro factory begin production?_____

Text 2. The Birth of Scientific English

World science is dominated today by a small number of languages, including Japanese, German and French, but it is English which is probably the most popular global language of science. This is not just because of the importance of English-speaking countries such as the USA in scientific research; the scientists of many non-English-speaking countries find that they need to write their research papers in English to reach a wide international audience. Given the prominence of scientific English today, it may seem surprising that no one really knew *how* to write science in English before the 17th century. Before that, Latin was regarded as the *lingua franca*[1] for European intellectuals.

The European Renaissance (c. 14th-16th century) is sometimes called the 'revival of learning', a time of renewed interest in the 'lost knowledge' of classical times. At the same time, however, scholars also began to test and extend this knowledge. The emergent nation states of Europe developed competitive interests in world exploration and the development of trade. Such expansion, which was to take the English language west to America and east to India, was supported by scientific developments such as the discovery of magnetism (and hence the invention of the compass), improvements in cartography and - perhaps the most important scientific revolution of them all - the new theories of astronomy and the movement of the Earth in relation to the planets and stars, developed by Copernicus (1473-1543).

England was one of the first countries where scientists adopted and publicized Copernican ideas with enthusiasm. Some of these scholars, including two with interests in language -John Wall's and John Wilkins - helped Found the Royal Society in 1660 in order to promote empirical scientific research.

Across Europe similar academies and societies arose, creating new national traditions of science. In the initial stages of the scientific revolution, most publications in the national languages were popular works, encyclopedias, educational textbooks and translations. Original science was not done in English until the second half of the 17th century. For example, Newton published his mathematical treatise, known as the Principia, in Latin, but published his later work on the properties of light – *Opticks* - in English.

There were several reasons why original science continued to be written in Latin. The first was simply a matter of audience. Latin was suitable for an international audience of scholars, whereas English reached a socially wider, but more local, audience. Hence, popular science was written in English.

A second reason for writing in Latin may, perversely, have been a concern for secrecy. Open publication had dangers in putting into the public domain preliminary ideas which had not yet been fully exploited by their 'author'. This growing concern about intellectual property rights was a feature of the period - it reflected both the humanist notion of the individual, rational scientist who invents and discovers through private intellectual labor, and the growing connection between original science and commercial exploitation.

There was something of a social distinction between 'scholars and gentlemen' who understood Latin, and men of trade who lacked a classical education. And in the mid-17th century it was common practice for mathematicians to keep their discoveries and proofs secret, by writing them in cipher, in obscure languages, or in private messages deposited in a sealed box with the Royal Society. Some scientists might have felt more comfortable with Latin precisely because its audience, though international, was socially restricted. Doctors clung the most keenly to Latin as an 'insider language'.

A third reason why the writing of original science in English was delayed may have been to do with the linguistic inadequacy of English in the early modern period. English was not well equipped to deal with scientific argument. First, it lacked the necessary technical vocabulary. Second, it lacked the grammatical resources required to represent the world in an objective and impersonal way, and to discuss the relations, such as cause and effect, that might hold between complex and hypothetical entities.

Fortunately, several members of the Royal Society possessed an interest in language and became engaged in various linguistic projects. Although a proposal in 1664 to establish a committee for improving the English language came to little, the society's members did a great deal to foster the publication of science in English and to encourage the development of a suitable writing style. Many members of the Royal Society also published monographs in English. One of the first was by Robert Hooke, the society's first curator of experiments, who described his experiments with microscopes in *Micrographia* (1665). This work is largely narrative in style, based on a transcript of oral demonstrations and lectures.

In 1665 a new scientific journal, *Philosophical Transactions*, was inaugurated. Perhaps the first international English-language scientific journal, it encouraged a new genre of scientific writing, that of short, focused accounts of particular experiments.

The 17th century was thus a formative period in the establishment of scientific English. In the following century much of this momentum was lost as German established itself as the leading European language of science. It is estimated that by the end of the 18th century 401 German scientific journals had been established as opposed to 96 in France and 50 in England. However, in the

19th century scientific English again enjoyed substantial lexical growth as the industrial revolution created the need for new technical vocabulary, and new, specialized, professional societies were instituted to promote and publish in the new disciplines.

Questions 1-7.Complete the summary below choose no more than two words from the passage for each answer.

In Europe modem science emerged at the same time as the nation state. At first, the scientific language of choice remained ____ (1). It allowed scientists to communicate with other socially privileged thinkers while protecting their work from unwanted exploitation. Sometimes the desire to protect ideas seems to have been stronger than the desire to communicate them, particularly in the case of mathematicians and ____ (2).

Britain, moreover, scientists worried that English had neither the ____ (3) nor the ____ (4) to express their ideas this situation only changed after 1660 when scientists associated with the ____ (5) set about developing English. An early scientific journal fostered a new kind of writing based on short descriptions of specific experiments. Although English was then overtaken by____ (6) it developed again in the 19th century as a direct result of the ____ (7).

Questions 8-10. Do the following statements agree with the information given in Reading Passage ?

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

8) There was strong competition between scientists in Renaissance Europe.

9) The most important scientific development of the Renaissance period was the discovery of magnetism.

10) In 17th-century Britain, leading thinkers combined their interest in science with an interest in how to express ideas.

Questions 11-13.Complete the table below choose no more than two words from the passage for each answer.

Science written in the first half of the 17th century

Language used	Latin	English
Type of science	Original	____ (11)
Examples	____ (12)	Encyclopaedias
Targetaudience	International scholars	____ (13), but sociallywider

Unit 2. Environmental protection

Exercise 1

Replace the words and expressions in bold in sentences 1 – 15 with one of those from the box. You will not need all of the words and expressions from the box.

acid rain activists animal rights battery farming biodegradable packaging biodiversity biofuels breeding (in)captivity CFC gases climate change conservation program conserve contaminated deforestation degradation desertification eco-friendly ecological ecology ecosystem emissions endangered species environmentalists environmentally friendly erosion extinct fossil fuels fumes genetically modified global warming green belt greenhouse effect greenhouse gases intensive farming natural behavior natural resources organic farming ozone-friendly ozone layer poaching pollute (air) pollution rare breeds rainforest recycle recycling renewable / sustainable energy research solar power tidal energy toxic waste unleaded gas wildlife management

1. In some countries, building is restricted or completely banned in the *area of farmland or wood sand parks which surround a community*.
2. More and more companies are *using boxes, cartons, and cans which can easily bed composed by organisms such as bacteria, or by sunlight, sea, water, etc.*, for their products.
3. The burning of some fuels creates *carbon dioxide, carbon monoxide, sulfur dioxide, and methane* which rise into the atmosphere.
4. Farmers have cleared acres of *thick wooded land in tropical regions where the precipitation is very high* to provide pasture for their cattle.
5. Planting trees and bushes can provide some protection from *the gradual wearing a way of soil.*
6. We should all try to *process waste material so that it can be used again*.
7. Many shops now sell fruit and vegetables which are *cultivated naturally, without using any chemical fertilizers or pesticides.*
8. This bread is made from wheat which has been *altered at a molecular level so as to change certain characteristics which can be inherited*.
9. Most modern cars use *fuel which has been made without lead additives.*
10. *Polluted precipitation which kills tree s*often falls a long distance from the source of the pollution.
11. Human activity has had a devastating effect on the *living things, both large and small*, in many parts of the word.
12. The *gases and other substances* which come from factories using oil, coal, and other *fuels which are the remains of plants and animals* can cause serious damage to the environment.
13. Don't drink that water. It's been *made dirty by something being added to it*.

14. Friends of the Earth, Greenpeace, and other *people concerned with protecting the environment* are holding an international summit in Geneva next month.

15. *The heating up of the earth's atmosphere by pollution* is threatening life as we know it.

Exercise 2

Use your dictionary to check the meanings of the other words and expressions in the box.

Exercise 3

Read this essay and complete the gaps with one of the words or expressions from the box in Exercise 1.

"Environmental degradation is a major world problem. What causes this problem, and what can we do top event it?"

There is no doubt that the environment is in trouble. Factories burn (1) _____ which produce(2) _____ , and this kills trees. At the same time, (3) _____ rise into the air and contribute to (4) _____ which threatens to melt the polar ice cap. Meanwhile farmers clear huge areas of(5) _____ in places such as the Amazon to produce feeding land for cattle or produce wood for building. Rivers and oceans are so heavily (6) _____ by industrial waste that it is no longer safe to go swimming. Cars pump out poisonous (7) _____which we all have to breathe in. (8) _____and overfishing are killing off millions of animals, including whales, elephants, and other (9) _____ .In fact, all around us, all living things large and small which comprise our finely balanced (10) _____are being systematically destroyed by human greed and thoughtlessness.

There is a lot we can all do, however, to help prevent this. The easiest thing, of course, is to(11) _____ waste material such as paper and glass so that we can use it again. We should also check that the things we buy from supermarkets are packaged in (12) _____ which decomposes easily. At
the same time, we should make a conscious effort to avoid foods which are (13) _____ (at least until someone proves that they are safe both for us and for the environment). If you are truly committed to protecting the environment, of course, you should only buy (14) _____fruit and vegetables, safe in the knowledge that they have been naturally cultivated. Finally, of course, we should buy a small car that uses(15) _____ which is less harmful to the environment or, even better; make more use of public transportation.

The serious (16) _____, however, do much more. They are aware of the global issues involved and will actively involve themselves in (17) _____ by making sure our forests are kept safe for future generations. They will oppose activities which are harmful to animals, such as (18)

_____. And they will campaign to keep the (19) _____ around our towns and cities free from new building.

We cannot all be as committed as them, but we can at least do our own little bit at grass roots level. We, as humans, have inherited the earth, but that doesn't mean we can do whatever we like with it.

Exercise 4

Now try this essay. Use words and expressions from Exercise 1, and any other words or expressions that you think would be relevant.

Some people think that the government should spend as much money as possible on protecting the environment. Others think this money should be spent on other things such as education and healthcare. Which one of these opinions do you agree with? Use specific reasons and details to support your answer.

Text 1. Facts you should know about global warming - Part 1

Global warming	the warming of the earth's air temperature
Biodiversity	different types of living things; species of animals, plants and insects
Naturalphenomenon	Something that happens in nature, and not made by humans
Carbondioxide	the gas produced from breathing, or the burning of carbon
Watervapour	the steam from heated water
Fossilfuels	for example, oil, natural gas and coal
Long-substantiated laws of physics	rules or facts of nature that have been believed for a long time
Solaroutput	heat or energy from the sun

Fact 1

In 1996, the Intergovernmental Panel on Climate Change (IPCC), representing 2,500 scientists, released a major assessment on climate change. The 3600-page report reduces many of the uncertainties surrounding the issue. Scientists are now more confident than ever that the emission of greenhouse gases through human activities is contributing to global warming. This will lead to climate change next century, with potentially disastrous impacts on biodiversity, coasts, agriculture, water and health.

Fact 2

The greenhouse effect is a natural phenomenon – if it weren't for the natural greenhouse effect the Earth would be some 33°C cooler than it is at present. The planet is warm enough for complex life because naturally occurring gases

(including carbon dioxide and water vapour) trap heat which would otherwise escape into space. The problem is that human activity – including combustion of fossil fuels and land clearing – is adding to these gases faster than oceans, plants and soil can absorb them. This is unnaturally 'enhancing' the greenhouse effect. Since the industrial revolution, the concentration of carbon dioxide, the main greenhouse gas, has increased by 30 per cent. Long-substantiated laws of physics tell us that, given we are altering the energy balance of the atmosphere; this will impact on the world's temperature and climate.

Fact 3

The measured increase in temperature of about 0.3-0.6°C this century is consistent with the latest climate model predictions. The 1980s was the warmest decade on record, with 1990, 1991 and 1995 the three warmest years on record. This is not to say that the warming trend is the consequence of the enhanced greenhouse effect. However, recent studies show that the warming trend this century is unlikely to be due to natural phenomena such as increased solar output. The IPCC has now stated that 'the balance of evidence suggests that there is discernible human influence on global climate'.

1 What is the main point of Fact One?

a) Most scientists believe that global warming is caused by human activity.
b) Scientists write a lot of reports.
c) The situation has changed a lot since 1996.
d) Our health will be damaged in the next century

2 Essentially, what does the 3600-page report do?

a) It does not say anything new.
b) It uses a lot of paper.
c) It helps make the global warming problem clearer.
d) It shows how the problem can be fixed next century.

3 Which statement about the greenhouse effect is true?

a) There was no greenhouse effect until humans created it.
b) Oceans, plants and soil created the greenhouse effect.
c) The greenhouse effect is not important for the planet.
d) The greenhouse effect occurs naturally.

4 Which statement is closest to what the text says?

a) The main greenhouse has increased by thirty times since the Industrial revolution.

b) Carbon dioxide in the atmosphere is thirty times higher than it was before the industrial revolution.

c) There is no evidence to show that there have been any changes in carbon dioxide levels since the industrial revolution.

d) Carbon dioxide in the atmosphere has increased by almost one-third since the Industrial Revolution.

5 Which is the best paragraph heading for Fact Three?

a) The Earth's temperature increase could be predicted

b) There is not enough evidence.
c) The Sun's heat causes the most problems.
d) The temperature increase is too small.

Text 2. Facts you should know about global warming - Part 2

Fact 4

Global warming predictions are based on computer models and analysis of climate change that has occurred in the past.

Global warming and climate change predictions are based on two major sources. Complex computer models (known as global circulation models) are able to simulate the broad features of the climate system including atmospheric and ocean circulations. These models can now simulate the present climate and have greatly improved scientists' ability to distinguish between natural and human influences on the climate. The most recent climate models predict an increase in global average temperatures of 1.5-3.5°C for a doubling in the atmospheric concentration of *greenhouse gases.* The average rate of warming would be greater than at any time in the history of civilization. Analysis of air trapped in glacier ice confirms the model predictions. The analysis reveals that past changes in temperature are closely correlated to changes in *carbon dioxide*(CO_2)in the atmosphere.

Fact 5

Global warming will lead to a rise in the sea level.

The *IPCC* has projected that sea levels will rise by between 15 and 95 cm next century, with a best estimate of 50 cm. Sea level rise will be principally due to *thermal expansion* of the oceans and also some melting of glaciers. The sea level will continue to rise after next century, even if the concentrations of *greenhouse gases* are stabilized by that time.

Fact 6

Human-induced climate change is different to past natural climate change.

Natural climate variability is an ongoing phenomenon – scientific analysis suggests temperatures have changed by a number of degrees in recent *geological history*. It is important to recognize, though, that present-day stresses on natural ecosystems from human activity will mean the resilience of *ecosystems* to the changes will be much less than in the past. Furthermore, both the rate and the level of global warming will be greater than any time in the last 10,000 years. Past global and regional climate changes, have resulted in social and cultural upheaval – in some cases contributing to the collapse of civilizations.

Fact 7

The costs of global warming will outweigh the benefits.

The nature and extent of the impacts of *global warming* are still uncertain. However, the IPCC has made it clear that many of the world's ecological and human systems are extremely vulnerable to the predicted global warming, in particular ecosystems and societies that are already subject to environmental,

economic and cultural stresses. The IPCC has also stated that future climate changes may involve ‘surprises’. Some commentators have suggested that because some regions or industries may benefit in the short term from climate change – for example, wheat yields could improve in Canada – then there is no need to be concerned about the issue. This suggestion is based on a false assumption that climate change will be a one-off event. Unless the level of greenhouse gases in the atmosphere is stabilized, though, human-induced climate change will continue to occur and benefits may only be transient. Furthermore, the suggestion ignores the social, economic and environmental upheaval that will arise if significant sections of society or ecosystems are unable to adapt to climate change.

Fact 8

Lack of scientific certainty is not a reason to delay responding to the issue.

The IPCC has stressed that the level of uncertainty about the climate change issue should not be exaggerated. It has also estimated that to stabilize the atmospheric concentration of greenhouse gases in the atmosphere will eventually require cutting greenhouse gas emissions by between 60 and 80 per cent below current levels. The longer we delay cutting emissions, the greater and more rapid are the cuts that will be needed in the future. Furthermore, to delay responding is to ignore the ‘precautionary principle’ of decision making. This principle states that when there is a high possibility of major or irreversible environmental or social damage as a consequence of human activities, lack of scientific certainty should not be used as a justification for not taking action.

1)How do scientists attempt to prove the reliability of climate computer models?

a) Talk to other scientist.
b) Read books about the history of civilization.
c) Analyze the air found in glacier ice.
d) Analyze ocean and air movement.

2)What is the topic of Fact 5?

a) The concentration of greenhouse gases.
b) The melting of glaciers.
c) Greenhouse gas emission in the 22nd Century.
d) The rise in sea levels due to global warming.

3) According to Fact 6, which of these statements is not true?

a) Climate change has always been part of long been part of the Earth's environment.
b) Present day climate change could be far more destructive than past ones.
c) Mankind has contributed to the inability of nature to survive climate change.
d) The Earth's temperature is exactly the same today as it was 10,000 years ago.

4)According to Fact 7, global warming:

a) will have long term economic benefits for all countries.

b) may provide some short-term economic benefits for a few countries and industries.

c) will not affect the economy of any country.

d) will increase industrial output in the future.

5)According to fact 8, the lack of scientific certainty about climate change:

a) means scientist should think about the problem longer.

b) means politicians should think about the problem longer.

c) is not an excuse for doing nothing about the problem.

d) proves that it is not an important problem.

Text 3. Greenhouse gases

Greenhouse gases arise from a wide range of sources and their increasing concentration is largely related to the compound effects of increased population, improved living standards and changes in lifestyle. From a current base of 5 billion, the United Nations predicts that the global population may stabilize in the twenty-first century between 8 and 14 billion, with more than 90 per cent of the projected increase taking place in the world's developing nations. The associated activities to support that growth, particularly to produce the required energy and food, will cause further increases in greenhouse gas emissions. The challenge, therefore, is to attain a sustainable balance between population, economic growth and the environment.

The major greenhouse gas emissions from human activities are carbon dioxide (CO_2), methane and nitrous oxide. Chlorofluorocarbons (CFCs) are the only major contributor to the greenhouse effect that does not occur naturally, coming from such sources as refrigeration, plastics and manufacture. Coal's total contribution to greenhouse gas emissions is thought to be about 18 per cent, with about half of this coming from electricity generation.

The worldwide coal industry allocates extensive resources to researching and developing new technologies and ways of capturing greenhouse gases. Efficiencies are likely to be improved dramatically, and hence CO_2 emissions reduced, through combustion and gasification techniques which are now at pilot and demonstration stages.

Clean coal is another avenue for improving fuel conversion efficiency. Investigations are under way into *super-clean* coal (35 per cent ash) and *ultraclean* coal (less than 1 per cent ash). Super-clean coal has the potential to enhance the combustion efficiency of conventional pulverized fuel power plants. Ultraclean coal will enable coal to be used in advanced power systems such as coal-fired gas turbines which, when operated in combined cycle, have the potential to achieve much greater efficiencies.

Defendants of mining point out that, environmentally, coal mining has two important factors in its favor. It makes only temporary use of the land and produces no toxic chemical wastes. By carefully preplanning projects, implementing pollution control measures, monitoring the effects of mining and rehabilitating

mined areas, the coal industry minimizes the impact on the neighboring community, the immediate environment and long-term land capability.

Dust levels are controlled by spraying roads and stockpiles, and water pollution is controlled by carefully separating clean water runoff from runoff which contains sediments or salt from mine workings. The latter is treated and reused for dust suppression. Noise is controlled by modifying equipment and by using insulation and sound enclosures around machinery.

Since mining activities represent only a temporary use of the land, extensive rehabilitation measures are adopted to ensure that land capability after mining meets agreed and appropriate standards which, in some cases, are superior to the land's pre-mining condition. Where the mining is underground, the surface area can be simultaneously used for forests, cattle grazing and crop rising, or even reservoirs and urban development, with little or no disruption to the existing land use. In all cases, mining is subject to stringent controls and approvals processes.

Questions 1 – 5. Choose the correct letter, A, B, C or D.

1)The global increase in greenhouse gases has been attributed to

a) industrial pollution in developing countries.
b) coal mining and electricity generation.
c) reduced rainfall in many parts of the world.
d) trends in population and lifestyle.

2) The proportion of all greenhouse gases created by coal is approximately

a) 14 per cent.
b) 18 per cent.
c) 27 per cent.
d) 90 per cent.

3)Current research aims to increase the energy-producing efficiency of coal by

a) burning it at a lower temperature.
b) developing new gasification techniques.
c) extracting CO2 from it.
d) recycling greenhouse gases.

4)Compared with ordinary coal, new, 'clean' coals may generate power

a) more cleanly and more efficiently.
b) more cleanly but less efficiently.
c) more cleanly but at higher cost.
d) more cleanly but much more slowly.

5)To control dust at mine sites, mining companies often use

a) chemicals which may be toxic.
b) topsoil taken from the site before mining.
c) fresh water from nearby dams.
d) runoff water containing sediments.

Question 6. Choose the most suitable title for the text from the list below. Write the correct letter, A, B, C or D, in box 6 on your answer sheet.

a) Pollution control in coal mining
b) The greenhouse effect
c) The coal industry and the environment
d) Sustainable population growth

Speaking Practice Test: The Environment

Part 1 – sample questions

a) What is the climate like in your country?
b) Are there any problems with the climate in your country?
c) What is your favorite type of weather?
d) What kind of weather do you dislike?
e) Would you prefer to live in a hot or cold country?
f) What is the best/worst weather for travelling in?

Part 2 – sample task card

Describe an environmental problem. You should say:

a) what it is
b) how long it has existed
c) how it affects people's live sand explain how you think the problem will develop in the future.

Part 3 – sample questions

1) Which environmental problems are people most concerned about in your country?
2) What are the main causes of these environmental problems?
3) Do you think it is the responsibility of governments alone to protect the environment?
4) What measures can individuals take to protect the environment?
5) Do you think large companies and business organizations should be more environmentally friendly? Why? How?
6) How can we teach children about the importance of protecting the environment?

Useful Vocabulary: Environmental Problems

a) destruction of the rainforests (deforestation)
b) мelt ingoftheicecaps
c) extinction of many species (loss of biodiversity)
d) destruction of the ozone layer
e) global warming / the "greenhouse effect"
f) rising sea levels
g) pollution of land, sea and air
h) increase of natural disasters eg, earthquakes, landslides, floods

Causes of Environmental Problems

a) excessive emissions of greenhouse gases, e.g. carbon dioxide
b) chemical and industrial waste
c) emissions from cars and planes
d) improper dumping of household waste
e) overuse of non-renewable fossil fuels
f) genetic modification
g) over-consumption
h) over-urbanization

Solutions to Environmental Problems

a) recycling
b) using renewable sources of energy, eg solar heating, wind-farms
c) replanting trees
d) cutting carbonemissions
e) cleaner waste disposal
f) sustainable consumption and development
g) buying products with less packaging
h) buying organic products
i) buying products made from recycled material / renewable sources
j) using natural remedies as alternative medicine

Useful Linking Expressions. Explaining causes

a) caused by
b) due to
c) because of
d) a result of

Explaining effects

a) leads to
b) resultsin
c) causes

Sample Answer

Which environmental problems are people most concerned about in your country?

I think people in my country are most concerned about future shortages of fresh drinking water, which I suppose is both *a result of* poor water management and general global warming. I think everyone is feeling the effects of the latter problem which is *causing* us to experience more extreme temperatures, for example, much colder winters and much hotter summers. The long hot summers are

particularly worrying in the south of the country where there is a real risk of drought *due to* the consistent lack of rainfall.

Unit 3. Electricity and Alternative Energy Sources

Text 1. Petroleum Alternatives

Target Words

1. constraint
2. contamination
3. deplete
4. dispose of
5. elementally
6. emission
7. extinction
8. reservoir
9. shrink
10. stable

Definitions and Samples

1. *constraint n.* Something that restricts thought or action

The *constraints* of military life kept Eileen from seeing Private Morris more than once a month.

Parts of speech constrain *v*

2. *contamination* . Being made less clean by a germ or hazardous substance

The *contamination* in the river came from the factory located just upstream.

Parts of speech contaminate *v,* contaminant *n*

3. *deplete v.* To greatly decrease the supply of a resource or material

The prolonged war *depleted* the country's national treasury.

Parts of speech depletion *n*

4.*dispose* of *v.* To throw away; to get rid of; to kill

She *disposed of* her unwanted possessions before moving.

The tyrant cruelly disposed of all his enemies.

Usage tips Dispose of should be learned as a unit. In this meaning, *dispose* does not occur without *of.*

Parts of speech disposal *n,* disposable *adj*

5. *elemental lyad* . In terms of elements; basically

Elementally, coal and diamonds are the same.

Parts of speech element *n,* elemental *adj*

6. *emission n.* Sending out from a small space into the general environment; a substance discharged into the air

The Environmental Protection Agency regulates the *emission* of pollutants into the air.

Usage tips Emission is usually followed by an *of* phrase.

Parts of speech emit *v*

7. *extinction.* Complete disappearance; the end of existence

Human beings have caused the *extinction* of many other species.

Usage tips Extinction implies an absolute end; an extinct thing cannot be brought back into existence.

Parts of speech extinct *adj*

8. *reservoir n.* A place where a liquid is collected and stored

Cult members threatened to poison the town's water *reservoir*.

Parts of speech reserve *v*

9. *shrink.* To become reduced in size, amount, or value

If you dry your clothing on the "high heat" setting, they may *shrink.*

Parts of speech shrinkage *n*, shrinkable *adj*

10. *stable adj*. Firm and dependable; showing little change

He fell because the ladder wasn't *stable.*

Parts of speech stability *n,* stably *adv*

TOEFL Prep I Find the word that is closest in meaning to the opposite of each word in the left-hand column. Write the letter in the blank.

1. stable	a) keep
2. contamination	b) expand
3. extinct	c) unsteady
4. dispose of	d) existing
5. shrink	e) purity

Circle the word that best completes each sentence.

1. The (constraints / contamination) of being in prison made her hate society even more.

2. A recognition that the Earth is round was one of the (elemental /shrunken) advances in thought during the time period.

3. Mother Teresa, who helped the poorest of the poor, had a great(disposal / reservoir) of love within her spirit.

4. Automobiles are responsible for some (emissions / extinction) of greenhouse
gases.

5. By the end of the storm, the hikers had (depleted / reserved) even their emergency stores.

Read the passage to review the vocabulary you have learned. Answer the question that follows.

Human consumption of fossil fuels is expected to fully *deplete* the Earth's crude oil reserves by the year 2060.Asunderground *reservoirs* of oil continue to *shrink;*we have no choice but to find alternatives. *One promising source,* with much cleaner *emissions,* is called bio-diesel. Bio-*Petroleum Alternatives* 19diesel is often made from soybean oil, although it can be made from any vegetable oil that is not *elementally* different from soy. Bio-diesel can even be made from used cooking oils that homes or restaurants would otherwise *dispose of.* Bio-diesel can be used without *constraint* in any vehicle that runs on diesel—no modifications are needed. Presently, diesel engines can take up to 20 percent soy in their soy-diesel blend. As

the need for bio-diesel increases and the technology improves, we may soon witness the *extinction* of the fossil-fueled vehicle. This is good news for the planet, as bio-diesel is a more *stable* source of energy than petroleum, and introduces *contamination* of our air and water.

An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the three answer choices that express the most important ideas in the passage. In each blank, write the letter of one of your choices.

Bio-diesel is a promising alternative to fossil fuels
•
•
•

a) Humans have shown little self-restraint in their consumption of fossil fuels.
b) Underground reservoirs of oil will soon be depleted.
c) Bio-diesel burns cleaner than fossil fuels.
d) Bio-diesel comes from a more stable source than petroleum.
e) Restaurants can save disposal fees on used cooking oil.

Text 2. Energy

Target Words

1. combustion
2. component
3. convey
4. discretely
5. nucleus
6. permeate
7. rotate
8. solar
9. source
10. Trigger

Definitions and Samples

1. combustion *n.* The process of burning
When air quality is poor, *combustion* of materials in a fireplace is prohibited.
Usage tips Combustion is often followed by *of.*
Parts of speech combust *v,* combustible *adj*
2.*component n.* One part of a system or whole
Their home theater system has a number of separate *components.*
Usage tips Component is often followed or preceded by *of.*
3. *convey* . To transport from one place to another; to transmit or make known
A messenger *conveyed* the prince's letter to the commander of the army.
The worst part about being a doctor was when she had to *convey* bad news to a family.
Parts of speech conveyance *n,* conveyor *n*
4. *discretely adv.* Separately; distinctly

In order to understand how the engine worked, each component needed to be studied *discretely.*

Parts of speech discrete *adj*

5. *nucleus n.* A central or essential part around which other parts are gathered; a core

The *nucleus* of many European cities is the town square.

Usage tips Nucleus is often followed by *of.*

Parts of speech nuclear *adj*

6. *permeate* . To spread or flow throughout; to pass through or penetrate

The smell of cooking *permeated* the entire apartment building.

Parts of speech permeation *n*

7. *rotate v.* To turn around; to take turns in sequence

The planet *rotates* on its axis once every 14 Earth days.

The children *rotate* classroom responsibilities on a weekly basis.

Parts of speech rotation *n*

8. solar *adj.* Of, or relating to, the sun

The ancient society kept time with a *solar* calendar.

9. *source.* The point of origin or creation

The reporter was unable to identify the *source* of the information for his story.

Parts of speech source *v*

10. *trigger* . To set off or initiate

I was certain any mention of politics would *trigger* a big argument.

Parts of speech trigger *n*

Complete each sentence by filling in the blank with the best word from the list. Change the form of the word if necessary. Use each word only once.

combustion	convey	permeate	source	trigger

1. It is often difficult to _____ the meaning of a poem to a large audience.
2. The _____ of the gossip was someone inside this office.
3. Her bad mood that day _____ the atmosphere in the laboratory.
4. The internal _____ engine revolutionized the way automobiles run.
5. A cigarette _____ the explosion.

Find the word or phrase that is closest in meaning to each word in the left-hand column. Write the letter in the blank.

1. rotate	a) separately, as an individual part
2. solar	b) spin on an axis
3. component	c) sun
4. discretely	d) center
5. nucleus	e) part

Read the passage to review the vocabulary you have learned. Answer the questions that follow.

Most of the electricity in the United States is produced in steam turbines. There are many *discrete* steps in this process. In a steam turbine, *combustion* of coal, petroleum, or natural gas heats water to make steam. The steam *rotates* a shaft that is connected to a generator that produces electricity. Finally, that electricity is converted by a transformer and *conveyed* from the turbine to its place of use. Many *sources* can provide energy to heat the water in a steam turbine. Coal is primary, producing 51percent of the country's electricity. Another common way to heat water for steam turbines is through *nuclear* power. In nuclear fission, atoms of uranium fuel are hit by neutrons, *triggering* a continuous chain of fission that releases heat. In 2001, nuclear power generated 21 percent of the electricity in the United States. *Solar* power produces less than 1 percent of the United States' electricity needs, because it is not regularly available and harnessing it is more expensive than using fossil fuels. Dependence on electricity *permeates* daily life in the United States. Still, few people are aware of the many *components* of electricity production.

1. What does the author say about solar power?
a) It produces more electricity than any other source.
b) It is a relatively small source of energy for heating water in steam turbines.
c) Electricity producers are trying to use it more regularly.
d) Researchers are trying to make it cheaper to use.

2. In the passage, the word transformer probably refers to a
a) truck
b) generator that produces electricity
c) type of turbine
d) device that changes electric currents

Text 3. Nuclear Danger

Answer the questions according to the reading

Our demand for electricity is climbing so fast that over the next decade our generating capacity must increase by a third. Fossil fuels supply nearly three-quarters of this energy. But the smoke expelling coal, gas, and oil-fired plants are also responsible for half of our air pollution. That might be considered as a small price to pay for progress. But there's an alternative, .one that produces no smoke and can actually create more fuel than it consumes. In many regions it's even cheaper than coal-fired electricity: nuclear power. It may directly bring danger of radioactivity to the mind, but if other types of power didn't present equal and even

worse problems, it would make no sense to consider nuclear power at all. But they do.

1) Although 3/4 of the electricity is generated from fossil fuels, ____.
a) we should consider the potential dangers of nuclear power
b) everything has got an expense; and nuclear power's is its radioactivity
c) it may contribute to global warming, the greenhouse effect
d) half of the air pollution is caused by the plants using them
e) coal also contains a surprising amount of radioactive material
2)It's claimed in the passage that nuclear power ____.
a) supplies three-quarters of the country's energy demand
b) is less dangerous and cheaper than other types of power
c) is a potential danger because it's radioactive
d) will present us a more polluted environment
e) is more expensive to generate, but not a pollutant
3) In the passage, the writer is worried that in the future ____.
a) fossil based plants might bring bigger problems than nuclear energy
b) there's not a better alternative than fossil fuels
c) nuclear waste might be more dangerous than air pollution
d) they will have to build nuclear power stations one day
e) there will always be possible dangers of nuclear power

Text 4. Wind Power

The power of the wind has been used for centuries to directly drive various machines to perform such tasks as grinding wheat or pumping water. Recently, however, the wind has joined other natural forces such as water and steam as a viable method of generating electricity.

Traditional means of electricity generation using coal or oil-fueled plants have two major drawbacks; they pollute the environment and the fuels they use are inefficient and non-renewable. In response to growing environmental awareness there have been calls for a greener alternative. Nuclear power, while more efficient and less polluting is seen by many people as unacceptable, because of the danger of accidents such as those that happened at Chernobyl or Three Mile Island. Wind power, however, is clean, renewable and, with modern advances, surprisingly efficient.

In the 1970s Britain was in the forefront of research into wind power. The interest in wind diminished in the 1980s due to cheap North Sea oil, a strong pro-nuclear lobby and pricing structures that made it uneconomical to set up wind farms. Britain, the windiest country in Europe, had to wait until 1991 for its first wind farm. Located at Delabole in Cornwall, the farm was originally the idea of locals who opposed the construction of a nuclear power plant nearby and decided to set up a private company to generate power for the area using the wind. They had to fight opposition from local government and other local residents, who thought the

turbines, would be noisy and might interfere with television signals, but eventually, after showing local officials working wind farms in Denmark, they won and now there are 10 huge white wind turbines on the Delabole hills.

It is in Germany and Denmark that the greatest advances in wind power have come. Germany alone produces half of the wind generated electricity in Europe. Every year Germany adds 400 Megawatts (Mw) of capacity. In 2000 alone capacity expanded by 1669 Mw. Denmark now produces 30% of its electricity from wind power and this is predicted to rise to 50% by 2010. Both countries have encouraged this growth by "fixed feed tariffs" which guarantee a good price for private wind power operators.

The UK is catching up and the government has set a target 10% of all electricity to come from renewable sources by 2010, half of this to be from wind power. The 900 wind turbines in operation generate 400Mw of electricity and to meet the target roughly 400Mw will need to be added each year. With the advances in technology this is technically possible. Each turbine can now produce 400 Kilowatts (KW) compared to only 70 KW at the start of the 1980s. It will, however, need help from the government. This is being done by offering financial support and giving private power companies targets to meet.

Because many people feel wind farms spoil the view and, also, because the wind is stronger at sea, many wind farms are now being built offshore. They are usually built a few kilometers off the coast in shallow water. The construction and maintenance costs are higher, but electricity output is higher. The first in Britain was built in 2000 at Blyth, north of Newcastle, and was the largest in the world until May 2001, when a 20 turbine farm was opened at Middel gruden off Copenhagen. There are plans to construct up to 18 more in the UK by 2010. Together they will produce 800 Mw of electricity annually.

The use of wind power is far less advanced in the USA. Only 0.5% of America's power comes from the wind, although it is estimated that this could be increased to as high as 12% with no changes to the power grid. However, there is an increased interest in wind power. There are plans to build a huge offshore wind farm off the coast of Cape Cod on the North East seaboard. The farm will take up over 25 square miles, have 170 turbines and produce 420Mw at a cost of $600m. If constructed, it will be the world's second biggest wind farm, after the 520Mw farm planned in Ireland.

Questions 1 – 2. Choose the best answer to the questions below.

1) People do not like coal and oil powered power production because …

a)it damages the environment.

b) it is wasteful...

c) eventually it will run out.

d) all of the above.

2) Wind power …

a) has only been used recently.

b) promotes environmental awareness.

c) cleans the environment.
d) is not wasteful.

IELTS Reading: Questions 3 – 7

Complete the following summary of the third paragraph from the IELTS sample reading using one or two words from the reading texts.

British Wind Power

While there was a great deal of interest in wind power in the 1970s, it ____ (3) in the 1980s. This was mainly due to intense support for ____(4) power and little help in making wind power affordable. So, even though Britain has some of the best winds in Europe, the first wind farm was only built in 1991. The farm at Delabole came out of opposition by ____ (5) to a nuclear power plant. Initially, they were opposed by local officials due to fears about noise and possible obstruction to ____(6). This opposition was eventually overcome only after they were shown successful examples from ____ (7).

Questions 8 – 13. Match the country or countries below to the statements taken from the IELTS sample reading.

BR_____ Britain
G_____ Germany
D_____ Denmark
US_____ The United States
IRE_____ Ireland
N_____ None of the countries

8) Plans to produce 5% of its power using wind power.
9) Produces 50% of its power from wind.
10) Produces very little of its power using wind.
11) Will have the world's largest wind farm.
12) Has ambitious plans in developing its wind power capacity.
13) Was the leader in the early development of wind power.

Text 5. Electric light bulb

Edison did not invent the first electric light bulb, but instead invented the first commercially practical incandescent light. Many earlier inventors had previously devised incandescent lamps, including Alessandro Volta's demonstration of a glowing wire in 1800 and inventions by Henry Woodward and Mathew Evans. Others who developed early and commercially impractical incandescent electric lamps included Humphry Davy, James Bowman Lindsay, Moses G. Farmer, William E. Sawyer, Joseph Swan and Heinrich Gobel. Some of these early bulbs

had such flaws as an extremely short life, high expense to produce, and high electric current drawn, making them difficult to apply on a large scale commercially.

After many experiments, first with carbon filaments in the early 1880s and then with platinum and other metals, in the end Edison returned to a carbon filament. The first successful test was on October 22, 1879; it lasted 13.5 hours. Edison continued to improve this design and by November 4, 1879, filed for U.S. patent 223,898 (granted on January 27, 1880) for an electric lamp using "a carbon filament or strip coiled and connected to platinum contact wires".

Although the patent described several ways of creating the carbon filament including "cotton and linen thread, wood splints, papers coiled in various ways", it was not until several months after the patent was granted that Edison and his team discovered a carbonized bamboo filament that could last over 1,200 hours. The idea of using this particular raw material originated from Edison's recalling his examination of a few threads from a bamboo fishing pole while relaxing on the shore of Battle Lake in the present-day state of Wyoming, where he and other members of a scientific team had traveled so that they could clearly observe a total eclipse of the sun on July 29, 1878, from the Continental Divide.

Which TWO of the following statements are correct?

a) Edison's electric light bulb was the most successful light bulb.

b) Light bulbs invented by many previous inventors took too much money to produce, and therefore could not be sold widely.

c) Edison failed to generate electric light using platinum and other kinds of metal.

d) Edison and his colleagues received U.S patent for the invention of electric light bulb with carbonized bamboo filament.

e) Edison and some colleagues were looking for a material to produce a filament that can last for an extremely long time when they came to Battle Lake.

Unit 4. Means of communications

1)Answer these questions and then talk about your answers in class.

Do you have a mobile phone?

Did you have a mobile phone five / 10 / 15 years ago?

Do you know anyone between the ages of 18 and 60 who does not have a mobile phone?

How many mobile phones are there in your home?

2)Write the words from the article into the gaps. The paragraph numbers will help you choose the right words.

novelties	tariff	boom	culminating	masts
projected	customize	potential	iconic	subsidizing

1)_____ are tall metal structures used for broadcasting radio and television, and telephone signals. (para 3)

2) the possibility to develop or achieve something in the future _____ (para 3)

3) calculated how big or successful something would become in the future using information that was available at the time _____ (para 4)

4)A _____ is a sudden increase in the popularity of something. (para 6)

5) paying some of the cost of goods or services so that they can be sold to other people at a lower price _____(para 7)

6) the prices charged for supplying gas or electricity or for providing a telephone service _____ (para 7)

7) new and unusual things _____ (para 9)

8) very famous and well known, and believed to represent a particular idea _____ (para 11)

9) to change the way something looks or works so that it is exactly what you want or need _____ (para 11)

10) happening or existing as the final result of a process or situation _____ (para 12)

Text 1. Mobile phones have transformed the way we communicate

In just 25 years, the mobile phone has transformed the way we communicate

On New Year's Day, 1985, Michael Harrison phoned his father, Sir Ernest, to wish him a happy new year. Sir Ernest was chairman of Racal Electronics, the owner of Vodafone, and his son was making the first-ever mobile phone call in the UK.

Later that morning, comedian Ernie Wise made a very public mobile phone call from St Katherine's Dock, east London, to announce that Vodafone was now open for business. A few days later, its only rival, Cell net, a joint venture between BT and Securicor, was in business.

At the time, mobile phones weighed almost a kilogram, cost several thousand pounds and, in some cases, provided only 20 minutes talk time. The networks themselves were small; Vodafone had just a dozen masts covering London and the area west of London, while Cell net started with a single mast, stuck on the BT Tower. Neither company had any idea of the huge potential of wireless communication and the dramatic impact that mobile phones would have over the next quarter century.

"We projected there would only be about a million ever sold and we would get about 35% of the market and BT projected there would be about half a million and they would get about 80% of the market," remembers Sir Christopher Gent, former Vodafone chief executive who was at St Katherine's Dock a quarter of a century ago. "In the first year, we sold about 15,000 to 20,000 phones. The

portable Motorola was about £3,000 but most of the phones we sold were car phones from companies such as Panasonic and Nokia."

Hardly anyone believed there would come a day when mobile phones were so popular that there would be more phones in the UK than there are people. But in 1999 one mobile phone was sold in the UK every four seconds, and by 2004 there were more mobile phones in the UK than people. The boom was a result of increased competition – which pushed prices lower and created innovations in the way that mobiles were sold, which helped put them within the reach of the mass market – and the move to digital technology.

In 1986 BT did something which was to change the way that mobile phones were sold in the UK. "We started subsidizing handsets and bringing down the price of phones," Sir Christopher recalls. Ever since then, the mobile phone networks have subsidized the price of a phone, hoping to recover the costs over the lifetime of a customer's contract. Cell net also changed its prices, reducing its monthly charge and relying instead on actual call charges. It also introduced local call tariffs.

But there was still a basic block to mobile phones going mass market: not enough capacity. "But when digital came along, that really opened up the market," said Sir Christopher.

When the government introduced more competition, companies started cutting prices to attract more customers. The campaign, "The future's bright, the future's Orange", created by Wolff Olins, and the introduction of such novelties as per second and itemized billing helped give Orange a strong position in the market. In 1999, Virgin Mobile had a big success with the new idea of pre-pay phones.

The way that handsets themselves were marketed was also changing and it was Finland's Nokia who made the leap from phones as technology to phones as fashion items with the Nokia 3210 device.

The Nokia 3210 is iconic because it is the first phone that deliberately did not display any sort of external aerial. In the late 1990s Nokia realized that the mobile phone was a fashion item: so it offered interchangeable covers which allowed you to customize and personalize your handset.

The mobile phone industry has spent the later part of the past decade trying to persuade people to do more with their phones than just call and text, culminating in the fight between the iPhone and a succession of touch screen rivals – including Google's Nexus One.

John Cunliffe, chief technology officer at Ericsson in north-west Europe, believes the next wave of growth for mobile telephony will come not from persuading more people to get a phone – because many already have one – but connecting machines to wireless networks. Everything from company vehicles and smart electric and water meters to people's fridge freezers will one day be able to communicate.

“At the moment there are 4.5 billion handsets worldwide. At Ericsson we believe there will be 50 billion by 2020,” reckons Cunliffe. “This is all about machine-to-machine communication, touching all aspects of our lives.”

3) Comprehension: Find the information. Are these statements true (T) or false (F) according to the article? Correct any false statements.

1. Vodafone and Cell net were the first two mobile phone providers in the UK.

2. In 1985, car phones cost £3,000.

3. There are now more mobile phones than people in the UK.

4. Digital technology and increased competition allowed the mobile phone to become available to everyone. 5. Interchangeable covers and itemized billing made Nokia’s 3210 handset a fashion item.

6. Providers Orange and Virgin introduced itemized billing and pre-pay phones.

7. According to the chief technology officer at Ericsson we will no longer want to buy mobile phones in the future.

8. Touch screen phones are no longer being produced.

9. The future of the mobile phone lies in machine to machine communication.

4) Discussion

Compare the mobile phone you have now to the very first one you had.

What additional features does your current phone have?

How has the design changed?

What else is different?

What do you think mobile phones will be able to do in the future?

Text 2. Radar

A pilot cannot fly a plane by sight alone. In many conditions, such as flying at night and landing in dense fog, a pilot must use radar, an alternative way of navigating. Because human eyes are not very good at determining speeds of approaching objects, radar can show a pilot how fast nearby planes are moving. The basic principle of radar is exemplified by what happens when one shouts in a cave. The echo of the sounds against the walls helps a person determine the size of the cave. With radar, however, the waves are radio waves instead of sound waves. Radio waves travel at the speed of light, about 300,000 kilometers in one second. A radar set sends out a short burst of radio waves. Then it receives the echoes produced when the waves bounce off objects. By determining the time it takes for the echoes to return to the radar set, a trained technician can determine the distance between the radar set and other objects. The word "radar," in fact, gets its name from the term "radio detection and ranging." "Ranging" is the term for detection of the distance between an object and the radar set. Besides being of critical

importance to pilots, radar is essential for air traffic control, tracking ships at sea, and for tracking weather systems and storms.

1) What is the main topic of this passage?
a) The nature of radar
b) Types of ranging
c) Alternatives to radar
d) History of radar
2)In line 1, the word "dense" could be replaced by:
a) Cold
b) Wet
c) Dark
d) Thick
3)According to the passage, what can radar detect besides location of objects?
a) Size
b) Weight
c) Speed
d) Shape
4)The word "shouts" in line 4 is most similar in meaning to which of the following?
Eavesdrops
(B) Yells
(C) Confesses
(D) Whispers
5)Which of the following words best describes the tone of this passage? a) Argumentative
b) Imaginative
c) Explanatory
d) Humorous
6) The phrase "a short burst" in line 7 is closest in meaning in which of the following?
a) An attachment
b) A discharge
c) A stream
d) A ray
7) The word "it" in line 8 refers to which of the following?
a) A radar set
b) A short burst
c) A radio wave
d) Light
8) Which of the following could best replace the word "bounce" in line 8?
a) Overturn
b) Groove

c) Extend
d) Rebound
9) Which type of waves does radar use?
a) Sound
b) Heat
c) Radio
d) Ocean
10) The word "tracking" in line 14 is closest in meaning to which of the following?
a) Repairing
b) Searching for
c) Glancing at
d) Fighting
11)Which of the following would most likely be the topic of the next paragraph?
a) Other uses of radar
b) Uses of sonar technology
c) Other technology used by pilots
d) A history of flying
12)What might be inferred about radar?
a) It takes the place of a radio.
b) I gave birth to invention of the airplane.
c) It developed from a study of sound waves.
d) It has improved navigational safety.

Unit 5. Computers

Text 1. Computers

Target Words

1. circulate	6. Implement
2. corrode	7. Innovative
3. derive	8. Installation
4. detection	9. Maintenance
5. expeditiously	10. Simulation

Definitions and Samples
1)circulate v. To move throughout an area or group; to move along a somewhat circular route
The gossip *circulated* quickly through the small town.
Blood *circulates* more quickly during physical exercise.
Usage tips Circulate is often followed by *through.*
Parts of speech circulation *n*
2)corrode . To be slowly weakened by chemical reactions

Sitting in salt water, the old coins *corroded* and became very easy to break.

Usage tips A familiar kind of corrosion produces rust, the reddish coating on iron or steel that has been exposed to air and water.

Parts of speech corrosion *n*

3)derive v. To come from, usually through a long, slow process

The Cyrillic alphabet was *derived* from the Greek alphabet.

Usage tips Derive is often followed by *from.*

Parts of speech derivation *n,* derivative *adj*

4) detection . Discovering something that cannot easily be found

With new medical technology, the *detection* of cancer is much easier nowadays.

Usage tips Detection is often followed by an *of* phrase.

Parts of speech detect *v,* detectable *adj*

5) expeditious lyad. Quickly and efficiently

Using carrier pigeons, the military commanders exchanged messages *expeditiously.*

Parts of speech expedite *v,* expedition *n,* expeditious *adj*

6)implement. To make use of; to carry out

Not until after the new software was installed could we *implement* the new filing system.

Parts of speech implement *n,* implementation *n*

7)innovative adj. Ahead of the times; novel

The *innovative* use of props and lighting drew many favorable comments.

Parts of speech innovation *n*

8)installation. Setting something into position for use

Installation of the new software takes only four minutes.

Parts of speech install *v*

9)maintenance . The act of keeping something in good condition

The only problem with living in such a big house is that it requires a lot of *maintenance***.**

Parts of speech maintain *v*

10)*simulation.* An imitation or representation

To test car safety, automobile makers study crash *simulations.*

Parts of speech simulate *v,* simulator *n*

Circle the most likely meaning of the word part that is shared within each set of words.

1) circulate, circumnavigate, circuit

The root *circs / circum* probably means

a. around

b. broken

c. fair

d. straight

2) innovative, novel, renovate

The root *no* probably means

a. clear
b. old
c. new
d. sweet

3) installation, implement, imprison

The prefix *in-/* probably means

a. aside
b. behind
c. in
d. out

Circle the word that best completes each sentence.

1) Please make sure this information (circulates / derives) throughout the office quickly.

2) The (installation / simulation) of the new telephones took three days.

3) In order to stay on schedule, we need to complete this project as(expeditiously / innovatively) as possible.

4) The smuggler moved cautiously through the airport to avoid(detection / maintenance).

5) Years of neglect had caused the building's water pipes to (corrode /implement).

Read the passage to review the vocabulary you have learned. Answer the questions that follow.

As dependence on computers increases, so does the need for technical support. From *installation* of software to *detection* of viruses, computers require constant vigilance. Larger companies find it most *expeditious* to maintain in-house computer staff. Many smaller companies, however, can't fund their own full-time, in-house technical help. Instead, many of them assign the task of computer *maintenance* to a current employee who may not have any formal training. Rather, these "computer buffs" have *derived* their skills through practice and self-training. These self-appointed tech specialists, however, often cannot solve bigger problems. What's more, they may see their office relations *corrode* when they are swamped with basic user questions that they simply don't have time to address. For these reasons, many small companies choose to employ a freelance technical assistant who *circulates* among clients on an as-needed basis. With their professional training, these consultants may propose *innovative* solutions to users' unique needs, which could vary from tracking inventory to *simulating* mechanized processes. They can *implement* new programs, train personnel, and escape the work place before being asked, How can I cut this file and paste it somewhere else?"

1) Which sentence best expresses the essential information of this passage?

a) Larger companies are better off using freelance technical consultants.

b) Computer maintenance and troubleshooting cuts into employee productivity.

c) Self-trained technical support personnel are often as effective as trained professionals.

d) Smaller companies may benefit from hiring occasional technical support.

2) The article implies that the question How do I cut and paste a file?

a) too basic to require professional attention

b) a good question to give to in-house tech support

c) appropriate for a freelancer to address

d) a good topic for a training program

Text 2. Robots with a sense of self

At Yale University, scientists have created a humanoid robot named Nico. When Nico sits in front of a mirror and raises an arm, he recognizes the arm moving in the mirror as his own. It may not sound like much of a feat, but he has just become the first of his kind to recognize his own reflection in a mirror.

The ability to recognize your reflection is considered an important milestone in infant development and as a mark of self-awareness, sociability and intelligence in a non-human animal. Nico's ability to perform the same feat could pave the way for more sophisticated robots that can recognize their own bodies even if they are damaged or reconfigured.

The achievement is one of a cluster of recent instances in which robots have begun to approach the major milestones in cognitive development. If robots can be taught to move from one developmental stage to the next, as infants do, they may eventually be capable of learning more complicated tasks and therefore become more useful to humans. 'It's less about recreating a human than making a human compatible being,' says Matt Berlin, a robotics researcher at Massachusetts Institute of Technology.

To give Nico the ability to recognize himself, Kevin Gold and his supervisor Brian Scassellati equipped Nico with a video camera behind one of his eyes. They also gave him a jointed arm with an attached computer running some clever software. When Nico points his camera eye at the mirror, the software assigns sections of the image a probability of being 'self ', 'another' or 'neither'. At the same time, motion sensors in Nico's arm tell the software when he is moving. Whenever a section of the image changes at the same time as his motion sensors detect movement in the arm, he assigns that section a high probability of being 'self'. If a section of the image shifts and Nico detects no movement in his arm, he assigns that image section a high probability of being 'another', while static sections are likely to be 'neither'. This allows him to recognize not only his own moving limbs, but those of other robots or people.

To test the self-recognition software, Gold programmed Nico to move his arm for four minutes while filming it with his camera, allowing him to learn when movement of his arm, detected by his arm sensors, corresponded to motion of the

arm in the video. Nico was then positioned so that could see both his own reflection in a mirror and Gold standing beside it. Gold carried out a range of different tasks, including juggling balls, while Nico moved his arm around. Nico's software was able to correctly classify the movements corresponding to his own reflection and those of Gold 95% of the time.

The same system should also make it possible for robots to recognize their own limbs even if they are damaged, or wearing different clothes by correlating movement detected by on-board cameras with those reported by sensors on their limbs, says Gold. This should help them carryout tasks such as manipulating objects or let them adapt the way they walk to a changing terrain, when conventional vision software can be fooled by changes in appearance or environment.

The ability to tell self from other should also allow robots to carry out more sophisticated tasks, says Olaf Sporn , a cognitive scientist and roboticist at Indiana University in Bloomington. For instance, researchers are investigating imitation as a way of helping robots learn how to carry out tasks. To successfully and safely imitate someone, though, robots will need to distinguish between their own limbs and those of another person, as Nico can.

'The distinction between self and other is a fundamental problem for humanoid robotics,' says Sporns.

Meanwhile, a furry robot called Leonardo, built at MIT recently, reached another developmental milestone, the ability to grasp that someone else might believe something you know to be untrue. You can test the capacity for 'false belief' in children by showing them a scene in which a child puts chocolate in a drawer and goes away. While he is out of sight, his mother moves the chocolate somewhere else. Young children are incapable of seeing the world through the other child's eyes, and so predict that he will look for the chocolate in the place his mother has left it. Only when they reach four or five can they predict that the other child will mistakenly look for the chocolate in the drawer.

Leonardo, developed by Cynthia Breazeal together with Berlin and colleague Jesse Gray,uses face, image and voice recognition software running on an array of attached computers to build a 'brain' for himself –basically a list of objects around him in the room and events that has witnessed. Whenever he spots a new face, he builds and stores another 'brain' which processes information in the same way as his own but sees the world from the new person's point of view.

When faced with the false-belief test, Leonardo knows that the object has been moved and also that a person who left the room before this would not know this. It is more than just a cute trick, however. Gray found that the ability to model other people's beliefs allows Leonardo to gain a better understanding of their goals.

As well as helping to build better robots, such research could ultimately enhance our understanding of cognitive development in infants. Developmental milestones such as self-recognition and modelling other people's beliefs are believed to be associated with the development of other important capabilities, such as empathy and sociability. By performing feats associated with these milestones, such robots could help researchers understand what capabilities infants need to

reach them, says Sporns. ‘It shows us that complex phenomena can sometimes be explained on the basis of simple mechanisms.’

Look at the following people (Questions 1–4) and the list of statements below. Match each person with the correct statement, A–E.

1) Matt Berlin
2)Kevin Gold
3)Olaf Sporns
4)Jesse Gray

a) suggests that robots cannot yet discriminate between themselves and others
b) thinks that research using robots can help us understand the skills young children need to develop
c) wants robots to be able to respond to varying conditions
d)is working on a number of different versions of a robot
e)is not trying to make a human being but a machine to help humans

Questions 5–9.Complete the sentences below. Choose no more than two words from the passage for each answer.

5) Nico has reached a significant developmental stage by identifying a ____ as his own.
6) Nico classifies what he sees as being ‘ ____’ if he detects no movement on the image or his sensors.
7)Researchers are developing robots that can recognize broken ____ belonging to them.
8) Researchers investigate ____ among youngsters using chocolate.
9) Robotic research can help us learn about children’s ____.

Text 3. Microsoft

Choose the sentences which best fit the gaps.

1 _____

Bill Gates, the head of Microsoft, the creator of Basic, MSDOS, Windows and Flight Simulator, is the richest man in America. If you lived to be 70, you would have to make $100 million dollars every year of your life in order to come up with what Gates is currently worth. 2 _____ Gates himself draws a salary around $300,000, about a tenth of that claimed by America's best-paid company heads.

He is a one-man band: he works 15-hour days and loses his temper easily. He is addicted to competition, and to winning. He enjoys poker and fast cars.

3_____

4 _____ By the time he was 16, he had already set up a company, and was making money from computing. Math was his strong subject, important

because it shares with programming the same ways of thinking. Gates was paid to debug the local mainframe, and he also offered a data-processing service to local authorities.

When the first PC appeared on the cover of Popular Computer in January 1975, Gates, then 19, phoned the manufacturer. He claimed he had a version of Basic for the 8080 microprocessor and was ready to do business. Working night and day, Gates and a friend squeezed the language into 4K with enough space left over to run a programme. 5 _____ The coding certainly required a high level of ingenuity.

Things were done so quickly that a bootstrap loader had to be written on the flight to deliver the completed tape. 6 _____ Gates never forgot how his Basic was immediately pirated by computer companies all over the world. He became a very sharp businessman indeed, unwilling to give anyone a free ride.

A typical example of the Gates technique can be demonstrated by his relationship with IBM. IBM split with Microsoft and produced its own version of OS/2 to compete with Windows. 7 _____When OS/2 had to be Windows-compatible to stand a chance of survival; Microsoft released Windows 3.1 and made other changes so that IBM's product was compatible only with last year's model.

8 _____They wear T-shirts and anoraks, eat pizzas and read sci-fi, but they know more than the difference between ROM and RAM, and they shall inherit the earth.

a) It was a task so difficult that many claimed it was impossible.

b) Above all, he is a technical whizkid.

c) It's a hard life competing against the new technicians.

d) By a miracle, the tape worked when it was loaded.

e) IBM is a company whose management was tied to old technology.

f) Of course, that wealth is largely the result of Microsoft' astronomical share price.

g) Gates started early.

h) But Microsoft makes money on every copy of OS/2 that IBM sells.

i) How do you become a billionaire?

Text 4

How important are software design skills to a programmer? Programmers, in the traditional, and perhaps most widespread, view of the software development process, are not themselves seen as designers but rather as people who implement the designs of other people. The job of the programmer, after all, is to write code. Code is viewed as a "construction" activity, and everyone knows you have to complete the design before beginning construction. The real design work is performed by specialized software designers. Designers create the designs and hand them off to programmers, who turn them into code according to the designer’s specifications. In this view, then, the programmer only needs enough design skills

to understand the designs given to him. The programmer's main job is to master the tools of her trade.

This view, of course, only tells one story, since there is great variety among software development projects. Let's consider a spectrum of software development "realities." At one end of the spectrum we have the situation described above. This hand-off based scenario occurs especially on larger, more complex projects, and especially within organizations that have a longstanding traditional software engineering culture. Specialization of function is a key component on these kinds of projects. Analysts specialize in gathering and analyzing requirements, which are handed off to designers who specialize in producing design specifications, which are handed off to programmers who specialize in producing code.

At the opposite end of the spectrum, best represented by the example of Extreme Programming (XP), there are no designers, just programmers; the programmers are responsible for the design of the system. In this situation, there is no room for specialization. According to Pete Mc Breen, in his excellent analysis of the Extreme Programming methodology and phenomenon, Questioning Extreme Programming, "The choice that XP makes is to keep as many as possible of the design-related activities concentrated in one role—the programmer." This reality is also well represented in a less formal sense by the millions of one or two person software development shops in which the same people do just about everything—requirements, design, construction, testing, deployment, documentation, training, and support.

Do the following statements agree with the information given in Reading Passage? From question No 1-5, Mark

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) Designers create the designs and hand them off to programmers, who turn them into code according to the designer's specifications.

2) The Designer's main job is to master the tools of her trade.

3) Programmers specialize in producing code.

4) In Extreme Programming (XP), there are no programmers, just designers; the programmers are responsible for the design of the system.

5) Pete McBreen is both a designer and programmer.

From question 6-10, mark the correct letter A, B, C or D

6) Traditionally, programmers were seen to (be)

a) Real designers

b) Less expert in coding

c) Implement designs of others

7) In Extreme Programming (XP),

a)There are designers and programmers,

b) Programmers are responsible for the design of the system.
c) There are just designers, no programmers
d) Designers have more responsibility
8) The programmer needs enough design skills to
a) Understand the designs given to him.
b) Develop fantastic designs.
c) Enhance their expertise.
d) Develop new applications.
9) Analysts specialize in
a) Fantastic designs.
b) Developing codes
c) Analyzing designs and codes
d) Gathering and analyzing requirements.
10) XP makes is to keep as many as possible of the design-related activities concentrated in the
a) Programmer
b) Designer
c) Analysts
d) Architect

Text 5

Scientists have developed a new bionic computer chip that can be mated with human cells to combat disease. The tiny device, smaller and thinner than a strand of hair, combines a healthy human cell with an electronic circuitry chip. Doctors can control the activity of the cell by controlling the chip with a computer.

It has long been established that cell membranes become permeable when exposed to electrical impulses. Researchers have conducted genetic research for years with a trial and-error process of bombarding cells with electricity in an attempt to introduce foreign substances such as new drug treatments or genetic material. They were unable to apply a particular level of voltage for a particular purpose. With the new invention, the computer sends electrical impulses to the chip, which triggers the cell's membrane pores to open and activate the cell in order to correct diseased tissues. It permits physicians to open a cell's pores with control.

Researchers hope that eventually they will be able to develop more advanced chips whereby they can choose a particular voltage to activate particular tissues, whether they are muscle, bone, brain, or others. They believe that they will be able to implant multiple chips into a person to deal with one problem or more than one problem.

1)The word mated in the first sentence is closest in meaning to
a) avoided.
b) combined.
c) introduced.

d) developed.

2)The word strand in the second sentence is closest in meaning to

a) type.

b) thread.

c) chip.

c) color.

3)The author implies that scientists are excited about the new technology because

a) it is less expensive than current techniques.

b) it allows them to be able to shock cells for the first time.

c) it is more precise than previous techniques.

d) it is possible to kill cancer with a single jolt.

4)The author states that scientists previously were aware that

a) they could control cells with a separate computer.

b) electronic impulses could affect cells.

c) electric charges could harm a person.

d) cells interact with each other through electrical charges.

5)The word bombarding in the second paragraph is closest in meaning to

a) barraging.

b) influencing.

c) receiving.

d) testing.

6)The author implies that up to now, the point of applying electric impulse to cells was to

a) kill them.

b) open their walls to introduce medication.

c) stop growth.

d) combine cells.

7)The word triggers in the second paragraph is closest in meaning to

a) damages.

b) causes.

c) shoots.

c) assists.

8)The word eventually in the third paragraph is closest in meaning to

a) finally.

b) in the future.

c) possibly.

d)especially.

9)The word they in the first sentence of the third paragraph refers to

a) researchers.

b) chips.

c) voltages.

d) tissues.

10)The word particular in the third paragraph is closest in meaning to

a) huge.
b) slight.
c)specific.
d)controlled.
11)The word others in the third paragraph refers to other
a) researchers.
b) chips.
c) voltages.
d) tissues.
12)The author indicates that it is expected doctors will be able to
a) place one large chip in a person to control multiple problems.
b) place more than one chip in a single person.
c) place a chip directly inside a cell.
d) place a chip inside a strand of hair.

Unit 6. Materials

Text 1. Chemical Elements

Elements make up everything in the world. Elements are the basic substances that we cannot divide into simpler substances. We group elements by the things they have in common – what they look like, how they react with other substances, if they conduct electricity, etc. We group elements into nine official groups. The element, "Hydrogen" is in a group by itself. It is different from all the other elements.

Hydrogen is a basic substance. 90% of all atoms in the universe are hydrogen atoms. Hydrogen atoms are the lightest atoms. Hydrogen got its name from the scientist Lavoisier. Lavoisier noticed that hydrogen atoms are always present in water. The word root "*Hydro"* means water. Therefore, it was *intuitive* to represent hydrogen with the letter H.

The second group is the alkaline-earth metals. You can find these elements in the earth's crust. They react with water. This group of elements contains elements such as Calcium. Calcium is a basic substance found in substances like milk and chalk. It is a member of the second group of elements. Some other members of the second group are beryllium and magnesium.

The third group is the alkali metals. These elements react very strongly with water. They might even explode if they touch water. This group of elements contains elements such as Sodium. Sodium is an element found in table salt. Scientists represent sodium with the letters Na. Some other members of the third group are lithium and potassium.

The fourth group of elements includes metals. It is the largest group of elements. It includes iron, silver, gold, nickel, platinum and titanium. Elements in this group conduct electricity. They are hard and shiny. Members of this group are called the transition metals.

The fifth group of elements is the actinides. The elements in this group are radioactive metals. Most of the members of this group are *synthetic* elements. They are non-natural elements. They are made in special labs. Some members of this group are uranium and plutonium.

The sixth group of elements is the lanthanides. Some people call this group the rare–earth elements. Some people call them the inner–transition elements. These metals are silver or silvery–white. They conduct electricity very well. They tarnish when they come into contact with air.

The seventh group consists of the nonmetals. Carbon is a member of this group. Every living thing depends on carbon. Oxygen is also a member of this group. We take in oxygen and ***exhale*** carbon dioxide (which is a combination of carbon and oxygen) when we breathe.

The eighth group consists of the inert gases. They are called *inert* gases because they do not react easily with other substances. Most of these gases are present in lighting. When a current of electricity goes through neon, it glows red. Some other members of this group are argon and xenon. This group is sometimes called Group Zero or Group 0.

The ninth group consists of the poor metals. These metals are different from the metals in the fourth group because these metals are soft. These metals melt easily. They also mix well with other metals to form *alloys*. Both lead and aluminum are poor metals.

The last group consists of the semi–metals. The members of this group are like metals in some ways. They are also like non–metals in some ways. Some semi–metals are arsenic and bismuth. Depending on which other substances touch them, they can be conductors of electricity or they can *insulate*, or protect, substances from electricity. Some scientists call the semi–metals "double metals" because of their structure.

1) What did Lavoisier notice about hydrogen?

a) That it was always in water.
b) That it was the lightest atom.
c) That 90% of all atoms in the universe are hydrogen atoms.
d) That it is a basic substance.
e) All of the above are correct.

2) Where can calcium be found?

a) In milk.
b) In chalk.
c) In the earth's crust.
d) All of the above are correct.
e) Both A and B are correct.

3) What do the third, fourth, fifth, and sixth groups have in common?

a) They all tarnish in the air.
b) They are all present in water.
c) They are all synthetic.

d) They are all metals.
e) They are all inert.
4) Why are uranium and plutonium grouped together?
a) They are found in the earth's crust.
b) They are radioactive.
c) They are metals.
d) Both A and C are correct.
e) Both B and C are correct.
5) Why are lead and aluminum grouped together?
a) They mix with other metals.
b) They are soft metals.
c) They melt easily.
d) All of the above are correct.
e) Both A and C are correct.
6)The best synonym for intuitive is…
a) non-natural.
b) inclined.
c) automatic.
d) simple.
e) passionate.
7) Something synthetic is…
a) non-natural.
b) manmade.
c) artificial.
d) All of the above are correct.
e) Both B and C are correct.
8) When you exhale, you …
a) breathe.
b) take out.
c) consist of.
d) Both A and B are correct.
e) Both B and C are correct.
9) Inert means…
a) non–reactive.
b) radioactive.
c) reactive.
d) shiny.
e) hard.
10) An alloy is…
a) a combination of carbon and oxygen.
b) a mixture of metals.
c) a chemical laboratory.
d) a soft metal.
e) a non–metal.

11) The best synonym for insulate is…

a) melt.

b) protect.

c) conduct.

d) combine.

e) represent

Text 2. Glass fibers

Glass fibers are extremely strong; for their weight, they are stronger than steel. They are made by forcing molten glass through tiny holes called spinnerets. As many as four hundred spinnerets are placed together, and threads of glass much thinner than human hairs are drawn off at great speed-miles of thread per minute. As they speed along, the threads are coated thinly with a type of glue and twisted into a yarn. The glass fibers are used with plastics to make boats and car bodies. They are also woven into heavy cloth for window draperies and into strong belts for making tires stronger.

A special kind of glass fiber is causing a revolution in communications. A signal of light can be made to travel along the fiber for very long distances. By changing the quality of the light, many messages can be sent at once along one strand of glass. New office buildings are being "wired" with glass fibers as they are built. The glass fibers will be used to connect telephones and computers in ways that not long ago were either impossible or too expensive.

Glass wool traps air in a thick, light blanket of fibers. This blanket is then put into walls and ceilings to keep warm air in during the winter and cool air in during the summer.

To make glass wool, molten glass is fed into a spinning drum with many holes in it. As the glass threads stream out of the holes, they are forced downward by a blast of hot air and through a spray of glues. The threads are then further blown about to mix them up as they fall in a thick mat on a moving belt. The glass we see through and drink out of has many, many other uses besides the ones described here.

1) What was the author's main purpose in writing the article?

a) To inform you how special kinds of glass are made and used

b) To persuade you to investigate the many uses of glass beyond those mentioned in the article

c) To inform you about the strength of glass fibers

d) To inform you that glue is used to hold strands of glass together

2) The word special in the second paragraph is closets in meaning to:

a) Distinct among others of a kind

b) Additional

c) Common

d) Species

3) Glass fibers are made by forcing molten glass through:

a) Spinners

b) Spider

c) Spinnerets

d) Spinets

4) The word changing in the second paragraph could best be replaced by the word:

a) Altering

b) Boring

c) Bringing

d) Doing

5) What are glass fibers woven into cloth for?

a) Draperies

b) Cars and boats

c) Glasses

d) Glue

6) The word fed in the fourth paragraph means:

a) To give food to

b) To minister to

c) To support

d) To supply

7) The word they in the second sentence of the first paragraph refers to:

a) Human hair

b) Weight

c) Glass fibers

d) Yarn

8) The word it in the fourth paragraph refers to:

a) Molten glass

b) Glass wool

c) Spinning drum

d) Holes

9) The following sentence would best complete which paragraph? "This improvement in technology is expected to continue."

a) Paragraph 1

b) Paragraph 2

c) Paragraph 3

d) Paragraph 4

10) A signal of what can be made to travel along fiber for very long distances?

a) Heat

b) Wave

c) Wool

d) Light

11) The word spray in the fourth paragraph could best be replaced by the word:

a) Shower
b) Blow
c) Spit
d) Force

Text 3. Bakelite

In 1907, Leo Hendrick Baekeland, a Belgian scientist working in New York, discovered and patented a revolutionary new synthetic material. His invention, which he named 'Bakelite', was of enormous technological importance, and effectively launched the modern plastics industry.

The term 'plastic' comes from the Greek *plass in*, meaning 'to mould'. Some plastics are derived from natural sources, some are semi-synthetic (the result of chemical action on a natural substance), and some are entirely synthetic, that is, chemically engineered from the constituents of coal or oil. Some are 'thermoplastic', which means that, like candlewax, they melt when heated and can then be reshaped. Others are 'thermosetting': like eggs, they cannot revert to their original viscous state, and their shape is thus fixed forever. Bakelite had the distinction of being the first totally synthetic thermosetting plastic.

The history of today's plastics begins with the discovery of a series of semi-synthetic thermoplastic materials in the mid-nineteenth century. The impetus behind the development of these early plastics was generated by a number of factors – immense technological progress in the domain of chemistry, coupled with wider cultural changes, and the pragmatic need to find acceptable substitutes for dwindling supplies of 'luxury' materials such as tortoiseshell and ivory.

Baekeland's interest in plastics began in 1885 when, as a young chemistry student in Belgium, he embarked on research into phenolic resins, the group of sticky substances produced when phenol (carbolic acid) combines with an aldehyde (a volatile fluid similar to alcohol). He soon abandoned the subject, however, only returning to it some years later. By 1905 he was a wealthy New Yorker, having recently made his fortune with the invention of a new photographic paper. While Baekeland had been busily amassing dollars, some advances had been made in the development of plastics. The years 1899 and 1900 had seen the patenting of the first semi-synthetic thermosetting material that could be manufactured on an industrial scale. In purely scientific terms, Baekeland's major contribution to the field is not so much the actual discovery of the material to which he gave his name, but rather the method by which a reaction between phenol and formaldehyde could be controlled, thus making possible its preparation on a commercial basis. On 13 July 1907, Baekeland took out his famous patent describing this preparation, the essential features of which are still in use today.

The original patent outlined a three-stage process, in which phenol and formaldehyde (from wood or coal) were initially combined under vacuum inside a large egg-shaped kettle. The result was a resin known as Novalak, which became soluble and malleable when heated. The resin was allowed to cool in shallow trays until it hardened, and then broken up and ground into powder. Other substances were then introduced: including fillers, such as wood flour, asbestos or cotton, which increase strength and moisture resistance, catalysts (substances to speed up the reaction between two chemicals without joining to either) and hex, a compound of ammonia and formaldehyde which supplied the additional formaldehyde necessary to form a thermosetting resin. This resin was then left to cool and harden, and ground up a second time. The resulting granular powder was raw Bakelite, ready to be made into a vast range of manufactured objects. In the last stage, the heated Bakelite was poured into a hollow mould of the required shape and subjected to extreme heat and pressure; thereby 'setting' its form for life.

The design of Bakelite objects, everything from earrings to television sets, was governed to a large extent by the technical requirements of the moulding process. The object could not be designed so that it was locked into the mould and therefore difficult to extract. A common general rule was that objects should taper towards the deepest part of the mould, and if necessary the product was moulded in separate pieces. Moulds had to be carefully designed so that the molten Bakelite would flow evenly and completely into the mould. Sharp corners proved impractical and were thus avoided, giving rise to the smooth, 'streamlined' style popular in the 1930s. The thickness of the walls of the mould was also crucial: thick walls took longer to cool and harden, a factor which had to be considered by the designer in order to make the most efficient use of machines.

Baekeland's invention, although treated with disdain in its early years, went on to enjoy an unparalleled popularity which lasted throughout the first half of the twentieth century. It became the wonder product of the new world of industrial expansion — 'the material of a thousand uses'. Being both non-porous and heat-resistant, Bakelite kitchen goods were promoted as being germ-free and serializable. Electrical manufacturers seized on its insulating: properties, and consumers everywhere relished its dazzling array of shades, delighted that they were now, at last, no longer restricted to the wood tones and drab browns of the pre-plastic era. It then fell from favors again during the 1950s, and was despised and destroyed in vast quantities. Recently, however, it has been experiencing something of a renaissance, with renewed demand for original Bakelite objects in the collectors' marketplace, and museums, societies and dedicated individuals once again appreciating the style and originality of this innovative material.

Questions 1-3.Complete the summary. Choose one word only from the passage for each answer.

Some plastics behave in a similar way to ____ (1) in that they melt under heat and can be mounded into new forms. Bakelite was unique because it was the first material to be both entirely ____ **(**2) in origin and thermosetting. There were several reasons for the research into plastics in the nineteenth century, among them the great advances that had been made in the field of ____ (3) and the search for alternatives to natural resources like ivory.

Questions 4-8**.** Complete the flow chart. Choose one word from the passage for each answer:

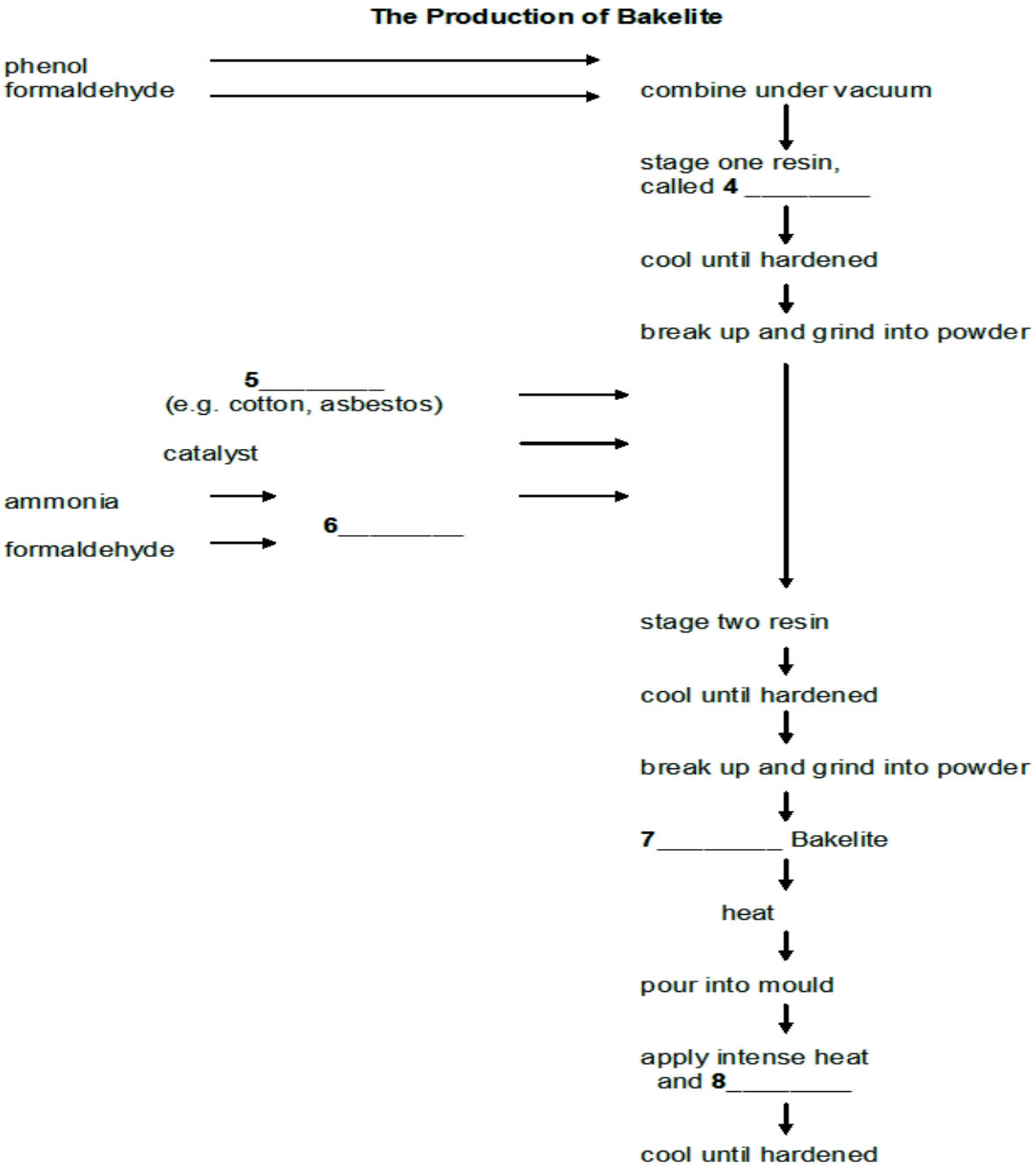

Figure 1.

Questions 9-10. Write your answers in boxes 9 and 10 on your answer sheet.

Which two of the following factors influencing the design of Bakelite objects are mentioned in the text?

a) the function which the object would serve

b)the ease with which the resin could fill the mould

c) the facility with which the object could be removed from mould

d) the limitations of the materials used to manufacture the mould

e) the fashionable styles of the period

*Questions 11-13. Do the following statements agree with the information given in Reading Passage 1?In for questions **11-13**, 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 statement

11) Modern-day plastic preparation is based on the same principles as that patented in 1907.

13) Bakelite was immediately welcomed as a practical and versatile material.

13) Bakelite was only available in a limited range of color.

Answer keys

Unit 1. Education

Exercise 1

1. correspondence course / night class / day release 2. SAT 3. lesson / class (in either order) 4. lecture / subject *or* topic / lecturer / seminar / tutorial / tutor 5. Literacy / Numeracy 6. prospectus / enroll (the British-English spelling is *enrol*) 7. faculty 8. Physical education 9. public school / private school / fees* 10. kindergarten / grade / elementary school / grade school 11. syllabus 12. junior high school / middle school (in either order) / high school 13. semester / quarter 14. graduate / graduate school / higher degree *Note that in the U.K., a public school is a school for children whose parents pay for their education. In the U.S.A., a public school is a free local school controlled and paid for by the government.

Exercise 3

1. skills 2 / 3. literacy / numeracy (in either order) 4. kindergarten / elementary school 5. elementary 6. Secondary 7. discipline 8. pass 9. qualifications 10. acquire 11. physical education 12. graduate 13. higher 14. Degree 15. subject 16. graduate school 17. doctorate 18. night class 19. day release 20. correspondence course 21. mature 22. opportunity

Text 1. The history of the biro

Answers: 1 vii 2ix 3vi 4 iv 5viii 6 iii

7D 8A 9 C 10 leather 11(in) Argentina 12(in) 1945

Text 2. The Birth of Scientific English

1. Latin
2. doctors
3. technical vocabulary
4. grammatical resources
5. Royal Society
6. German
7. industrial revolution
8. Not given
9. False
10. True
11. Popular
12. Principia/Mathematical treatise
13. more local/local audience

Unit 2. Environmental protection

Exercise 1

1. green belt 2. biodegradable packaging 3. greenhouse gases 4. rain forest 5. erosion 6. recycle 7. Organic 8. genetically modified (often shortened to *GM*) 9. unleaded gas 10. Acid rain 11. ecosystem 12. emissions / fossil fuels 13. contaminated (or *polluted*) 14. environmentalists 15. Global warming

Exercise 3

1. fossil fuels 2. acid rain 3. greenhouse gases / CFC gases 4. global warming 5. rainforest 6. Contaminated 7. emissions / gases / fumes 8. poaching 9.

Endangered species 10. ecosystem 11. recycle 12. Biodegradable packaging 13. Genetically modified 14. organic 15. unleaded gas 16. environmentalists 17. Conservation programs 18. battery farming 19. green belts

Text 1. Facts you should know about global warming - Part 1

1A 2C 3D 4D 5A

Text 2. Facts you should know about global warming - Part 2

1C 2D 3D 4B 5C

Text 3. Greenhouse gases

1 D
2 B
3 B
4 A
5 D
6 C

Unit 3

Text 1. Petroleum Alternatives

TOEFL Prep I 1. c 2. e 3. d 4. a 5. b
TOEFL Prep II1. constraint 2. elemental 3. reservoir 4.emission 5. deplete
TOEFL Success a, c, d

Text 2. Energy

TOEFL Prep I 1. convey 2. source 3. permeated
4. combustion 5. triggered
TOEFL Prep II 1. b 2. c 3. e 4. a 5. d
TOEFL Success 1. b 2. D

Text 3. Nuclear Danger

1. D 2. B 3. A

Text 4. Wind Power

1. D
2. D
3. diminished
4. nuclear
5. locals
6. television signals
7. DanishFarm / Denmark
8. BR
9. N
10. US
11. US
12. D
13. B

Text 5. Electric light bulb

A Not Given
B True
C True

D Not Given
E False

Unit 4. Means of communications

Text 1. Mobile phones have transformed the way we communicate

Text 2. Radar

1 A
2 D
3 C
4 B
5 C
6 B
7 A
8 D
9 C
10 B
11 A
12 D

Unit 5. Computers

Text 1

TOEFL Prep I 1. a 2. c 3. C

TOEFL Prep II 1. circulate 2. installation 3. Expeditiously4. detection 5. Corrode

TOEFL Success 1. d 2. A

Text 2. Robots with a sense of self

1 E
2 C
3 A
4 B
5 reflection / (arm) movement
6 neither
7 limbs (*not* arms)
8 false belief
9 cognitive development

Text 3. Microsoft

1. I
2. F
3. B
4. G
5. A
6. D
7. H
8. C

Text 4

1 True

2 Not given
3 True
4 False
5 Not given
6 C
7 B
8 A
9 D
10 A

Text 5

1 B: *combined.*

2 B: *thread.*

3 C: *it is more precise than previous techniques.* The passage indicates that they will have control, whereas they previously did not.

4 B: *electronic impulses could affect cells.* The first paragraph indicates that they have known this for a while.

5 A: *barraging.*

6 B: *open their walls to introduce medication.* The passage states that they have used electrical charges in an attempt to introduce foreign substances such as new drug treatments or genetic material.

7 B: *causes.*

8 B: *in the future.*

9 A: *researchers.* The noun to which *they* refers is in the previous sentence.

10 C: *specific.*

11 D: *tissues.* The passage indicates that *others* is a pronoun for *other tissues,*because it says: . . . *to activate particular tissues, whether they be muscle, bone, brain, or others.*

12 B: *place more than one chip in a single person.* The last sentence of the passage

answers this question: *They believe that they will be able to implant*multiple *chips into a person to deal with one problem or more than oneproblem*.

Unit 6. Materials

Text 2. Glass fibers

1a
2a
3c
4a
5a
6d
7c
8c
9b
10d
11a

Text 3. Bakelite

1) candlewax
2) synthetic
3) chemistry
4) Novalak
5) fillers
6) hex
7) raw
8) pressure
9) B
10) C
11) true
12) false
13) false

Content

Main plan 2020, pos. 49

Luara Sergeyeva

ENGLISH LANGUAGE

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