

**Non - profit  
joint- stock  
company**



**ALMATY UNIVERSITY  
OF POWER  
ENGINEERING AND  
TELECOMMUNICATION**

Department for  
language studies

**PROFESSIONAL ORIENTED FOREIGN LANGUAGE**

Methodological recommendations for practical use, for students of specialty  
5B073100 – Life safety and environmental protection

Almaty 2018



**Некоммерческое  
акционерное  
общество**

**АЛМАТИНСКИЙ  
УНИВЕРСИТЕТ  
ЭНЕРГЕТИКИ И  
СВЯЗИ**

Кафедра  
ЯЗЫКОВЫХ  
ЗНАНИЙ

**PROFESSIONAL ORIENTED FOREIGN LANGUAGE**

Methodological Recommendations for practical use, for students of specialty  
5B073100 – Life safety and environmental protection

Алматы 2018

Author: Luara Sergeyeva. Methodological recommendations for practical use, for students of specialty 5B073100 – Life safety and environmental protection. – Almaty. AUPET, 2018 - 49 p.

This guideline is developed for using in practical classes for third-year students. After studying this material, students will master the lexical minimum and improve reading skills with texts in the format of international exams TOEFL and IELTS.

Reviewer: candidate of Philology, assistant professor V. Kozlov

Published according to the plan of publication of the non-profit joint-stock company "Almaty university of power engineering and telecommunications" for 2018.

© Non-profit JSK «Almaty university of power engineering and telecommunications», 2018

Luara Sergeyeva

PROFESSIONAL ORIENTED FOREIGN LANGUAGE

Methodological Recommendations for practical use, for students of specialty  
5B073100 – Life safety and environmental protection

Editor V. Kozlov

Standardization Specialist N. Moldabekova

Signed in print \_\_\_\_\_

Circulation 50 copies

Content \_3\_ co. pub. paper

Format 60x84 1/16

Printing paper № 1

Order\_\_\_\_\_. Prise 1540 т.

Copying Office of  
non-profit joint-stock company  
«Almaty University of Power Engineering and Telecommunication»  
126 Baitursynov street Almaty 50013

Некоммерческое акционерное общество  
АЛМАТИНСКИЙ УНИВЕРСИТЕТ ЭНЕРГЕТИКИ И СВЯЗИ  
Кафедра Языковых знаний

УТВЕРЖДАЮ  
Проректор по академической деятельности  
\_\_\_\_\_ С.В. Коньшин  
«\_\_\_\_\_» \_\_\_\_\_ 2018 г.

**PROFESSIONAL ORIENTED FOREIGN LANGUAGE**

Methodological Recommendations for practical use, for students of specialty  
5B073100 – Life safety and Environmental protection

СОГЛАСОВАНО  
Начальник УМО  
\_\_\_\_\_ Р.Р. Мухамеджанова  
«\_\_\_\_\_» \_\_\_\_\_ 2018 г.

Рассмотрено и одобрено на  
заседании кафедры \_\_\_\_\_  
протокол № 5 от .01.2018 г.  
Зав.кафедрой \_\_\_\_\_

Редактор  
\_\_\_\_\_ Л.Т. Сластихина  
«\_\_\_\_\_» \_\_\_\_\_ 2018 г.

Согласовано  
Зав. кафедрой ЯЗ  
\_\_\_\_\_ Тулеуп М.М.  
«\_\_\_\_\_» \_\_\_\_\_ 2018 г.

Председатель ОУМК по МО и Э  
\_\_\_\_\_ Б.К. Курпенов  
«\_\_\_\_\_» \_\_\_\_\_ 2018г.  
Специалист по стандартизации  
\_\_\_\_\_  
«\_\_\_\_\_» \_\_\_\_\_ 2018г.

Составитель (разработчики)  
Л.Д. Сергеева

Алматы 2018

## Vocabulary

### 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	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	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 woods and parks which surround a community*.

2) More and more companies are *using boxes, cartons, and cans which can easily be decomposed 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 away 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 trees* 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 world.

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

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

“Environmental degradation is a major world problem. What causes this problem, and what can we do to prevent 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 3**

*Now discuss the problem. 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**

#### **Tracking Hurricanes**

North American meteorologists from the National Oceanic and Atmospheric Administration (NOAA)'s Hurricane Research Division have recently improved the success rate in their forecasting of where hurricanes are likely to hit land by an estimated 15 to 30%. This increase in accuracy is due to the use of instruments called GPS-dropwindsondes, which can probe the atmosphere surrounding a hurricane while it is still out at sea. The atmospheric characteristics of hurricanes over land are well understood because investigation is possible with weather balloons containing sophisticated meteorological instruments. When hurricanes are out of reach of balloons, gathering information is decidedly more difficult. Little is known of the weather conditions that guide hurricanes towards land.

An accurate estimation of where a hurricane will strike is essential in order to reduce loss of life and property. Hurricane Andrew, the most costly hurricane in U.S. history, killed 15 people and caused damage of \$35 billion, in today's dollars, in 1992. However, the unnamed: Category 4 hurricane which struck southeast Florida in 1926 and killed 243 people would have caused an estimated \$77 billion if it had struck today. The reason for this is the explosion in population growth and development along the south-east coast of the U.S. during the last half century.

Hurricanes occur in cycles every few decades, the last intense period in the U.S. being from 1940 to 1969. 'Camille', a Category 5 hurricane of such catastrophic force that it caused over a billion and a half dollars' worth of damage at the time and killed 256 people, struck the coast of the Gulf of Mexico in 1969 with winds over 320 km/h. Yet, for the last quarter century, hurricane activity has been relatively mild. Scientists do not know the precise reason for the cycles of hurricane activity, but they could be caused by a phenomenon called the 'Atlantic Conveyor'. This is the name given to the gigantic current of water that flows cold from the top of the globe slowly along the Atlantic Ocean floor to Antarctica and resurfaces decades later before flowing back north, absorbing heat as it crosses the equator. Since hurricanes derive their energy from the heat of warm water, it is thought that an increase in the speed of the 'Conveyor', as it pulls warm water to the north, is an indicator of intensifying hurricane activity.

The use of GPS-dropwindsondes began in 1997. Small sensing devices dropped from planes at very high altitudes and over a wide area, they are far more

revealing than previously used sensors. Because they weigh only 0.4 kilograms, they are able to stay aloft for longer periods and broadcast more data to the ground. Each sonde carries its own global positioning satellite receiver. The GPS signals received are used to calculate the direction and speed of wind, and data on temperature, humidity, and barometric pressure at half second intervals all the way down to the ocean surface.

Dropwindsonde information is fed into a special meteorological computer in Maryland which generates a global computer model of wind patterns. Data analysts have discovered a greater variability in the winds at sea level than previously believed, but many forecasting problems are beyond a solution, at least for the time being. For instance, it is not yet known why hurricanes can suddenly change in intensity; current computer models often fail to predict whether a hurricane will reach land or else cannot pinpoint where a strike will take place.

One surprising result of a recent computer simulation was the destruction of a large part of downtown New York. Hurricane researchers believe that the city is more likely than Miami to suffer a direct hit in the near future. Also, certain geographical features of the coastline near New York make it conceivable that a wall of water called a storm surge pushed ashore by hurricane winds would cause a devastating flooding of Manhattan. A storm surge was responsible for the more than 8000 deaths caused by the hurricane that destroyed the city of Galveston in 1900.

1. *The custom of naming hurricanes began in the early 1950s*

2. *Hurricanes are categorized according to their wind speed from Category 1 (least intense) to Category 5 (most intense).*

1. *Questions 1 – 4. You are advised to spend about 5 minutes on Questions 1-4. Refer to Reading Passage "Tracking Hurricanes", and look at Questions 1 - 4 below. Example: What do the letters NOAA stand for?*

1) Which instruments have recently increased the success rate of U.S. hurricane forecasts?

2) What reason is given for the lack of knowledge of hurricanes at sea?

3) Why was the hurricane which struck in 1926 not given a name?

4) What is the name of the strongest hurricane mentioned in the article?

2. *Questions 5-11. You are advised to spend about 8 minutes on Questions 5-11. Look at the table below. According to Reading Passage, to whom or what do the phrases on the right refer? Note that you must give your answer IN NO MORE THAN THREE WORDS.*

Example: meteorologists \_\_\_\_\_ have improved their forecasts for hurricanes.

5) \_\_\_\_\_ become stronger every few decades.

6) \_\_\_\_\_ energizes all hurricanes.

7) \_\_\_\_\_ is a huge current of water flowing from north to south.

8) \_\_\_\_\_ could not stay in the air for a long time.

9) \_\_\_\_\_ know more about surface winds than they knew before.

- 10) \_\_\_\_\_ recently predicted a catastrophe for the city of New York.  
11) \_\_\_\_\_ is a huge wave of water blown on land by a hurricane.

3. *Questions 12 -15.* You are advised to spend about 7 minutes on Questions 12-15. Refer to Reading Passage , and decide which of the answers best completes the following sentences. The first one has been done for you as an example.

*Example:* The main point of the passage is to give information about:

- a) previous U.S. hurricanes;
- b) future U.S. hurricanes;
- c) forecasting hurricane activity;
- d) why hurricanes change in intensity – correct answer.

*12. The intensity of U.S. hurricanes:*

- a) has increased by 15 to 30% recently;
- b) by depends on the GPS-dropwindsondes;
- c) was greater from 1940 to 1969 than at any previous time;
- d) can be more accurately measured by satellite assistance.

*13. The Category 4 hurricane which hit Florida in 1926:*

- a) was the most catastrophic to hit the U. S. this century;
- b) caused \$77 billion worth of damage;
- c) caused an explosion in population growth;
- d) none of the above.

*14. Hurricane 'Camille':*

- a) caused \$1.5 billion dollars damage in today's money;
- b) was the worst U.S. storm this century in terms of life lost;
- c) was named in the 1950s;
- d) was not as intense as the hurricane of 1926.

*15. The writer of the passage probably believes that:*

- a) accurate tracking of hurricanes might be possible in the future;
- b) storm surges only occur within computer simulations;
- c) computer predictions are unreliable;
- d) the worst hurricanes occur in the U.S.

## **Text 2**

### **Beneath the Capony**

1. The world's tropical rainforests comprise some 6% of the Earth's land area and contain more than half of all known life forms, or a conservative estimate of about 30 million species of plants and animals. Some experts estimate there could be two or even three times as many species hidden within these complex and fast disappearing ecosystems; scientists will probably never know for certain, so vast is the amount of study required.

2. Time is running out for biological research. Commercial development is responsible for the loss of about 17 million hectares of virgin rainforest each year - a figure approximating 1% of what remains of the world's rainforests.

3. The current devastation of once impenetrable rainforest is of particular concern because, although new tree growth may in time repopulate felled areas, the biologically diverse storehouse of flora and fauna is gone forever. Losing this bountiful inheritance, which took millions of years to reach its present highly evolved state, would be an unparalleled act of human stupidity.

4. Chemical compounds that might be extracted from yet-to-be-discovered species hidden beneath the tree canopy could assist in the treatment of disease or help to control fertility. Conservationists point out that important medical discoveries have already been made from material found in tropical rainforests. The drug aspirin, now synthesized, was originally found in the bark of a rainforest tree. Two of the most potent anti-cancer drugs derive from the rosy periwinkle discovered in the 1950s in the tropical rainforests of Madagascar.

5. The rewards of discovery are potentially normous, yet the outlook is bleak. Timber-rich countries mired in debt, view potential financial gain decades into the future as less attractive than short-term profit from logging. Cataloguing species and analyzing newly-found substances takes time and money, both of which are in short supply.

6. The developed world takes every opportunity to lecture countries which are the guardians of rainforest. Rich nations exhort them to preserve and care for what is left, ignoring the fact that their wealth was in large part due to the exploitation of their own natural world.

7. It is often forgotten that forests once covered most of Europe. Large tracts of forest were destroyed over the centuries for the same reason that the remaining rainforests are now being felled - timber. As well as providing material for housing, it enabled wealthy nations to build large navies and shipping fleets with which to continue their plunder of the world's resources.

8. Besides, it is not clear that developing countries would necessarily benefit financially from extended bioprospecting of their rainforests. Pharmaceutical companies make huge profits from the sale of drugs with little return to the country in which an original discovery was made.

9. Also, cataloguing tropical biodiversity involves much more than a search for medically useful and therefore commercially viable drugs. Painstaking biological fieldwork helps to build immense databases of genetic, chemical and behavioral information that will be of benefit only to those countries developed enough to use them.

10. Reckless logging itself is not the only danger to rainforests. Fires lit to clear land for further logging and for housing and agricultural development played havoc in the late 1990s in the forests of Borneo. Massive clouds of smoke from burning forest fires swept across the southernmost countries of South-East Asia choking cities and reminding even the most resolute advocates of rainforest clearing of the swiftness of nature's retribution.

11. Nor are the dangers entirely to the rainforests themselves. Until very recently, so-called "lost" tribes - indigenous peoples who have had no contact with the outside world - still existed deep within certain rainforests. It is now unlikely that there are any more truly lost tribes. Contact with the modern world inevitably brings with it exploitation, loss of traditional culture, and, in an alarming number of instances, complete obliteration.

12. Forest-dwellers who have managed to live in harmony with their environment have much to teach us of life beneath the tree canopy. If we do not listen, the impact will be on the entire human race. Loss of biodiversity, coupled with climate change and ecological destruction will have profound and lasting consequences.

*1. Questions 1 - 5*

You are advised to spend about 8 minutes on Questions 1-5. Refer to Reading Passage «Beneath the Canopy" and answer the following questions. The left hand column contains quotations taken directly from the reading passage. The right-hand column contains explanations of those quotations. Match each quotation with the correct explanation.

*Example:* a conservative estimate - b).

Quotations	Explanations
<i>Ex:</i> 'a conservative estimate' (paragraph 1)	a) with many trees but few financial resources
1) 'biologically diverse storehouse of flora and fauna' (paragraph 3)	b) purposely low and cautious reckoning
2) 'timber-rich countries mired in debt' (paragraph 5)	c) large-scale use of plant and wildlife
3) 'exploitation of their own natural world' (paragraph 6)	d) profit from an analysis of the plant and animal life
4) 'benefit financially from extended bioprospecting of their rainforests' (paragraph 8)	e) wealth of plants and animals
5) 'loss of biodiversity' (paragraph 12)	f) being less rich in natural wealth

*2. Questions 6 - 8*

You are advised to spend about 5 minutes on Questions 6-8.

6) How many medical drug discoveries does the article mention?

7) What two shortages are given as the reason for the writer's pessimistic outlook?

8) Who will most likely benefit from the bioprospecting of developing countries' rainforests?

3. Questions 9 – 11. You are advised to spend about 7 minutes on Questions 9-11. Refer to Reading Passage and choose the best answer.

9) The amount of rainforest destroyed annually is:

- a) approximately 6% of the Earth's land area;
- b) such that it will only take 100 years to lose all the forests;
- c) increasing at an alarming rate;
- d) responsible for commercial development.

10) In Borneo in the late 1990s:

- a) burning forest fires caused air pollution problems as far away as Europe;
- b) reckless logging resulted from burning forest fires;
- c) fires were lit to play the game of havoc;
- d) none of the above.

11) Many so-called "lost" tribes of certain rainforests:

- a) have been destroyed by contact with the modern world;
- b) do not know how to exploit the rainforest without causing harm to the environment;
- c) are still lost inside the rainforest;
- d) must listen or they will impact on the entire human race.

### Text 3

#### Geothermal Energy

Geothermal energy is natural heat from the interior of the earth that is converted to heat buildings and generate electricity. The idea of harnessing earth's internal heat is not new. As early as 1904, geothermal power was used in Italy. Today, earth's natural internal heat is being used to generate electricity in 21 countries, including Russia, Japan, New Zealand, Iceland, Mexico, Ethiopia, Guatemala, El Salvador, the Philippines, and the United States. Total worldwide production is *approaching* 9,000 MW (equivalent to nine large modern coal burning or nuclear power plants)—double the amount in 1980. Some 40 million people today receive their electricity from geothermal energy at a cost competitive with *that* of other energy sources. In El Salvador, geothermal energy is supplying 30% of the total electric energy used. However, at the global level, geothermal energy supplies less than 0.15% of the total energy supply.

Geothermal energy may be considered a nonrenewable energy source when rates of extraction are greater than rates of natural replenishment. However, geothermal energy has its origin in the natural heat production within earth, and only a small fraction of the vast total resource base is being utilized today. *Although most geothermal energy production involves the tapping of high heat sources, people are also using the low-temperature geothermal energy of groundwater in some applications.*

#### Geothermal Systems

A. The average heat flow from the interior of the earth is very low, about 0.06 W/m<sup>2</sup>. B. This amount is trivial compared with the 177 W/m<sup>2</sup> from solar heat at the surface in the United States. However, in some areas, heat flow is sufficiently high to be useful for producing energy. For the most part, areas of high heat flow are associated with plate tectonic boundaries. Oceanic ridge systems (divergent plate boundaries) and areas where mountains are being uplifted and volcanic island arcs are forming (convergent plate boundaries) are areas where this natural heat flow is anomalously high. C.

On the basis of geological criteria, several types of hot geothermal systems (with temperatures greater than about 80°C, or 176°F) have been defined, and the resource base is larger than that of fossil fuels and nuclear energy combined. A common system for energy development is hydrothermal convection, characterized by the circulation of steam and/or hot water that transfers heat from depths to the surface. D.

### **Geothermal Energy and the Environment**

The environmental impact of geothermal energy may not be as extensive as that of other sources of energy. When geothermal energy is developed at a particular site, environmental problems include on-site noise, emissions of gas, and disturbance of the land at drilling sites, disposal sites, roads and pipelines, and power plants. Development of geothermal energy does not require large scale transportation of raw materials or refining of chemicals, as development of fossil fuels does. Furthermore, geothermal energy does not produce the atmospheric pollutants associated with burning fossil fuels or the radioactive waste associated with nuclear energy. However, geothermal development often does produce *considerable* thermal pollution from hot waste-waters, which may be saline or highly corrosive.

Geothermal power is not always popular. For instance, geothermal energy has been produced for years on the island of Hawaii, where active volcanic processes provide abundant near-surface heat. There is controversy, however, over further exploration and development. Native Hawaiians and others have argued that the exploration and development of geothermal energy degrade the tropical forest as developers construct roads, build facilities, and drill wells. In addition, religious and cultural issues in Hawaii relate to the use of geothermal energy. For example, some people are offended by using the “breath and water of Pele” (the volcano goddess) to make electricity. This issue points out the importance of being sensitive to the values and cultures of people where development is planned.

### **Future of Geothermal Energy**

At present, the United States produces only 2800 MN of geothermal energy. However, if developed, known geothermal resources in the United States could produce about 20,000 MW which is about 10% of the electricity needed for the

western states. Geothermal resources not yet discovered could conservatively provide four times that amount (approximately 10% of total U.S. electric capacity), about equivalent to the electricity produced from water power today.

*1. In paragraph 1, the author introduces the concept of geothermal energy by*

- a) explaining the history of this energy source worldwide;
- b) arguing that this energy source has been tried unsuccessfully;
- c) comparing the production with that of other energy sources;
- d) describing the alternatives for generating electric power.

*2. What is true about geothermal energy production worldwide?*

- a) because it is a new idea, very few countries are developing geothermal energy sources.
- b) only countries in the southern Hemisphere are using geothermal energy on a large scale.
- c) until the cost of geothermal energy becomes competitive, it will not be used globally.
- d) geothermal energy is already being used in a number of nations, but it is not yet a major source of power.

*3. The word approaching in the passage is closest in meaning to:*

- a) hardly;
- b) mostly;
- c) nearly;
- d) briefly.

*4. The word that in the passage refers to:*

- a) electricity;
- b) cost;
- c) energy;
- d) people;

*5. In paragraph 2, the author states that geothermal energy is considered a nonrenewable resource because:*

- a) the production of geothermal energy is a natural process;
- b) geothermal energy comes from the earth;
- c) we are not using very much geothermal energy now;
- d) we could use more geothermal energy than is naturally replaced.

*6. Which of the sentences below best expresses the information in the highlighted statement in the passage? The other choices change the meaning or leave out important information:*

- a) high heat is the source of most of the geothermal energy but low heat groundwater is also used sometimes.

b) even though low temperatures are possible, high heat is the best resource for energy production for groundwater.

c) both high heat and low heat sources are used for the production of geothermal energy from groundwater.

d) most high heat sources for geothermal energy are tapped from applications that involve low heat in groundwater.

7. *According to paragraph 3, the heat flow necessary for the production of geothermal energy:*

a) is like solar heat on the earth's surface;

b) happens near tectonic plate boundaries;

c) must always be artificially increased;

d) may be impractical because of its location.

8. *the word considerable in the passage is closest in meaning to:*

a) large;

b) dangerous;

c) steady;

d) unexpected.

9. *In paragraph 5, the author mentions the "atmospheric pollution" and "waste" for fossil fuel and nuclear power:*

a) to introduce the discussion of pollution caused by geothermal energy development and production;

b) to contrast pollution caused by fossil fuels and nuclear power with pollution caused by geothermal energy;

c) to argue that geothermal production does not cause pollution like other sources of energy do;

d) to discourage the use of raw materials and chemicals in the production of energy because of pollution;

10. *According to paragraph 6, the production of geothermal energy in Hawaii is controversial for all of the following reasons except:*

a) the volcanoes in Hawaii could be disrupted by the rapid release of geothermal energy;

b) the rainforest might be damaged during the construction of the geothermal energy plant;

c) the native people are concerned that geothermal energy is disrespectful to their cultural traditions;

d) some Hawaiians oppose using geothermal energy because of their religious beliefs.

11 *What is the author's opinion of geothermal energy?*

a) geothermal energy has some disadvantages, but it is probably going to be used in the future.

b) geothermal energy is a source that should be explored further before large-scale production begins.

c) geothermal energy offers an opportunity to supply a significant amount of power in the future.

d) geothermal energy should replace water power in the production of electricity for the United States.

12. *look at the four capital letters [A,B,C,D] that show where the following sentence could be inserted in the passage. Where could the sentence best be added?*

*One such region is located in the western United States, where recent tectonic and volcanic activity has occurred.*

13. *Directions: An introduction for a short summary of the passage appears below. Complete the summary by selecting the three answer choices that mention the most important points in the passage. Some sentences do not belong in the summary because they express ideas that are not included in the passage or are minor points from the passage.*

*Geothermal energy is natural heat from the interior of the Earth that is converted to electricity.*

### **Answer Choices**

1. Geothermal energy sources that convert natural heat to electricity account for 30% of the total energy supply in el Salvador at relatively competitive cost to the consumers.

2. Although geothermal energy is nonrenewable when more is used than can be replaced naturally, only a small amount of the potential energy is being exploited worldwide.

3. The heat from geothermal sites is thought to be the breath and water of the volcanic goddess Pele, worshiped by some native groups on the Hawaiian Islands.

4. Hot geothermal systems at both divergent plate boundaries and convergent plate boundaries could provide more energy than fossil fuels and nuclear power.

5. Some groups oppose the exploitation of geothermal sources because of pollution and other environmental problems or because of their cultural values.

6. Thermal waste water can be very corrosive or can contain high levels of saline, which causes problems in disposal and water treatment at development sites.

### **Text 4**

### **Rising Sea Levels**

Sea level must be expressed as a *range* of values that are under constant reassessment. During the last century, sea level rose 10–20 cm (4–8 inches), a rate 10 times higher than the average rate during the last 3000 years. The 2007 IPCC

(Intergovernmental Panel on Climate Change) forecast scenarios for global mean sea level rise this century, given regional variations, are

Low forecast: 0.18 m (7.1 in.)

Middle forecast: 0.39 m (15.4 in.)

High forecast: 0.59 m (23.2 in.)

Observations since 1961 show the average global ocean temperature increased to depths of 3000 m and the ocean absorbed more than 80% of climate system heating. Such warming causes thermal expansion of seawater, contributing to sea level rise. Mountain glaciers and snow cover declined on average in both hemispheres, contributing to sea level rise. Mount Kilimanjaro in Africa, portions of the South American Andes, and the Himalayas will very *likely* lose most of their glacial ice within the next two decades, affecting local water resources. Glacial ice continues its retreat in Alaska.

Surrounding the margins of Antarctica, and constituting about 11% of its surface area, are numerous ice shelves, especially where sheltering inlets or bays exist. Covering many thousands of square kilometers, these ice shelves extend over the sea while still attached to continental ice. The loss of these ice shelves does not significantly raise sea level, for they already displace seawater. The concern is for the possible surge of grounded continental ice that the ice shelves hold back from the sea.

Although ice shelves constantly break up to produce icebergs, some large sections have recently broken free. In 1998 an iceberg the size of Delaware broke off the Ronne Ice Shelf, southeast of the Antarctic Peninsula. In March 2000 an iceberg tagged B-15 broke off the Ross Ice Shelf (some 90° longitude west of the Antarctic Peninsula), measuring *twice* the size of Delaware, 300 km by 40 km or 190 mi by 25 mi. Since 1993, six ice shelves have disintegrated in Antarctica. About 8000 km (3090 mi) of ice shelf are gone, changing maps, freeing up islands to circumnavigation, and creating thousands of icebergs. A) Larsen-A suddenly disintegrated in 1995. B) In only 35 days in early 2002, Larsen-B collapsed into icebergs. C) Larsen C, the next segment to the south, is losing mass on its underside. This ice loss is likely a result of the 2.5°C (4.5°F) temperature increase in the peninsula region in the last 50 years. D) In response to the increasing warmth, the Antarctic Peninsula is sporting new vegetation growth, reduced sea ice, and disruption of penguin feeding, nesting, and fledging activities.

A loss of polar ice mass, augmented by melting of alpine and mountain glaciers (which experienced more than a 30% decrease in overall ice mass during the last century) will affect sea-level rise. The IPCC assessment states that “between one-third to one-half of the existing mountain glacier mass could disappear over the next hundred years.” Also, “there is *conclusive* evidence for a worldwide recession of mountain glaciers . . . This is among the clearest and best evidence for a change in energy balance at the Earth’s surface since the end of the 19th century.”

*Unfortunately, the new measurements of Greenland’s ice loss acceleration did not reach the IPCC in time for its report.* Scientists are considering at least a 1.2 m (3.94 ft) high case for estimates of sea-level rise this century as more realistic given Greenland’s present losses coupled with mountain glacial ice losses worldwide.

According to Rahmstorf and colleagues, the data now available raise concerns that the climate system, in particular sea level, may be responding more quickly than climate models indicate. . . . The rate of sea-level rise for the past 20 years is 25% faster than the rate of rise in any 20-year period in the preceding 115 years. . . . Since 1990, the observed sea level has been rising faster than the rise projected by models. These increases would continue beyond 2100 even if greenhouse gas concentrations were stabilized.

A quick survey of world coastlines shows that even a moderate rise could bring changes of unparalleled proportions. At stake are the river deltas, lowland coastal farming valleys, and low lying mainland areas, all contending with high water, high tides, and higher storm surges. Particularly tragic social and economic consequences will affect small island states—which are unable to adjust within their present country boundaries—disruption of biological systems, loss of biodiversity, reduction in water resources, and evacuation of residents among the impacts *there*. There could be both internal and international migrations of affected human populations, spread over decades, as people move away from coastal flooding from the sea-level rise.

1. *The word range in the passage is closest in meaning to:*

- a) function;
- b) scale;
- c) version;
- d) lack.

2. *The word likely in the passage is closest in meaning to:*

- a) suddenly;
- b) probably;
- c) hopefully;
- d) actually.

3. *Why does the author mention the state of Delaware in paragraph 4?*

- a) To include the North American continent in the discussion;
- b) To impress the reader with the size of the icebergs;
- c) To emphasize the problems of coastal regions;
- d) To solicit support from residents in the United States;

4. *According to paragraph 4, why is there more new plant life in Antarctica recently?*

- a) the mountain glaciers have melted;
- b) the land masses have split into islands;
- c) the icebergs have broken into smaller pieces;
- d) the temperature has risen by a few degrees;

5. *It may be inferred from this passage that icebergs are formed*

- a) by a drop in ocean temperatures;

- b) when an ice shelf breaks free;
- c) from intensely cold islands;
- d) if mountain glaciers melt.

6. *In paragraph 5, the author explains the loss of polar and glacial ice by:*

- a) stating an educated opinion;
- b) referring to data in a study;
- c) comparing sea levels worldwide;
- d) presenting his research.

7. *The word conclusive in the paragraph 5 is closest in meaning to:*

- a) definite;
- b) independent;
- c) unique'
- d) valuable.

8. *Which of the sentences below best expresses the information in the highlighted statement in the passage? The other choices change the meaning or leave out important information:*

- a) the IPCC did not have the data about ice loss in Greenland before the report was published;
- b) this year, the report from Greenland did not measure the new ice loss for the IPCC;
- c) the new measurements by the IPCC did not include Greenland's ice loss this time;
- d) Greenland's recent ice loss had not accelerated enough to be reported to the IPCC.

9. *According to paragraph 7, why will people move away from the coastlines in the future?*

- a) it will be too warm for them to live there;
- b) the coastlines will have too much vegetation;
- c) flooding will destroy the coastal areas;
- d) no agricultural crops will be grown on the coasts.

10. *Which of the following statements most accurately reflects the author's opinion about rising sea levels?*

- a) sea levels would rise without global warming;
- b) rising sea levels can be reversed;
- c) the results of rising sea levels will be serious;
- d) sea levels are rising because of new glaciers.

11. *The word there in the last paragraph refers to:*

- a) resources;

- b) systems;
- c) boundaries;
- d) states.

12. Look at the four capital letters [A,B,C,D] that show where the following sentence could be inserted in the passage. Where could the sentence best be added?

*The Larsen Ice Shelf, along the east coast of the Antarctic Peninsula, has been retreating slowly for years.*

13. Directions: An introduction for a short summary of the passage appears below. Complete the summary by selecting the three answer choices that mention the most important points in the passage. Some sentences do not belong in the summary because they express ideas that are not included in the passage or are minor points from the passage.

Global warming is causing a rise in sea levels, with accompanying changes in coastal boundaries as well as social and economic ramifications.

### Answer Choices

1. The ice shelf called Larsen-A suddenly disintegrated in 1995.
2. Even an average rise in sea levels will cause serious social and economic changes.
3. Continental ice shelves and grounded ice sheets from Antarctica to the Polar cap are melting into the oceans.
4. It is predicted that many human migrations inland will occur along flooded coastal regions.
5. The melting of glacial ice on high mountain ranges will affect regional water resources worldwide.
6. Scientists at NASA have concluded that the ice sheet in Greenland is melting at a rate of about 1 meter every year.

### Text 5

#### Exotic and Endangered Species

When you hear someone bubbling enthusiastically about an *exotic species*, you can safely bet the speaker isn't an ecologist. This is a name for a resident of an established community that was deliberately or accidentally moved from its home range and became established elsewhere. Unlike most imports, which can't take hold outside their home range, an exotic species permanently insinuates *itself* into a new community.

Sometimes the additions are harmless and even have beneficial effects. More often, they make native species *endangered species*, which by definition are extremely vulnerable to extinction. Of all species on the rare or endangered lists or that recently became extinct, *close to 70 percent owe their precarious existence or*

*demise to displacement by exotic species.* Two examples are included here to illustrate the problem.

During the 1800s, British settlers in Australia just couldn't *bond* with the koalas and kangaroos, so they started to import familiar animals from their homeland. In 1859, in what would be the start of a wholesale disaster, a northern Australian landowner imported and then released two dozen wild European rabbits (*Oryctolagus cuniculus*). Good food and good sport hunting—that was the idea. An ideal rabbit habitat with no natural predators was the reality.

Six years later, the landowner had killed 20,000 rabbits and was besieged by 20,000 more. The rabbits displaced livestock, even kangaroos. Now Australia has 200 to 300 million hippityhopping through the southern half of the country. They overgraze perennial grasses in good times and strip bark from shrubs and trees during droughts. You know where they've been; they transform grasslands and shrublands into eroded deserts. They have been shot and poisoned. Their warrens have been plowed under, fumigated, and dynamited. Even when all-out assaults reduced their population size by 70 percent, the rapidly reproducing imports made a comeback in less than a year. Did the construction of a 2,000-mile-long fence protect western Australia? No. Rabbits made it to the other side before workers finished the fence.

In 1951, government workers introduced a myxoma virus by way of mildly infected South American rabbits, its normal hosts. This virus causes *myxomatosis*. The disease has mild effects on South American rabbits that coevolved with the virus but nearly always had lethal effects on *O. cuniculus*. Biting insects, mainly mosquitoes and fleas, quickly transmit the virus from host to host. Having no coevolved defenses against the novel virus, the European rabbits died in droves. But, as you might expect, natural selection has since favored rapid growth of populations of *O. cuniculus* resistant to the virus.

In 1991, on an uninhabited island in Spencer Gulf, Australian researchers released a population of rabbits that they had injected with a calcivirus. The rabbits died quickly and relatively painlessly from blood clots in their lungs, hearts, and kidneys. In 1995, the test virus escaped from the island, possibly on insect vectors. It has been killing 80 to 95 percent of the adult rabbits in Australian regions. At this writing, researchers are now questioning whether the calcivirus should be used on a widespread scale, whether it can jump boundaries and infect animals other than rabbits (such as humans), and what the long-term *consequences* will be.

A vine called kudzu (*Pueraria lobata*) was deliberately imported from Japan to the United States, where it faces no serious threats from herbivores, pathogens, or competitor plants. In temperate parts of Asia, it is a well-behaved legume with a well-developed root system. It *seemed* like a good idea to use it to control erosion on hills and highway embankments in the southeastern United States. A) With nothing to stop it, though, kudzu's shoots grew a third of a meter per day. Vines now blanket streambanks, trees, telephone poles, houses, and almost everything else in their path. Attempts to dig up or burn kudzu are futile. Grazing goats and herbicides help, but goats eat other plants, too, and herbicides contaminate water supplies. B) Kudzu could reach the Great Lakes by the year 2040.

On the bright side, a Japanese firm is constructing a kudzu farm and processing plant in Alabama. The idea is to export the starch to Asia, where the demand currently exceeds the supply. C) Also, kudzu may eventually help reduce logging operations. D) At the Georgia Institute of Technology, researchers report that kudzu might become an alternative source for paper.

1. *Based on the information in paragraph 1, which of the following best explains the term “exotic species”?*

- a) animals or plants on the rare species list;
- b) a permanent resident in an established community;
- c) a species that has been moved to a different community;
- d) an import that fails to thrive outside of its home range.

2. *The word itself in the paragraph 1 refers to:*

- a) most imports;
- b) new community;
- c) home range;
- d) exotic species.

3. *The word bond in the paragraph 3 is closest in meaning to:*

- a) move;
- b) connect;
- c) live;
- d) fight.

4. *According to the author, why did the plan to introduce rabbits in Australia fail?*

- a) the rabbits were infected with a contagious virus;
- b) most Australians did not like the rabbits;
- c) no natural predators controlled the rabbit population;
- d) hunters killed the rabbits for sport and for food.

5. *All of the following methods were used to control the rabbit population in Australia EXCEPT:*

- a) they were poisoned;
- b) their habitats were buried;
- c) they were moved to deserts;
- d) they were surrounded by fences.

6. *Why does the author mention “mosquitoes and fleas” in paragraph 5?*

- a) because they are the origin of the myxoma virus;
- b) because they carry the myxoma virus to other animals;
- c) because they die when they are infected by myxoma;
- d) because they have an immunity to the myxoma virus.

7. According to paragraph 6, the Spencer Gulf experiment was dangerous because:

- a) insect populations were exposed to a virus;
- b) rabbits on the island died from a virus;
- c) the virus may be a threat to humans;
- d) some animals are immune to the virus.

8. The word *consequences* in the paragraph 6 is closest in meaning to:

- a) stages;
- b) advantages;
- c) results;
- d) increases.

9. Why does the author give details about the “kudzu farm” and “processing plant” in paragraph 8?

- a) to explain why kudzu was imported from abroad;
- b) to argue that the decision to plant kudzu was a good one;
- c) to give a reason for kudzu to be planted in Asia;
- d) to offer partial solutions to the kudzu problem.

10. The word *exceeds* in the last paragraph is closest in meaning to:

- a) surpasses;
- b) destroys;
- c) estimates;
- d) causes.

11. Which of the following statements most accurately reflects the author’s opinion about exotic species?

- a) exotic species should be protected by ecologists;
- b) importing an exotic species can solve many problems;
- c) ecologists should make the decision to import an exotic species;
- d) exotic species are often disruptive to the ecology.

12. Look at the four capital letters [A,B,C,D] that show where the following sentence could be inserted in the passage. Where could the sentence best be added?

*Asians use a starch extract from kudzu in drinks, herbal medicines, and candy.*

13. Directions: An introduction for a short summary of the passage appears below. Complete the summary by selecting the three answer choices that mention the most important points in the passage. Some sentences do not belong in the summary because they express ideas that are not included in the passage or are minor points from the passage.

*Exotic species often require containment because they displace other species when they become established in a new environment.*

### **Answer Choices**

1. Rabbits were able to cross a fence 2,000 miles long that was constructed to keep them out of Western Australia.
2. Methods to control exotic species include fences, viruses, burning, herbicides, natural predators, and harvesting.
3. Rabbits that were introduced in Australia and kudzu which was introduced in the United States are examples of species that caused problems.
4. Researchers may be able to develop material from the kudzu vine that will be an alternative to wood pulp paper.
5. The problem is that exotic species make native species vulnerable to extinction.
6. A virus that is deadly to rabbits may have serious effects for other animals.

### **Text 6**

#### **Environmental Impacts of Logging**

A) From shipping crates to paper bags, the logging industry supplies the raw materials for an array of products. However, this is not without untold harm to the environment. The damage includes habitat loss, pollution, and climate change, with the effects spanning the globe from the rain forests of Central Africa, Southeast Asia, and South America to the northern forests of Canada and Scandinavia. The effects of logging extend beyond just the felling of a swath of trees. Nutrients, water and shelter for plants, animals, and microorganisms throughout the ecosystem are also lost; many life forms-both terrestrial and aquatic-are becoming endangered as forests vanish.

B) Trees protect the soil beneath them; thus, tree loss can affect soil integrity. For example, the rain forest floor, home to myriad plant life as well as insects, worms, reptiles and amphibians, and small mammals, relies on a dense canopy of branches and leaves to keep it healthy and intact. The canopy prevents surface runoff by intercepting heavy rainfall so that water can drip down slowly onto the porous earth. Tree roots also stabilize the soil and help prevent erosion. In return, a healthy soil encourages root development and microbial activity, which contribute to tree growth and well-being. A major factor in logging-related soil damage comes from road building, with trucks and other heavy equipment compressing the spongy soil, creating furrows where water collects, and disrupting the underground water flow. Eventually, the topsoil wears away, leaving behind an infertile layer of rocks and hard clay.

C) Logging can also damage aquatic habitats. Vegetation along rivers and stream banks helps maintain a steady water flow by blocking the entry of soil and other residue, and tree shade inhibits the growth of algae. Removing trees obliterates these benefits. When eroding soil flows into waterways, the organic matter within it

consumes more oxygen, which can lead to oxygen depletion in the water, killing fish and other aquatic wildlife.

D) Trees provide a natural defense against air pollution. They remove carbon dioxide (CO<sub>2</sub>) from the atmosphere while they emit oxygen, and their leaves filter pollutants from the air. Cutting down trees keeps pollutants airborne, where they can mix with water vapor and form acid rain. Water quality in nearby streams and rivers also deteriorates as tree loss contributes to increased sedimentation.

E) In a healthy forest ecosystem, trees draw moisture from the soil and release it into the atmosphere while they provide shade to lessen evaporation. Thus, deforestation impacts rainfall patterns, leading to flooding as well as drought and forest fires. Deforestation is responsible for about one-fifth of carbon dioxide emissions worldwide, making it a major contributor to climate change—in particular, global warming. In the Amazon basin alone, deforestation is responsible for millions of tons of carbon dioxide (CO<sub>2</sub>) being released into the atmosphere annually. Some logging companies burn large tracts of forest just to facilitate access to one area—a practice that discharges even more carbon dioxide.

F) Forests, especially the tropical rain forests, are a vital natural resource with extensive biodiversity and irreplaceable wildlife habitats. More responsible logging practices would help ensure that they are protected for future generations.

1. Questions 1-4. The reading passage contains six paragraphs, A-F. Which paragraphs discuss the following information? Write the correct letter A-F.

- 1) \_\_\_\_ the impact of logging on the weather;
- 2) \_\_\_\_ how trees inhibit soil erosion;
- 3) \_\_\_\_ how deforestation contributes to air pollution;
- 4) \_\_\_\_ the impact of erosion on fish.

2. Questions 5-8. Complete the summary using words from the list below.

aquatic   arrays   defense   fells   habitats   intercepts   myriad   vegetation
--

The logging industry \_\_\_\_ (5) trees to get the wood that is used to make many products. This practice has \_\_\_\_ (6) effects on the environment. The natural \_\_\_\_ (7) of many terrestrial and aquatic animals are damaged. Trees protect the environment in many ways. They are an effective \_\_\_\_ (8) against both air pollution and soil erosion.

3. Word Family Practice. Choose the correct word family member from the list below to complete each blank.

Modern industry has caused damage to our natural \_\_\_\_ (9) in many ways. The air and water are filled with \_\_\_\_ (10). One result of this is acid rain, which has caused \_\_\_\_ (11) damage to vegetation in many areas. When large amounts of vegetation die off, the environment loses \_\_\_\_ (12). If there are no plants to hold the soil, it starts to \_\_\_\_ (13). This leads to myriad problems, including water pollution

and habitat loss. \_\_\_\_\_ (14) of wildlife work hard to prevent further damage to natural areas.

9. environment	environmental	environmentally
10. pollution	pollutants	pollutes
11. extent	extend	extensive
12. stability	stabilizes	stable
13. erosion	erode	eroded
14. Defenses	Defenders	Defends

### Text 7

#### The Long-Term Stability of Ecosystems

1. Plant communities assemble themselves flexibly, and their particular structure depends on the specific history of the area. Ecologists use the term “succession” to refer to the changes that happen in plant communities and ecosystems over time. The first community in a succession is called a pioneer community, while the long-lived community at the end of succession is called a climax community. Pioneer and successional plant communities are said to change over periods from 1 to 500 years. These changes—in plant numbers and the mix of species—are cumulative. Climax communities themselves change but over periods of time greater than about 500 years.

2. An ecologist who studies a pond today may well find it relatively unchanged in a year’s time. Individual fish may be replaced, but the number of fish will tend to be the same from one year to the next. We can say that the properties of an ecosystem are more stable than the individual organisms that compose the ecosystem.

3. At one time, ecologists believed that species diversity made ecosystems stable. They believed that the greater the diversity the more stable the ecosystem. Support for this idea came from the observation that long-lasting climax communities usually have more complex food webs and more species diversity than pioneer communities. Ecologists concluded that the apparent stability of climax ecosystems depended on their complexity- To take an extreme example, farmlands dominated by a single crop are so unstable that one year of bad weather or the invasion of a single pest can destroy the entire crop. In contrast, a complex climax community, such as a temperate forest, will tolerate considerable damage from weather or pests.

4. The question of ecosystem stability is complicated, however. The first problem is that ecologists do not all agree what "stability" means. Stability can be defined as simply lack of change In that case, the climax community would be considered the most stable, since, by definition, it changes the least over time. Alternatively, stability can be defined as the speed with which an ecosystem returns to a *particular* form following a major disturbance, such as a fire. This kind of stability is also called resilience. In that case, climax communities would be the most fragile and the least stable, since they can require hundreds of years to return to the climax state.

5. *Even the kind of stability defined as simple lack of change is not always associated with maximum diversity.* At least in temperate zones, maximum diversity is often found in mid-successional stages, not in the climax community. Once a redwood forest matures, for example, the kinds of species and the number of individuals growing on the forest floor are reduced. In general, diversity, by itself, does not ensure stability. Mathematical models of ecosystems likewise suggest that diversity does not *guarantee* ecosystem stability—just the opposite, in fact. A more complicated system is, in general, more likely than a simple system to break down (A fifteen-speed racing bicycle is more likely to break down than a child's tricycle.)

6. A) Ecologists are especially interested to know what factors contribute to the resilience of communities because climax communities all over the world are being severely damaged or destroyed by human activities. B) The destruction caused by the volcanic explosion of Mount St Helens, in the northwestern United States, for example, *pales* in comparison to the destruction caused by humans. C) We need to know what aspects of a community are most important to the community's resistance to destruction, as well as its recovery. D)

7. Many ecologists now think that the relative long-term stability of climax communities comes not from diversity but from the "patchiness" of the environment; an environment that varies from place to place supports more kinds of organisms than an environment that is uniform. A local population that goes extinct is quickly replaced by immigrants from an *adjacent* community. Even if the new population is of a different species, it can approximately fill the niche vacated by the extinct population and keep the food web intact.

1. *The word particular in the paragraph 4 is closest in meaning to:*

- a) natural;
- b) final;
- c) specific;
- d) complex.

2) *According to paragraph 1, which of the following is not true of climax communities?*

- a) they occur at the end of a succession;
- b) they last longer than any other type of community;
- c) the numbers of plants in them and the mix of species do not change;
- d) they remain stable for at least 500 years at a time.

3. *According to paragraph 2, which of the following principles of ecosystems can be learned by studying a pond?*

- a) ecosystem properties change more slowly than individuals in the system;
- b) the stability of an ecosystem tends to change as individuals are replaced;
- c) individual organisms are stable from one year to the next;
- d) a change in the numbers of an organism does not affect an ecosystem's properties.

4. According to paragraph 3, ecologists once believed that which of the following illustrated the most stable ecosystems?

- a) pioneer communities;
- b) climax communities;
- c) single-crop farmlands;
- d) successional plant communities.

5. According to paragraph 4, why is the question of ecosystem stability complicated?

- a) the reasons for ecosystem change are not always clear;
- b) ecologists often confuse the word 'stability' with the word "resilience";
- c) the exact meaning of the word "stability" is debated by ecologists;
- d) there are many different answers to ecological questions.

6. According to paragraph 4, which of the following is true of climax communities?

- a) they are more resilient than pioneer communities;
- b) they can be considered both the most and the least stable communities;
- c) they are stable because they recover quickly after major disturbances;
- d) they are the most resilient communities because they change the least over time.

7. Which of the following can be inferred from paragraph 5 about redwood forests?

- a) they become less stable as they mature;
- b) they support many species when they reach climax;
- c) they are found in temperate zones;
- d) they have reduced diversity during mid-successional stages.

8. The word *guarantee* in the paragraph 5 is closest in meaning to:

- a) increase;
- b) ensure;
- c) favor;
- d) complicate.

9. In paragraph 5, why does the author provide the information that (A fifteen-speed racing bicycle is more likely to break down than a child's tricycle.)?

- a) to illustrate a general principle about the stability of systems by using an everyday;
- b) to demonstrate that an understanding of stability in ecosystems can be applied to help understand stability in other situations;
- c) to make a comparison that supports the claim that, in general stability increases with diversity;

d) to provide an example that contradicts mathematical models of ecosystems.

10. The word *pales* in the paragraph 6 is closest in meaning to:

- a) increases proportionally;
- b) differs;
- c) loses significance;
- d) is common.

11. Which of the sentences below best expresses the essential information in the highlighted sentence in the paragraph 5? Incorrect choices change the meaning in important ways or leave out essential information.

- a) ecologists now think that the stability of an environment is a result of diversity rather than patchiness;
- b) patchy environments that vary from place to place do not often have high species diversity;
- c) uniform environments cannot be climax communities because they do not support as many types of organisms as patchy environments;
- d) a patchy environment is thought to increase stability because it is able to support a wide variety of organisms.

12. The word *adjacent* in the paragraph 7 is closest in meaning to

- a) foreign;
- b) stable;
- c) fluid;
- d) neighboring.

13. Look at the four capital letters that indicate where the following sentence could be added to the passage. Where would the sentence best fit?

*In fact, damage to the environment by humans is often much more severe than damage by natural events and processes.*

- a) A
- b) B
- c) C
- d) D

14. Directions: 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. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage.

*The process of succession and the stability of a climax community can change overtime.*

a) the changes that occur in an ecosystem from the pioneer to the climax community can be seen in one human generation.

b) a high degree of species diversity does not always result in a stable ecosystem.

c) disagreements over the meaning of the term "stability" make it difficult to identify the most stable ecosystems.

d) ecologists agree that climax communities are the most stable types of ecosystems.

e) the level of resilience in a plant community contributes to its long-term stability.

f) the resilience of climax communities makes them resistant to destruction caused by humans.

## **Text 8**

### **The truth about the environment**

For many environmentalists, the world seems to be getting worse. They have developed a hit-list of our main fears: that natural resources are running out, that the population is ever growing, leaving less and less to eat, that species are becoming extinct in vast numbers, and that the planet's air and water are becoming ever more polluted.

But a quick look at the facts shows a different picture. First, energy and other natural resources have become more abundant, not less so, since the book 'The Limits to Growth' was published in 1972 by a group of scientists. Second, more food is now produced per head of the world's population than at any time in history. Fewer people are starving. Third, although species are indeed becoming extinct, only about 0.7% of them are expelled to disappear in the next 50 years, not 25-50%, as has so often been predicted. And finally, most forms of environmental pollution either appear to have been exaggerated, or are transient - associated with the early phases of industrialization and therefore best cured not by restricting economic growth, but by accelerating it. One form of pollution - the release of greenhouse gases that causes global warming - does appear to be a phenomenon that is going to extend well into our future, but its total impact is unlikely to pose a devastating problem. A bigger problem may well turn out to be an inappropriate response to it.

Yet opinion polls suggest that many people nurture the belief that environmental standards are declining and four factors seem to cause this disjunction between perception and reality.

One is the lopsidedness built into scientific research. Scientific funding goes mainly to areas with many problems. That may be wise policy but it will also create an impression that many more potential problems exist than is the case.

Secondly, environmental groups need to be noticed by the mass media. They also need to keep the money rolling in. Understandably, perhaps, they sometimes overstate their arguments. In 1997, for example, the World Wide Fund for Nature

issued a press release entitled: 'Two-thirds of the world's forests lost forever'. The truth turns out to be nearer 20%.

Though these groups are run overwhelmingly by selfless folk, they nevertheless share many of the characteristics of other lobby groups. That would matter less if people applied the same degree of skepticism to environmental lobbying as they do to lobby groups in other fields. A trade organization arguing for, say, weaker pollution control is instantly seen as self-interested. Yet a green organization opposing such a weakening is seen as altruistic, even if an impartial view of the controls in question might suggest they are doing more harm than good. A third source of confusion is the attitude of the media. People are dearly more curious about bad news than good. Newspapers and broadcasters are there to provide what the public wants: That, however, can lead to significant distortions of perception. An example was America's encounter with El Niño in 1997 and 1998. This climatic phenomenon was accused of wrecking tourism, causing allergies, melting the ski-slopes, and causing 22 deaths. However, according to an article in the Bulletin of the American Meteorological Society, the damage it did was estimated at US\$4 billion but the benefits amounted to some US\$19 billion. These came from higher winter temperatures (which saved an estimated 850 lives, reduced heating costs and diminished spring floods caused by melt waters).

The fourth factor is poor individual perception. People worry that the endless rise in the amount of stuff everyone throws away will cause the world to run out of places to dispose of waste. Yet, even if America's trash output continues to rise as it has done in the past, and even if the American population doubles by 2100, all the rubbish America produces through the entire 21st century will still take up only one-12,000th of the area of the entire United States.

So what of global warming? As we know, carbon dioxide emissions are causing the planet to warm. The best estimates are that the temperatures will rise by 2-3°C in this century, causing considerable problems, at a total cost of US\$5,000 billion.

Despite the intuition that something drastic needs to be done about such a costly problem, economic analyses dearly show it will be far more expensive to cut carbon dioxide emissions radically than to pay the costs of adaptation to the increased temperatures. A model by one of the main authors of the United Nations Climate Change Panel shows how an expected temperature increase of 2.1 degrees in 2100 would only be diminished to an increase of 1.9 degrees. Or to put it another way, the temperature increase that the planet would have experienced in 2094 would be postponed to 2100.

So this does not prevent global warming, but merely buys the world six years. Yet the cost of reducing carbon dioxide emissions, for the United States alone, will be higher than the cost of solving the world's single, most pressing health problem: providing universal access to clean drinking water and sanitation. Such measures would avoid 2 million deaths every year, and prevent half a billion people from becoming seriously ill.

It is crucial that we look at the facts if we want to make the best possible decisions for the future. It may be costly to be overly optimistic - but more costly still to be too pessimistic.

1. Questions 1-6. Do the following statements agree with the information given in Reading Passage? Write:

YES if the statement agrees with the writer's claims.

NO if the statement contradicts the writer's claims.

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

1) Environmentalists take a pessimistic view of the world for a number of reasons.

2) Data on the Earth's natural resources has only been collected since 1972.

3) The number of starving people in the world has increased in recent years.

4) Extinct species are being replaced by new species.

5) Some pollution problems have been correctly linked to industrialisation.

6) It would be best to attempt to slow down economic growth.

2. Questions 7-11. Choose the correct letter.

7. What aspect of scientific research does the writer express concern about in paragraph 4?

a) the need to produce results;

b) the lack of financial support;

c) the selection of areas to research;

d) the desire to solve every research problem.

8. The writer quotes from the *Worldwide Fund for Nature* to illustrate how:

a) influential the mass media can be;

b) effective environmental groups can be;

c) the mass media can help groups raise funds;

d) environmental groups can exaggerate their claims.

9. What is the writer's main point about lobby groups in paragraph 6?

a) some are more active than others;

b) some are better organized than others;

c) some receive more criticism than others;

d) some support more important issues than others.

10. The writer suggests that newspapers print items that are intended to:

a) educate readers;

b) meet their readers' expectations;

c) encourage feedback from readers;

d) mislead readers.

11. What does the writer say about America's waste problem?

a) it will increase in line with population growth;

b) it is not as important as we have been led to believe;

c) it has been reduced through public awareness of the issues;

d) it is only significant in certain areas of the country.

3. Questions 12-14. Complete the summary with the list of words a)-i) below

### Global Warming

a) unrealistic	b) agreed	c) expensive	d) right	e) long-term	f) usual
g) surprising	h) personal	i) urgent			

The writer admits that global warming is a 12) \_\_\_\_\_ challenge, but says that it will not have a catastrophic impact on our future if we deal with it in the 13) \_\_\_\_\_ way. If we try to reduce the levels of greenhouse gases, he believes that it would only have a minimal impact on rising temperatures. He feels it would be better to spend money on the more 14) \_\_\_\_\_ health problem of providing the world's population with clean drinking water.

### Text 9

#### Forests

Forests are one of the main elements of our natural heritage. The decline of Europe's forests over the last decade and a half has led to an increasing awareness and understanding of the serious imbalances which threaten them. European countries are becoming increasingly concerned by major threats to European forests, threats which know no frontiers other than those of geography or climate: air pollution, soil deterioration, the increasing number of forest fires and sometimes even the mismanagement of our woodland and forest heritage. There has been a growing awareness of the need for countries to get together to co-ordinate their policies. In December 1990, Strasbourg hosted the first Ministerial Conference on the protection of Europe's forests. The conference brought together 31 countries from both Western and Eastern Europe. The topics discussed included the coordinate study of the destruction of forests, as well as how to combat forest fires and the extension of European research programs on the forest ecosystem. The preparatory work for the conference had been undertaken at two meetings of experts. Their initial task was to decide which of the many forest problems of concern to Europe involved the largest number of countries and might be the subject of joint action. Those confined to particular geographical areas, such as countries bordering the Mediterranean or the Nordic countries, therefore, had to be discarded. However, this does not mean that in future they will be ignored.

As a whole, European countries see forests as performing a triple function: biological, economic and recreational. The first is to act as a 'green lung' for our planet; by means of photosynthesis, forests produce oxygen through the transformation of solar energy, thus fulfilling what for humans is the essential role of an immense, non-polluting power plant. At the same time, forests provide raw materials for human activities through their constantly renewed production of wood. Finally, they offer those condemned to spend five days a week in an urban

environment an unrivalled area of freedom to unwind and take part in a range of leisure activities, such as hunting, riding and hiking. The economic importance of forests has been understood since the dawn of man - wood was the first fuel. The other aspects have been recognized only for a few centuries but they are becoming more and more important. Hence, there is a real concern throughout Europe about the damage to the forest environment which threatens these three basic roles.

The myth of the 'natural' forest has survived, yet there are effectively no remaining 'primary' forests in Europe. All European forests are artificial, having been adapted and exploited by man for thousands of years. This means that a forest policy is vital, that it must transcend national frontiers and generations of people, and that it must allow for the inevitable changes that take place in the forests, in needs, and hence in policy. The Strasbourg conference was one of the first events on such a scale to reach this conclusion. A general declaration was made that 'a central place in any ecologically coherent forest policy must be given to continuity over time and to the possible effects of unforeseen events, to ensure that the full potential of these forests is maintained'.

That general declaration was accompanied by six detailed resolutions to assist national policymaking. The first proposes the extension and systematic siting of surveillance sites to monitor forest decline. Forest decline is still poorly understood but leads to the loss of a high proportion of a tree's needles or leaves. The entire continent and the majority of species are now affected: between 30% and 50% of the tree population. The condition appears to result from the cumulative effect of a number of factors, with atmospheric pollutants the principal culprits. Compounds of nitrogen and sulphur dioxide should be particularly closely watched. However, their effects are probably accentuated by climatic factors, such as drought and hard winters, or soil imbalances such as soil acidification, which damages roots. The second resolution concentrates on the need to preserve the genetic diversity of European forests. The aim is to reverse the decline in the number of tree species or at least to preserve the 'genetic material' of all of them. Although forest fires do not affect all of Europe to the same extent the amount of damage caused the experts to propose as the third resolution that the Strasbourg conference considers the establishment of a European databank on the subject. All information used in the development of national preventative policies would become generally available. The subject of the fourth resolution discussed by the ministers was mountain forests.

In Europe, it is undoubtedly the mountain ecosystem which has changed most rapidly and is most at risk. A thinly scattered permanent population and development of leisure activities, particularly skiing, have resulted in significant long-term changes to the local ecosystems. Proposed developments include a preferential research program on mountain forests. The fifth resolution related the European research network on the physiology of trees, called Euro. Silva should support joint European research on tree diseases and their physiological and biochemical aspects. Each country concerned could increase "the number of scholarships and other financial support for doctoral theses and research projects in this area, finally, the conference established the framework for a European research network on forest ecosystems.

This would also involve harmonizing activities in individual countries as well as identifying a number of priority research topics relating to the protection of forests. The Strasbourg conference's main concern was to provide for the future. This was the initial motivation, one now shared by all 31 participants representing 31 European countries. Their final text commits them to on-going discussion between government representatives with responsibility for forests.

*1. Questions 1-7. 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.

1) Forest problems of Mediterranean countries are to be discussed at the next meeting of experts.

2) Problems in Nordic countries were excluded because they are outside the European - Economic Community.

3) Forests are a renewable source of raw material.

4) The biological functions of forests were recognized only in the twentieth century

5) Natural forests still exist in parts of Europe

6) Forest policy should be limited by national boundaries.

7) The Strasbourg conference decided that a forest policy must allow for the possibility of change.

*2. Questions 8-13. Look at the following statements issued by the conference. Which six of the following statements a) – j) refer to the resolutions that were issued? Match the statements with the appropriate resolutions (Questions 8-13).*

a) all kinds of species of trees should be preserved;

b) fragile mountain forests should be given priority in research programs;

c) the surviving natural forests of Europe do not need priority treatment;

d) research is to be better co-ordinate throughout Europe;

e) information on forest fires should be collected and shared;

f) loss Of leaves from trees should be more extensively and carefully monitored;

g) resources should be allocated to research into tree diseases;

h) skiing should be encouraged in thinly populated areas;

i) soil imbalances such as acidification should be treated with compounds of nitrogen and sulphur;

j) information is to be systematically gathered on any decline in the condition of forests.

8) Resolution 1.

9) Resolution 2.

- 10) Resolution 3.
- 11) Resolution 4.
- 12) Resolution 5.
- 13) Resolution 6.

3. Question 14. Choose the correct letter, A, B, C or D.

14. What is the best title for Reading Passage?

- a) the biological, economic and recreational role of forests;
- b) plans to protect the forests of Europe;
- c) the priority of European research into ecosystems;
- d) proposals for a worldwide policy on forest management.

## **Text 9**

### **Climate change and the Inuit**

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

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

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

c) The Canadian Arctic is a vast, treeless polar desert that's covered with snow for most of the year. Venture into this terrain and you get some idea of the hardships facing anyone who calls this home. Farming is out of the question and nature offers meagre pickings. Humans first settled in the Arctic a mere 4,500 years ago, surviving by exploiting sea mammals and fish. The environment tested them to the limits: sometimes the colonists were successful, sometimes they failed and vanished. But

around a thousand years ago, one group emerged that was uniquely well adapted to cope with the Arctic environment. These Thule people moved in from Alaska, bringing kayaks, sleds, dogs, pottery and iron tools. They are the ancestors of today's Inuit people.

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

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

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

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

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

List of Headings:

- 1) The reaction of the Inuit community to climate change.
- 2) Understanding of climate change remains limited.
- 3) Alternative sources of essential supplies.
- 4) Respect for Inuit opinion grows.
- 5) A healthier choice of food.
- 6) A difficult landscape.
- 7) Negative effects on well-being.
- 8) Alarm caused by unprecedented events in the Arctic.
- 9) The benefits of an easier existence.

<i>Example</i>	<i>Answer</i>
Paragraph A	8

- 1) Paragraph B.
- 2) Paragraph C.
- 3) Paragraph D.
- 4) Paragraph E.
- 5) Paragraph F.
- 6) Paragraph G.

2. Questions 7-14. Complete the summary of paragraphs c and d below. Choose **NO MORE THAN TWO WORDS** from paragraphs c and d for each answer.

If you visit the Canadian Arctic, you immediately appreciate the problems faced by people for whom this is home. It would clearly be impossible for the people to engage in \_\_\_\_ (7) as a means of supporting themselves. For thousands of years they have had to rely on catching \_\_\_\_ (8) and \_\_\_\_ (9) as a means of sustenance. The harsh surroundings saw many who tried to settle there pushed to their limits, although some were successful. The \_\_\_\_ (10) people were an example of the latter and for them the environment did not prove unmanageable. For the present inhabitants, life continues to be a struggle. The territory of Nunavut consists of little more than ice, rock and a few \_\_\_\_ (11). In recent years, many of them have been obliged to give up their \_\_\_\_ (12) lifestyle, but they continue to depend mainly on \_\_\_\_ (13) their food and clothes. \_\_\_\_ (14) produce is particularly expensive.

## **Text 10**

### **Reducing the Effect of Climate Change**

*Mark Rowe reports on the increasingly ambitious geo-engineering projects being explored by scientists:*

a) Such is our dependence on fossil fuels, and such is the volume of carbon dioxide already released into the atmosphere, that many experts agree that significant global warming is now inevitable. They believe that the best we can do is keep it at a reasonable level, and at present, the only serious option for doing this is cutting back on our carbon emissions. But while a few countries are making major strides in this regard, the majority is having great difficulty even stemming the rate of increase, let alone reversing it. Consequently, an increasing number of scientists are beginning to explore the alternative of geo-engineering — a term which generally refers to the intentional large-scale manipulation of the environment. According to its proponents, geo-engineering is the equivalent of a backup generator: if Plan A - reducing our dependency on fossil fuels - fails, we require a Plan B, employing grand schemes to slow down or reverse the process of global warming.

b) Geo-engineering; has been shown to work, at least on a small localised scale. For decades, MayDay parades in Moscow have taken place under clear blue skies, aircraft having deposited dry ice, silver iodide and cement powder to disperse clouds. Many of the schemes now suggested look to do the opposite, and reduce the amount of sunlight reaching the planet. The most eye-catching idea of all is suggested by Professor Roger Angel of the University of Arizona. His scheme would employ up to 16 trillion minute spacecraft, each weighing about one gram, to form a transparent, sunlight-refracting sunshade in an orbit 1.5 million km above the Earth. This could, argues Angel, reduce the amount of light reaching the Earth by two per cent.

c) The majority of geo-engineering projects so far carried out — which include planting forests in deserts and depositing iron in the ocean to stimulate the growth of algae - have focused on achieving a general cooling of the Earth. But some look specifically at reversing the melting at the poles, particularly the Arctic. The reasoning is that if you replenish the ice sheets and frozen waters of the high latitudes, more light will be reflected back into space, so reducing the warming of the oceans and atmosphere.

d) The concept of releasing aerosol sprays into the stratosphere above the Arctic has been proposed by several scientists. This would involve using sulphur or hydrogen sulphide aerosols so that sulphur dioxide would form clouds, which would, in turn, lead to a global dimming. The idea is modeled on historic volcanic explosions, such as that of Mount Pinatubo in the Philippines in 1991, which led to a short-term cooling of global temperatures by 0.5 °C. Scientists have also scrutinized whether it's possible to preserve the ice sheets of Greenland with reinforced high-tension cables, preventing icebergs from moving into the sea. Meanwhile, in the Russian Arctic, geo-engineering plans include the planting of millions of birch trees. Whereas the -regions native evergreen pines shade the snow and absorb radiation, birches would shed their leaves in winter, thus enabling radiation to be reflected by the snow. Re-routing Russian rivers to increase cold water flow to ice-forming areas could also be used to slow down warming, say some climate scientists.

e) But will such schemes ever be implemented? Generally speaking, those who are most cautious about geo-engineering are the scientists involved in the research. Angel says that his plan is 'no substitute for developing renewable energy: the only

permanent solution'. And Dr Phil Rasch of the US-based Pacific Northwest National Laboratory is equally guarded about the role of geo-engineering: 'I think all of us agree that if we were to end geo-engineering on a given day, then the planet would return to its pre-engineered condition very rapidly and probably within ten to twenty years. That's certainly something to worry about.'

f) The US National Center for Atmospheric Research has already suggested that the proposal to inject sulphur into the atmosphere might affect rainfall patterns across the tropics and the Southern Ocean. 'Geo-engineering plans to inject stratospheric aerosols or to seed clouds would act to cool the planet, and act to increase the extent of sea ice,' says Rasch. 'But all the models suggest some impact on the distribution of precipitation.'

g) A further risk with geo-engineering projects is that you can "overshoot Y says Dr Dan Hunt, from the University of Bristol's School of Geophysical Sciences, who has studied the likely impacts of the sunshade and aerosol schemes on the climate. 'You may bring global temperatures back to pre-industrial levels, but the risk is that the poles will still be warmer than they should be and the tropics will be cooler than before industrialization. 'To avoid such a scenario," Hunt says, "Angel's project would have to operate at half strength; all of which reinforces his view that the best option is to avoid the need for geo-engineering altogether."

h) The main reason why geo-engineering is supported by many in the scientific community is that most researchers have little faith in the ability of politicians to agree - and then bring in — the necessary carbon cuts. Even leading conservation organizations see the value of investigating the potential of geo-engineering. According to Dr Martin Sommerkorn, climate change advisor for the World Wildlife Fund's International Arctic Program, 'Human-induced climate change has brought humanity to a position where we shouldn't exclude thinking thoroughly about this topic and its possibilities.'

1. Questions 1-3. Reading Passage 184 has eight paragraphs a) – h). Which paragraph contains the following information?

- 1) Mention of a geo-engineering project based on an earlier natural phenomenon.
- 2) An example of a successful use of geo-engineering.
- 3) A common definition of geo-engineering.

2. Questions 4-10. Complete the table below. Choose ONE WORD from the passage for each answer.

Procedure	Aim
put a large number of a tiny spacecraft into orbit far above Earth	to create ____ (4) that would reduce the amount of light reaching Earth
place ____ (5) in the sea	to encourage ____ (6) to form
release aerosol sprays into the stratosphere	To create ____ (7) that would reduce the amount of light reaching Earth

fix strong ____ (8) to Greenland ice sheets.	to prevent icebergs moving into the sea
plant trees in Russian Arctic that would lose their lives in winter	to allow the ____ (9) to reflect radiation
change the direction of ____ (10)	To bring more cold water into ice-forming areas

3. Questions 11-14 Look at the following statements (Questions 11-14) and the list of scientists below. Match each statement with the correct scientist, a) - d).

List of Scientists:

- a) Roger Angel;
- d) Phil Rasch;
- c) Dan Lunt;
- d) Martin Sommerkorn.

11) The effects of geo-engineering may not be long-lasting.

12) Geo-engineering is a topic worth exploring.

13) It may be necessary to limit the effectiveness of geo-engineering projects.

14) Research into non-fossil-based fuels cannot be replaced by geo-engineering.

## **Text 11**

### **Crop-growing skyscrapers**

By the year 2050, nearly 80% of the Earth's population will live in urban centers. Applying the most conservative estimates to current demographic trends, the human population will increase by about three billion people by then. An estimated 109 hectares of new land (about 20% larger than Brazil) will be needed to grow enough food to feed them, if traditional farming methods continue as they are practiced today.

At present, throughout the world, over 80% of the land that is suitable for raising crops is in use. Historically, some 15% of that has been laid waste by poor management practices. What can be done to ensure enough food for the world's population to live on?

The concept of indoor farming is not new, since hothouse production of tomatoes and other produce has been in vogue for some time. What is new is the urgent need to scale up this technology to accommodate another three billion people. Many believe an entirely new approach to indoor farming is required, employing cutting-edge technologies. One such proposal is for the 'Vertical Farm'. The concept is of multi-story buildings in which food crops are grown in environmentally controlled conditions. Situated in the heart of urban centers, they would drastically reduce the amount of transportation required to bring food to consumers. Vertical farms would need to be efficient, cheap to construct and safe to operate. If

successfully implemented, proponents claim, vertical farms offer the promise of urban renewal, sustainable production of a safe and varied food supply (through year-round production of all crops), and the eventual repair of ecosystems that have been sacrificed for horizontal farming.

It took humans 10,000 years to learn how to grow most of the crops we now take for granted. Along the way, we despoiled most of the land we worked, often turning verdant, natural ecozones into semi-arid deserts. Within that same time frame, we evolved into an urban species, in which 60% of the human population now lives vertically in cities. This means that, for the majority, we humans have shelter from the elements, yet we subject our food-bearing plants to the rigours of the great outdoors and can do no more than hope for a good weather year. However, more often than not now, due to a rapidly changing climate, that is not what happens. Massive floods, long droughts, hurricanes and severe monsoons take their toll each year, destroying millions of tons of valuable crops.

The supporters of vertical farming claim many potential advantages for the system. For instance, crops would be produced all year round, as they would be kept in artificially controlled, optimum growing conditions. There would be no weather-related crop failures due to droughts, floods or pests. All the food could be grown organically, eliminating the need for herbicides, pesticides and fertilizers. The system would greatly reduce the incidence of many infectious diseases that are acquired at the agricultural interface. Although the system would consume energy, it would return energy to the grid via methane generation from composting nonedible parts of plants. It would also dramatically reduce fossil fuel use, by cutting out the need for tractors, ploughs and shipping.

A major drawback of vertical farming, however, is that the plants would require artificial light. Without it, those plants nearest the windows would be exposed to more sunlight and grow more quickly, reducing the efficiency of the system. Single-storey greenhouses have the benefit of natural overhead light; even so, many still need artificial lighting.

A multi-story facility with no natural overhead light would require far more. Generating enough light could be prohibitively expensive, unless cheap, renewable energy is available, and this appears to be rather a future aspiration than likelihood for the near future.

One variation on vertical farming that has been developed is to grow plants in stacked trays that move on rails. Moving the trays allows the plants to get enough sunlight. This system is already in operation, and works well within a single-story greenhouse with light reaching it from above: it is not certain, however, that it can be made to work without that overhead natural light.

Vertical farming is an attempt to address the undoubted problems that we face in producing enough food for a growing population. At the moment, though, more needs to be done to reduce the detrimental impact it would have on the environment, particularly as regards the use of energy. While it is possible that much of our food will be grown in skyscrapers in future, most experts currently believe it is far more likely that we will simply use the space available on urban rooftops.

1. Questions 1-7. Complete the sentences below. Choose **NO MORE THAN TWO WORDS** from the passage for each answer.

### **Indoor farming**

- 1) Some food plants, including \_\_\_\_\_ are already grown indoors.
- 2) Vertical farms would be located in \_\_\_\_\_ meaning that there would be less need to take them long distances to customers.
- 3) Vertical farms could use methane from plants and animals to produce \_\_\_\_\_
- 4) The consumption of \_\_\_\_\_ would be cut because agricultural vehicles would be unnecessary.
- 5) The fact that vertical farms would need \_\_\_\_\_ light is a disadvantage.
- 6) One form of vertical farming involves planting in \_\_\_\_\_ which are not fixed.
- 7) The most probable development is that food will be grown on \_\_\_\_\_ in towns and cities.

2. Questions 8-13. Do the following statements agree with the information given in Reading Passage 1? Write

TRUE if the statement agrees with the information.

FALSE if the statement contradicts the information.

NOT GIVEN if there is no information on this.

- 8) Methods for predicting the Earth's population have recently changed.
- 9) Human beings are responsible for some of the destruction to food-producing land.
- 10) The crops produced in vertical farms will depend on the season.
- 11) Some damage to food crops is caused by climate change.
- 12) Fertilizers will be needed for certain crops in vertical farms.
- 13) Vertical farming will make plants less likely to be affected by infectious diseases.

### **Text 12**

#### **The Dust Bowl**

An ecological and economic disaster of unprecedented proportions struck the southern Great Plains in the mid-1930s. The region had suffered several drought years in the early 1930s. Such dry spells occurred regularly in roughly twenty-year cycles. But this time the parched earth became swept up in violent dust storms the likes of which had never been seen before. The dust storms were largely the consequence of years of stripping the landscape of its natural vegetation. During

World War I, wheat fetched record-high prices on the world market, and for the next twenty years Great Plains farmers had turned the region into a vast wheat factory.

The wide flatlands of the Great Plains were especially suited to mechanized farming, and gasoline powered tractors, disc plows, and harvester-thresher combines increased productivity enormously. Back in 1830 it had taken some fifty-eight hours of labor to bring an acre of wheat to the granary; in much of the Great Plains a hundred year later it required less than three hours. As wheat prices fell in the 1920s, farmers broke still more land to make up the difference with increased production. Great Plains farmers had created an ecological time bomb that exploded when drought returned in the early 1930s. a) With native buffalo grass destroyed for the sake of wheat growing, there was nothing left to prevent soil erosion. b) Dust storms blew away tens of millions of acres of rich topsoil, and thousands of farm families left the region. Those who stayed suffered deep economic and psychological losses from the calamity. c) The hardest-hit regions were western Kansas, eastern Colorado, western Oklahoma, the Texas Panhandle, and eastern New Mexico. d) It was the *calamity* in this southern part of the Great Plains that prompted a Denver journalist to coin the phrase "Dust Bowl."

Black blizzards of dust a mile and a half high rolled across the landscape, darkening the sky and whipping the earth into great drifts of dust that settled over hundreds of miles. Dust storms made it difficult for humans and livestock to breathe and destroyed crops and trees over vast areas. Dust storms turned day into night, terrifying those caught in them. "Dust pneumonia" and other respiratory infections afflicted thousands, and many travelers found themselves stranded in automobiles and trains unable to move. The worst storms occurred in the early spring of 1935. Several federal agencies intervened directly to relieve the distress. Many thousands of Great Plains farm families were given direct emergency relief by the Resettlement Administration. Other federal assistance included crop and seed loans, moratoriums on loan payments, and temporary jobs with the Works Progress Administration. In most Great Plains counties, from one-fifth to one third of the families applied for relief; in the hardest-hit communities as many as 90 percent of the families received direct government aid. *The Agricultural Adjustment Administration paid wheat farmers millions of dollars not to grow what they could not sell and encouraged the diversion of acreage from soil-depleting crops like wheat to soil – enriching crops such as sorghum.*

To reduce the pressure from grazing cattle on the remaining grasslands, the Drought Relief Service of the Department of Agriculture purchased more than 8 million head of cattle in 1934 and 1935. For a brief time, the federal government was the largest cattle owner in the world. This agency also lent ranchers money to feed their remaining cattle. The Taylor Grazing Act of 1934 brought stock grazing on 8 million acres of public domain lands under federal management.

The federal government also pursued longer-range policies designed to *alter* land-use patterns, reverse soil erosion, and nourish the return of grasslands. The Department of Agriculture, under Secretary Henry A. Wallace, sought to change farming practices. The spearhead for this effort was the Soil Conservation Service

(SCS), which conducted research into controlling wind and water erosion, set up demonstration projects, and offered technical assistance, supplies, and equipment to farmers engaged in conservation work on farms and ranches. The SCS pumped additional federal funds into the Great Plains and created a new rural organization, the soil conservation district, which administered conservation regulations locally. By 1940 the acreage subject to blowing in the Dust Bowl area of the southern Plains had been reduced from roughly 50 million acres to less than 4 million acres. In the face of the Dust Bowl disaster, New Deal farm policies had restricted market forces in agriculture. But the return of regular rainfall and the outbreak of World War II led many farmers to abandon the techniques that the SCS had taught *them* to accept. Wheat farming expanded and farms grew as farmers once again pursued commercial agriculture with little concern for its long-term effects on the land.

1). *What is the main idea in this passage?*

- a) the Dust Bowl was named by a journalist in Denver;
- b) ranchers and farmers competed for land in the Dust Bowl;
- b) conservation policies never succeeded in the Dust Bowl;
- d) farming practices in the Dust Bowl resulted in a disaster.

2). *How many acres were affected by the erosion at the height of the storms?*

- a) 50 million;
- b) 10 million;
- c) 8 million;
- d) 4 million.

3). *The word calamity in the passage is closest in meaning to:*

- a) situation;
- b) disaster;
- c) storm;
- d) region.

4). *The word alter in the passage is closest in meaning to:*

- a) expand;
- b) predict;
- c) notice;
- d) modify.

5) *The word them in the last paragraph refers to:*

- a) farmers;
- b) techniques;
- c) farms;
- d) policies.

6). *According to paragraph 7, which of the following practices did farmers use after World War II?*

- a) New Deal farm policies;
- b) The SCS techniques;
- c) Cattle grazing on farmland;
- d) Commercial methods.

7). *Which of the sentences below best expresses the information in the highlighted statement in the passage? The other choices change the meaning or leave out important information:*

- a) planting sorghum with wheat saved the government millions of dollars in subsidies;
- b) the government subsidized crops that contributed to the regeneration of the soil;
- c) farmers sold their wheat crops to the government for a large subsidy;
- d) the soil was depleted because the government had subsidized wheat crops.

8). *The author mentions all of the following government relief programs EXCEPT:*

- a) technical support for farmers in soil conservation techniques;
- b) loans to ranchers for the purchase of cattle feed;
- c) temporary employment in the Works Progress Administration;
- d) the purchase of homesteads that had been abandoned.

9). *It can be inferred from the passage that:*

- a) ranchers caused the Dust Bowl by grazing too many buffalo on the grasslands;
- b) the Dust Bowl was brought to an end by World War II;
- c) the Great Plains is a wheat-producing region in the United States;
- d) all the homesteaders had to abandon their farms during the Dust Bowl.

10). Four capital letters indicate where the following sentence can be added to the passage.

*A contemporary newspaper account describes dust blowing in through closed doors and windows, destroying possessions and making provision inedible.*

Where would the sentence best fit into the second paragraph?

- a) A
- b) B
- c) C
- d) D

Answer keys:

## Vocabulary

### 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 2

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

#### *Tracking Hurricanes*

- 1) GPS-dropwindsondes
- 2) (weather) balloons
- 3) (the custom of) naming hurricanes began in the (early) 1950s
- 4) Camille
- 5) hurricanes
- 6) heat (of water) / warm water (*NB: the Atlantic Conveyor does not give energy to all hurricanes*)
- 7) (the) Atlantic Conveyor
- 8) previously used sensors
- 9) data analysts
- 10) (a) computer (simulation) /hurricane researchers
- 11) (a) storm surge
- 13) d
- 14) b
- 15) a

### Text 2

#### *Beneath the Canopy*

- 1) E
- 2) A
- 3) C
- 4) D
- 5) F
- 6) 3
- 7) time (and) money

- 8) pharmaceutical companies /developed countries
- 9) b
- 10) d
- 11) a

**Text 3**

*Geothermal Energy*

- 1)A
- 2)D
- 3)C
- 4)B
- 5)D
- 6)a
- 7)B
- 8)A
- 9)B
- 10)A
- 11)C
- 12)C
- 13)B,D,E

**Text 4**

*Rising Sea Levels*

- 1)B
- 2)B
- 3)B
- 4)D
- 5)B
- 6)B
- 7)A
- 8)A
- 9)C
- 10)C
- 11)D
- 12)A
- 13) C,B,E

**Text 5**

*Exotic and Endangered Species”*

- 1)C
- 2)D
- 3)B
- 4)C
- 5)C

- 6)B
- 7)C
- 8)C
- 9)D
- 10)A
- 11)D
- 12)C
- 13) E,B,C

**Text 6**

*Environmental Impacts of Logging*

- 1) E
- 2) B
- 3) D
- 4) C
- 5) fells
- 6) myriad
- 7) habitats
- 8) defense
- 9) environment
- 10) pollutants
- 11) extensive
- 12) stability
- 13) erode
- 14) Derenders

**Text 7**

*The Long-Term Stability of Ecosystems*

- 1) C
- 2) C
- 3) A
- 4) B
- 5) C
- 6) B
- 7) C
- 8) B
- 9) A
- 10) C
- 11) D
- 12) D
- 13) B
- 14) B,C, E

**Text 8**

*The truth about the environment*

- 1) yes 2) not given 3) no 4) not given 5) yes 6) no 7) c 8) d 9) c  
10) d 11) 38.long-term 12) right 13) urgent

**Text 9**

*Forests*

- 1)not given  
2) false  
3) true  
4) false  
5) false  
6) false  
7) true  
8) j  
9)a  
10) e  
11)b  
12 g  
13)d  
14)b

**Text 9**

*Climate change and the Inuit*

---

- 1) 1  
2) 6  
3) 3  
4) 7  
5) 4  
6) 2  
7) farming  
8) sea mammals  
9) fish  
10) Thule  
11) islands  
12) nomadic  
13) nature  
14) Imported

**Text 10**

*Reducing the Effects of Climate Change*

---

- 1) D  
2) B  
3) A  
4) sunshade

- 5) iron
- 6) algae
- 7) clouds
- 8) cables
- 9) snow
- 10) rivers
- 11) B
- 12) D
- 13) C
- 14) A

**Text 11**

*Crop-growing skyscrapers*

- 1)tomatoes:
- 2) urban centres/centers:
- 3)energy:
- 4)fossil fuel:
- 5)artificial:
- 6)(stacked) trays:
- 7)(urban) rooftops:
- 8)NOT GIVEN:
- 9)TRUE:
- 10)FALSE:
- 11) TRUE:
- 12) FALSE:
- 13) TRUE

**Text 12**

*The Dust Bowl*

- 1) D
- 2) A
- 3) B
- 4) D
- 5) A
- 6) D
- 7) B
- 8) D
- 9) C
- 10) C