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Тетрадь

по английскому языку

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Содержание

Глава I

Модуль №1

Глава 1

Семинар №1 08.02.24

1.1. Text 10A

Light Beam at the Service of Humanity

(1) Lasers often remind us of science fiction films and novels. Long ago science fiction writers predicted the appearance of a mysterious fiery sword, which would become an invincible weapon. The idea of using lasers as death rays has also been employed by creators of such blockbusters as X-Men and Star Wars. And though the ray laser gun still remains science fiction, putting a light beam at the service of humanity is embodied in myriads5 of other uses based on laser technology.

(2) The word "laser" stands for “light amplification by stimulated emission of radiation”. A laser, an optical device that strengthens light waves and generates very intense beams of light, represents a powerful light source. The difference between ordinary light and laser light is like the difference between the ripples in your bathtub and huge waves on the sea. Until the invention of the laser, the available light sources were generally neither monochromatic nor coherent and were of relatively low intensity. The laser produces a well-directed, very intense beam which is monochromatic, directional and coherent. Monochromatic means that all of the light produced by the laser is of a single wavelength. Directional means that the beam of light has a very low divergence. Light from conventional sources, such as a light bulb or the sun, diverges, spreading in all directions. The intensity may be large at the source, but it decreases rapidly as the observer moves away from the source. In contrast, the laser output has a very small divergence and can maintain high beam intensities over long ranges. Thus, relatively low power lasers are able to project more energy at a single wavelength within a narrow beam than can be obtained from much more powerful conventional light sources. Coherent means that the waves of light are in phase with each other. A light bulb produces many wavelengths, that is why its light is incoherent.

(3) The first discoveries that eventually brought us lasers were made at the dawn of the 20th century. In 1917, Einstein laid the foundation for the laser when he introduced the concept of stimulated emission. In 1954, Russian physicists Nikolay Basov and Alexander Prokhorov working on the quantum oscillator created the first microwave generator, laser’s predecessor, and described the theory of its operation. At the same time, the idea how to generate stimulated emission at microwave frequencies was also developed independently by American physicist Charles Townes. He showed how this device, which was named a maser, could work. A decade later, in 1964, all three were awarded with the Nobel Prize in physics for their discoveries. In 1960, physicist from California Theodore Maiman demonstrated the first ruby laser, which was considered the first successful light laser. Other types of laser quickly followed: a gas laser and a semiconductor injection13 laser.

(4) Due to their remarkable properties lasers turned out to have all sorts of useful applications in different fields from communications to medicine. In science they are a great help in spectroscopy. They allow gigabytes of information to be recorded. They can be used to focus relatively low wattage power to such high intensity that it can be used to cut, heat or vaporise material. They have numerous applications aboard spacecraft. Laser beams allow us to measure distances with much greater accuracy than ever before. Laser-sighting devices are fitted to military and police rifles to help soldiers hit their targets. Lasers can be used as a defence against nuclear missiles and they may also be of use in thermonuclear fusion reactors. Medicine and surgery have been transformed thanks to highly accurate laser scalpels and laser diagnostics. In the arts, lasers can provide fantastic displays of light.

(5) We are currently living in an era of intense development of lasers. New types of lasers(chemical, excimer, semiconductor, free electron) are introduced almost every year. New applications of lasers are constantly emerging. For example, not long ago archaeologists uncovered a new vast network of cities and roads in the thick jungles around the ancient Cambodian temple complex of Angkor Wat, implementing an aerial survey using Lidar (light detection and ranging). Lidar might also prove crucial in helping autonomous vehicles navigate. Lasers could have a huge impact on the world of computing. For example, a silicon laser computer chip promises faster data transfers. Laser developers say it could enable us to see people behind walls, detect underground infrastructure without digging holes, and develop navigation systems that do not rely on GPS.

1.2. Exercise №1

Match the words (1-6) with their definitions (a-f). Use a dictionary if necessary.

1. stimulated
2. radiation
3. acronym
4. emission
5. beam
6. amplification

a. energy in the form of heat or light that you cannot see and which can be very harmful
b. a word formed from the initial letters of other words
c. the increase in volume of a signal
d. a line of radiation or particles flowing in one direction
f. the act of sending out gases or other substances
e. made stronger or more active

Solution

1. f
2. a
3. b
4. e
5. d
6. c

1.3. Exercise №2

In groups answer the questions.

1. What is a laser?
   a. a device which produces a very narrow beam of light useful in many technologies
   b. a process of optical amplification of light based on radiation emission
   c. both a and b
2. What kind of word is the word ‘laser’?
   a. acronym
   b. shortening
   c. contraction
3. Can you decode the word ‘laser’? (use the words from task 1)

   L... A... by Stimulated E... of R... .

Solution

1. a
2. a
3. Light Amplification by Stimulated Emission of Radiation

1.4. Exercise №3

Study the pictures below. Which of the following words and phrases refer to ordinary light (1) and which to laser light (2)?

Coherent; its intensity decreases with distance; highly monochromatic; it is not strictly monochromatic; organized; less intense; travels in one direction; incoherent; highly intense; concentrated; travels in all directions; disorganized.

Solution

`Ordinary light:`

- disorganized
- its intensity decreases with distance
- it is not strictly monochromatic
- less intense, incoherent
- travels in all directions

`Laser light:`

- organized
- coherent
- highly monochromatic
- travels in one direction
- highly intense
- concentrated

1.5. Exercise №6

`[Устно]`

Read the text again and answer the following questions.

1. Why can we say that lasers were predicted long before their invention?
2. What is a laser? What does the word ‘laser’ mean?
3. What kind of beam do lasers have?
4. What do we mean by the words ‘monochromatic, directional, and coherent’ when we refer to laser light?
5. Why is the light from the laser so concentrated?
6. Who proposed the theoretical possibility of the process that made lasers possible?
7. Who created the first microwave generator?
8. Who demonstrated the first successful light laser?
9. What laser types are mentioned in the text?
10. Do you agree with the author’s opinion that lasers have found myriads of useful applications? What examples do you think best prove this point?
11. While reading this text, which uses of lasers surprised you the most?
12. Can you think of an example of a laser device or technology that you have used or are using?

1.6. Exercise №7

`[Устно]`

Read the statements and decide which of them are true (T) and which are false (F) according to text 10A. Explain why.

1. The word ‘laser’ means microwave amplification by stimulated emission of radiation.
2. Laser was invented at the dawn of the 20th century.
3. Albert Einstein was the first inventor of a laser.
4. Laser came into existence only in the second half of the 20-th century.
5. Unfortunately most of the applications of a laser proved to be unattainable in the real world.
6. The use of lasers in thermonuclear fusion reactors may be the key to the future.
7. Laser weapons are widely used by the military.
8. In medicine lasers can be used for various surgical procedures.
9. Very few inventions can match the impact of the laser’s invention.
10. Laser technology has a promising future.

Глава 2

Домашнее задание №1 15.02.24

2.1. Exercise №5

Find the words and phrases in the text which have the following meanings.

§ 1

1. **a verb:** to make someone remember something
2. **a verb:** to use a particular idea or method
3. **a verb:** to continue to be in the same state or condition
4. **a verb:** to express clearly or show the importance of an idea or principle

§ 2

5. **a noun:** the product of making larger or greater in amount or intensity
6. **a noun:** the result of sending something out (e.g. gas or heat)
7. **a verb:** to make stronger
8. **a noun:** the point from which something begins
9. **an adverb:** in relation to something else
10. **a noun:** a shining line of light
11. **an -ing form of a verb:** covering a large area
12. **a verb:** to go down to a lower level
13. a phrase used when you are comparing objects or situations and saying that they are completely different
14. the amount of something (energy, work, information) produced by a machine

§ 3

15. **an adverb:** after a long time
16. **a verb phrase:** to provide something (idea, principle) from which another thing can develop
17. **a verb:** to give someone a prize for something they have done

§ 4, 5

18. **a prepositional phrase:** because of or thanks to
19. **an adjective:** unusual or surprising and therefore deserving attention
20. **a verb:** to have a particular result, especially one that you didn't expect
21. **a verb:** to write something (e.g. information) down
22. **a verb:** to change into a vapour
23. **a verb:** to find the size, length or amount of something
24. **a noun:** the quality of being correct and true
25. **a verb:** to carry out

26. **a verb phrase:** to be of primary importance

Solution

1. remind
2. employ
3. remain
4. embody
5. amplification
6. emission
7. strengthen
8. source
9. ?
10. laser
11. spreading
12. decrease
13. the difference between
14. intensity
15. eventually
16. -
17. award
18. due to
19. remarkable
20. -
21. record
22. -
23. measure
24. accuracy
25. -

2.2. Exercise №8

Complete the sentences using the information from the text without looking into the text.

1. The word laser is an acronym standing for _____.
2. Laser light differs from ordinary light due to its _____.
3. Russian physicists Nikolay Basov and Alexander Prokhorov created _____ while working on _____.
4. In 1960, physicist from California Theodore Maiman demonstrated _____.
5. Lasers turned out to have myriads of uses, from _____ to _____.
6. In science lasers provide great assistance with _____.
7. Laser-sighting devices are fitted to _____ to help soldiers _____.
8. Today new applications of lasers are _____.
9. Not long ago archaeologists uncovered _____ using Lidar.
10. In computing lasers could have _____.

Solution

1. Laser stands for "light amplification by stimulated emission of radiation."
   "The word 'laser' stands for 'light amplification by stimulated emission of radiation'." `(Paragraph 2)`
2. Laser light is different from ordinary light because it's monochromatic, directional, and coherent.
   "The laser produces a well-directed, very intense beam which is monochromatic, directional and coherent." `(Paragraph 2)`
3. Basov and Prokhorov created the precursor to the laser while studying the quantum oscillator.
   "In 1954, Russian physicists Nikolay Basov and Alexander Prokhorov working on the quantum oscillator created the first microwave generator, laser's predecessor." `(Paragraph 3)`
4. In 1960, Maiman demonstrated the first ruby laser.
   "In 1960, physicist from California Theodore Maiman demonstrated the first ruby laser." `(Paragraph 3)`
5. Lasers have diverse applications, from medicine to communications.
   "Due to their remarkable properties, lasers turned out to have all sorts of useful applications in different fields from communications to medicine." `(Paragraph 4)`
6. Lasers assist greatly in scientific spectroscopy.
   "In science they are a great help in spectroscopy." `(Paragraph 4)`
7. Laser-sighting aid devices soldiers in hitting targets.
   "Laser-sighting devices are fitted to military and police rifles to help soldiers hit their targets." `(Paragraph 4)`
8. New laser applications are continually emerging.
   "New applications of lasers are constantly emerging." `(Paragraph 5)`
9. Archaeologists found ancient structures using Lidar.
   "Not long ago archaeologists uncovered a new vast network of cities and roads in the thick jungles around the ancient Cambodian temple complex of Angkor Wat, implementing an aerial survey using Lidar." `(Paragraph 5)`
10. Lasers in computing could greatly improve data transfer speeds.
    "For example, a silicon laser computer chip promises faster data transfers." `(Paragraph 5)`

Глава 3

Семинар №2 15.02.24

Vocabulary

`Text 10 C`

confirm (v) consumer (n) controversial (n) cure (v) diseases far-reaching (adj) invisible (adj) lack (v, n) make (v) sense (n) particle (n) photonics (n) underpin (v)

`Выпилнять -`

1. carry out
2. implement
3. do
4. make
5. created
6. turn out
7. produce/manufacture
8. run
9. execute

3.1. Exercise №21

Fill in the gaps with the words from Exercise 20 in the right form. The first letters are given. Translate the sentences into Russian.

`Example:` A d_____ microphone is the one that picks up sound from a specific area.
→ A directional microphone is the one that picks up sound from a specific area.

1. All our laboratories are f_____ with computers and high-speed internet access. 2. Some people think that electromagnetic r_____ from our mobiles is harmful. 3.Climatologists say that the e_____ of greenhouse gases contributes to global warming. 4. Melatonin, a hormone involved in controlling our sleep, is s_____ by darkness. 5. The sky cleared up and a b_____ of sunlight shone in through the window. 6. If we don't modernise, the o_____ from the factory will decrease. 7. Today it is r_____ easy to find any information thanks to the Internet. 8. The 20th century was r_____ for its inventions. 9. The Nobel Prizes are a_____ annually from a fund created for that purpose by the Swedish inventor and industrialist Alfred Bernhard Nobel. 10. A school's success can be m_____ in terms of the number of pupils who got into university. 11. Scientists need to be very careful about the a_____ of their research results. 12. Reforms should be i_____ that will allow the company to stay competitive. 13. Our students' ideas are e_____ in new classroom rules. 14. Exercising regularly is the best way to s_____

your immune system. 15. D_____ to the large volume of letters he is unable to answer personally. 16. Sometimes things don't t_____ out the way we think they're going to.

Solution

1. All our laboratories are **fitted** with computers and high-speed internet access.
2. Some people think that electromagnetic **radiation** from our mobiles is harmful.
3. Climatologists say that the **emission** of greenhouse gases contributes to global warming.
4. Melatonin, a hormone involved in controlling our sleep, is **stimulated** by darkness.
5. The sky cleared up and a **beam** of sunlight shone in through the window.
6. If we don't modernise, the **output** from the factory will decrease.
7. Today it is **relatively** easy to find any information thanks to the Internet.
8. The 20th century was **remarkable** for its inventions.
9. The Nobel Prizes are **awarded** annually from a fund created for that purpose by the Swedish inventor and industrialist Alfred Bernhard Nobel.
10. A school's success can be **measured** in terms of the number of pupils who got into university.
11. Scientists need to be very careful about the **accuracy** of their research results.
12. Reforms should be **implemented** that will allow the company to stay competitive.
13. Our students' ideas are **embodied** in new classroom rules.
14. Exercising regularly is the best way to **strengthen** your immune system.
15. **Due** to the large volume of letters he is unable to answer personally.
16. Sometimes things don't **turn** out the way we think they're going to.

3.2. Exercise №22

Guess the word by its definition. Use text 10A word list to help you.

1. If two or more waves have the same phase we call this light c_____.
2. When a liquid changes into gas we can say that it v_____.
3. M_____ colour refers to a colour scheme that is comprised of variations of one colour.
4. If one thing is in c_____ to another, it is very different from it.
5. If something e_____ heat, light or gas, it produces it and sends out by means of a physical or chemical process.
6. If someone r_____ you of a fact or event that you already know about, they say something which makes you think about it.
7. If someone or something r_____ in a particular state or condition, they stay in that state or condition and do not change.
8. You use the conjunction n_____ n__ when you are talking about two or more things that are not true or that do not happen.
9. Laser light is very d_____ which means that it is extremely narrow and is emitted in one direction.
10. A l_____ is a device that emits light through a process of optical amplification based on the stimulated emission of electromagnetic radiation

Solution

1. If two or more waves have the same phase we call this light **coherent**.
2. When a liquid changes into gas we can say that it **vaporizes**.

3. **Monochromatic** colour refers to a colour scheme that is comprised of variations of one colour.
4. If one thing is in **contrast** to another, it is very different from it.
5. If something **emits** heat, light, or gas, it produces it and sends out by means of a physical or chemical process.
6. If someone **reminds** you of a fact or event that you already know about, they say something which makes you think about it.
7. If someone or something **remains** in a particular state or condition, they stay in that state or condition and do not change.
8. You use the conjunction **neither nor** when you are talking about two or more things that are not true or that do not happen.
9. Laser light is very **directional** which means that it is extremely narrow and is emitted in one direction.
10. A **laser** is a device that emits light through a process of optical amplification based on the stimulated emission of electromagnetic radiation.

3.3. Exercise №23

Match the words with numbers (1-10) with the words with letters (a-j) to make up word collocations. Explain the meaning of these expressions and try to recall how they were used in text 10A.

`Example:` to lay + the foundation for something means 'to provide conditions that will make something possible', e.g. Einstein laid the foundation for the laser.

1. to lay
2. to prove
3. to measure
4. light
5. stimulated
6. to decrease
7. conventional
8. to spread
9. remarkable
10. to vaporise

a. crucial
b. amplification
c. emission
d. source
e. properties
f. the foundation
g. distances
h. material
i. rapidly
j. in all directions

Solution

1. f

2. a
3. g
4. c
5. b
6. i
7. h
8. j
9. e
10. d

3.4. Exercise №24

Complete each sentence with the correct word to make up a word collocation from Exercise 23.

1. Buying the works of his contemporary artists, Pavel Tretiakov laid the _____ for one of the world's greatest collections of Russian paintings. 2. Learning the facts about how COVID-19 emerged may _____ crucial for preventing future outbreaks. 3.Before electricity was invented the _____ sources of light were candles or oil lamps. 4. The use of lasers to _____ distances is based on the principle of reflection of a laser beam. 5. One of the problems the inventors of a laser faced was how to create conditions for light _____. 6. Stimulated _____ of radiation is the first and necessary condition for laser light generation, but it is not the only one. 7. Marketers know that the value of data _____ rapidly over time. 8. The fire was spreading out in all _____ because of the hot weather and strong wind. 9.The number of articles about new materials with some remarkable _____ has increased in the last years. 10. Processing materials with a laser beam allows engineers to cut, drill, weld, and even _____ different materials.

Solution

1. Buying the works of his contemporary artists, Pavel Tretiakov laid the **foundation** for one of the world's greatest collections of Russian paintings.
2. Learning the facts about how COVID-19 emerged may **prove** crucial for preventing future outbreaks.
3. Before electricity was invented the **primary** sources of light were candles or oil lamps.
4. The use of lasers to **measure** distances is based on the principle of reflection of a laser beam.
5. One of the problems the inventors of a laser faced was how to create conditions for light **amplification**.
6. Stimulated **emission** of radiation is the first and necessary condition for laser light generation, but it is not the only one.
7. Marketers know that the value of data **decreases** rapidly over time.
8. The fire was spreading out in all **directions** because of the hot weather and strong wind.
9. The number of articles about new materials with some remarkable **properties** has increased in the last years.
10. Processing materials with a laser beam allows engineers to cut, drill, weld, and even **vaporise** different materials.

3.5. Exercise №25

Match the words with the correct definition or synonym of each word as it is used in text 10B.

1. photon
2. a partial (mirror)
3. back and forth
4. power source
5. to emit
6. to reflect
7. to absorb
8. to bounce
9. concentrated
10. hence
11. to inject

a. to introduce (e.g. a fluid) into something forcefully
b. a unit of energy that carries light and has zero mass
c. the device that supplies energy
d. to return or throw back (e.g. light or sound)
e. so, thus
f. to move away from a surface
g. not complete, limited
h. to send out (e.g. light or gas)
i. to take a liquid in
j. focused
k. moving first in one direction and then in the opposite one

Solution

1. b
2. g
3. k
4. c
5. h
6. d
7. i
8. f
9. j
10. e
11. a

3.6. Exercise №27

Find the opposites. Match the words in column A with their opposites in column B.

`Example:` `to evolve` is the opposite of `to decrease, worsen`.

`A.`

1. to increase
2. to absorb
3. stimulated emission
4. inside
5. output
6. to get excited
7. to flash on
8. to inject (energy)
9. coherent
10. organised
11. to strengthen
12. to implement

`B.`

a. input
b. to emit (energy)
c. disorganised
d. to decrease
e. outside
f. incoherent
g. to reflect
h. to calm down
i. to weaken
j. spontaneous emission
k. to prevent, delay
l. to flash off

Solution

1. d
2. g
3. j
4. e
5. a
6. h
7. l
8. k
9. f
10. c
11. i
12. l

Глава 4

Домашнее задание №2 22.02.24

4.1. Exercise №28

Rewrite each sentence replacing the words in italics by their opposites. Use the words in brackets so that the new sentence has the meaning opposite to the first sentence.

`Example:` The production efficiency is the result of good work. (bad). → The production inefficiency is the result of poor work.

1. Black surfaces absorb more light than other colours. **(white)** 2. In spring wild birds increase in number in Moscow region. **(in autumn)** 3. Spontaneous emission takes place without interaction with other photons. **(when photon emission is triggered by other photons)** 4. It feels really warm inside on a winter morning. **(cold)** 5. A mouse and a keyboard are the examples of input devices. **(amonitor and a printer)** 6. For the system (such as an atom or a molecule) to calm down, you need to make its energy level lower. **(higher than the ground state)** 7. If you want to take a picture when it is dark you should choose a 'flash on' mode. **(in daylight)** 8. Ordinary light unlike laser light is incoherent and disorganized. **(laser light)** 9. The committee agreed that it was necessary to implement the changes recommended in the report. 10. Our attention is weakened by stress. **(mindfulness)**

Solution

1. White surfaces reflect more light than other colors. **(black)**
2. In autumn wild birds decrease in number in Moscow region. **(in spring)**
3. Spontaneous absorption takes place without interaction with other photons. **(when photon absorption is triggered by other photons)**
4. It feels really cold inside on a winter morning. **(warm)**
5. A monitor and a printer are the examples of output devices. **(a mouse and a keyboard)**
6. For the system (such as an atom or a molecule) to excite, you need to make its energy level higher. **(lower than the ground state)**
7. If you want to take a picture when it is bright you should choose a 'flash off' mode. **(in darkness)**
8. Laser light, unlike ordinary light, is coherent and organized. **(ordinary light)**
9. The committee agreed that it was unnecessary to implement the changes recommended in the report.
10. Our attention is strengthened by mindfulness.

4.2. Exercise №29

Use the word given in brackets to form a word which fits in the gap.

1. The name ‘laser’ stands for Light _____ by stimulated emission of radiation. (amplify) 2. Many enjoy the mental _____ of a challenging job. (stimulate) 3.Words _____ thoughts and feelings.(embodiment) 4. Difficulties _____ the mind, as labour does the body. (strong) 5. Laws controlling the _____ of greenhouse gases should be introduced. (emit) 6. Truth is the _____ of all knowledge. (found) 7. A cloud is a mass of _____ in the sky. (vaporise) 8. A graphical _____ of the experiment results is required. (represent) 9. Do you think mobile phones emit _____ ? (radiate) 10. If a text is _____, it means that it is well planned, clear and logical. (coherence)

Solution

1. The name ‘laser’ stands for Light Amplification by stimulated emission of radiation.
2. Many enjoy the mental stimulation of a challenging job.
3. Words embody thoughts and feelings.
4. Difficulties strengthen the mind, as labour does the body.
5. Laws controlling the emission of greenhouse gases should be introduced.
6. Truth is the foundation of all knowledge.
7. A cloud is a mass of vapor in the sky.
8. A graphical representation of the experiment results is required.
9. Do you think mobile phones emit radiation?
10. If a text is coherent, it means that it is well planned, clear and logical.

4.3. Exercise №30

Read the text and fill in the gaps with the following words in the appropriate form.

concentrated, coherence, weapon, monochromatic, stands for, emission, beam, to encode and transmit, sophisticated, represents, hence, to vaporise

In «The War of the Worlds» written before the turn of the last century, H. Wells told a fantastic story of how Martians almost invaded our Earth. Their 1 _____ was a mysterious «sword of heat». Today Wells’ sword of heat has come to reality in the laser. The name 2 _____ light amplification by stimulated 3 _____ of radiation. Laser, one of the most 4 _____ inventions of man, produces an intensive 5 _____ of light of a very pure single colour. It 6 _____ the fulfillment of one of the humankind’s oldest dreams of technology to provide a light beam intensive enough 7 _____ the hardest materials. There are few materials which are not suited for laser processing, 8 _____ laser treatment of materials has become an important technique lately. The laser’s most important potential may be its use in communications. We send and receive the data, video and other information, using lasers 9 _____ the data at rates 10 to 100 times faster than radio, because lasers can generate a very intense, 10 _____, highly parallel and 11 _____ beam and 12 _____ is a very important property of laser light.

Solution

In «The War of the Worlds» written before the turn of the last century, H. Wells told a fantastic story of how Martians almost invaded our Earth. Their 1 **weapon** was a mysterious «sword of heat». Today Wells' sword of heat has come to reality in the laser. The name 2 **'laser' stands for** light amplification by stimulated 3 **emission** of radiation. Laser, one of the most 4 **sophisticated** inventions of man, produces an intensive 5 **monochromatic** beam of light of a very pure single color. It 6 **represents** the fulfillment of one of humankind's oldest dreams of technology to provide a light beam intensive enough 7 **to vaporise** the hardest materials. There are few materials which are not suited for laser processing, 8 **hence** laser treatment of materials has become an important technique lately. The laser's most important potential may be its use in communications. We send and receive data, video, and other information, using lasers 9 **to encode and transmit** the data at rates 10 to 100 times faster than radio because lasers can generate a very intense, 10 **concentrated**, highly parallel, and 11 **coherent** beam, and 12 **coherence** is a very important property of laser light.

4.4. Exercise №31

Work in groups. Choose 5-7 words from Module 10 Word list and prepare a short news story to tell your group using these words. Ask your listeners to write down the words while they listen to your story. Compare your lists.

4.5. Exercise №32

Summarise the text in English paying attention to the linking words and phrases

Solution

The text discusses the invention, properties, and use of lasers. Firstly, it outlines the history of laser invention, then transitions to its properties. Thirdly, it discusses the types of existing lasers and concludes by examining practical laser applications in various fields. While there is no definitive answer to who invented the laser, several scientists contributed to its creation. Despite initial expectations of mainly military use, lasers have found widespread application in areas such as warfare and medicine due to their ability to produce an extremely narrow beam of light. The text also highlights the role of lasers in computer science. Overall, lasers have a broad range of applications, from surgical procedures to vehicle speed control devices. In conclusion, the fact that "death rays" did not become a reality is ultimately beneficial.

The concept of "photonics" emerged in the late 20th century and has become part of everyday life, encompassing technologies like fiber optic communication lines, flat-screen TVs and computer monitors, smartphones, and more. Laser communication offers high quality, greater bandwidth, and strict confidentiality. Both lasers and fiber optics have become vital components of many industries, and their combined potential is rapidly expanding. Semiconductor lasers are used in fiber-optic telecommunication systems. Research in this field has led to advancements in areas such as quantum electronics, fiber optics, quantum optics, laser physics, laser chemistry, and more. The term "photonics" encompasses all these scientific and technical areas.

Глава 5

Семинар №3 22.02.24

5.1. Text 10C

Photonics

Photonics is the science and technology of generating, controlling, and detecting photons, which are particles of light. Photonics underpins technologies of daily life from smartphones to laptops, medical instruments and lighting technology. The 21st century will depend as much on photonics as the 20th century depended on electronics. Photonics is the science of light, it is the technology of generating, controlling, and detecting light waves and photons, which are 1. _____ of light. The characteristics of the waves and photons can be used to 2. _____ the universe, to 3. _____ diseases, and even to solve crimes. Scientists have been studying light for hundreds of years. The colors of the rainbow are only a small part of the entire light wave range, called the electromagnetic spectrum. Photonics explores a wider variety of 4. _____, from gamma rays to radio, including X-rays, UV and infrared light. It was only in the 17th century that Sir Isaac Newton showed that white light is made of different colors of light. At the beginning of the 20th century, Max Planck and later Albert Einstein 5. _____ that light was a wave as well as a particle, which was a very 6. _____ theory at the time. How can light be two completely different things at the same time? Experimentation later 7. _____ this duality in the nature of light. The word Photonics appeared around 1960, when the laser was invented by Theodore Maiman. Even if we cannot see the 8. _____ electromagnetic spectrum, 9. _____ light waves are a part of our everyday life. Photonics is everywhere; in consumer electronics (barcode scanners, DVD players, remote TV control), telecommunications (internet), health (eye surgery, medical instruments), manufacturing industry (laser cutting and machining), defense and security (infrared camera, remote sensing), entertainment (holography, laser shows), etc. All around the world, scientists, engineers and technicians perform 10. _____ research surrounding the field of Photonics. The science of light is also actively taught in classrooms and museums where teachers and educators share their passion for this field with young people and the general public. Photonics opens a world of unknown and 11. _____ possibilities limited only by a lack of imagination.

How Light Really Works

Once we understand how atoms take in and give out energy, the science of light 12. _____ in a very interesting new way. Think about mirrors, for example. When you look at a mirror and see your face reflected, what's actually going on? Light (maybe from a window) is hitting your face and 13. _____ into the mirror. Inside the mirror, atoms of silver (or another very

reflective metal) are catching the 14. _____ light energy and becoming 15. _____. That makes them unstable, so they throw out new 16. _____ of light that travel back out of the mirror towards you. In effect, the mirror is playing throw and catch with you using photons of light as the balls! The same idea can help us explain things like photocopiers and 17. _____ (flat sheets of the chemical element silicon that turn sunlight into electricity). Have you ever wondered why solar panels look black even when they're in full sunlight? That's because they're 18. _____ back little or none of the light that falls on them and 19. _____ all the energy instead. (Things that are black absorb light, and reflect little or none, while things that are white reflect virtually all the light that falls on them, and absorb little or none. That's why it's best to wear white clothes on a hot day.) Where does the energy go in a solar panel if it's not reflected? If you shine sunlight onto the solar 20. _____ in a solar panel, the atoms of silicon in the cells catch the energy from the sunlight. Then, instead of producing new photons, they produce a flow of electricity instead through what's known as the 21. _____ (or photovoltaic) effect. In other words, the incoming solar energy (from the Sun) is 22. _____ to outgoing electricity.

Solution

1. particles
2. explore
3. cure
4. wavelengths
5. suggested
6. controversial
7. confirmed
8. entire
9. invisible
10. cutting-edge
11. far-reaching
12. makes sense
13. bouncing
14. incoming
15. excited
16. photons
17. cells
18. reflecting
19. absorb
20. cells
21. photoelectric
22. converted

5.2. Exercise №17

Read the text again and answer the following questions.

1. What does photonics study?
2. How could the characteristics of waves and photons be put to practical use?
3. What kind of waves does photonics explore?
4. What discoveries did the scientists of the past make while studying light?
5. What does ‘duality of light’ mean?

6. Why can we say that photonics is everywhere?
7. Do you agree with the opinion that photonics is really important today?
8. What happens when you look at a mirror?
9. Why do solar panels look black in full sunlight?
10. Why is it best to wear white clothes on a hot day?
11. What happens to the solar energy in a solar panel?
12. Do you think pursuing a career in Photonics could be exciting and rewarding?

Solution

1. Photonics studies "generating, controlling, and detecting photons, which are particles of light."
2. The characteristics of waves and photons can be practically used to "explore the universe, to cure diseases, and even to solve crimes."
3. Photonics explores "a wider variety of wavelengths, from gamma rays to radio, including X-rays, UV and infrared light."
4. Scientists in the past discovered that "white light is made of different colors of light" and later confirmed that "light was a wave as well as a particle."
5. The "duality in the nature of light" refers to the fact that "light was a wave as well as a particle."
6. Photonics is everywhere because "light waves are a part of our everyday life."
7. Yes, photonics is important today as it underpins technologies crucial to daily life and offers possibilities for advancements in various fields.
8. When you look at a mirror, "atoms of silver... are catching the incoming light energy and becoming excited," which then "throw out new photons of light that travel back out of the mirror towards you."
9. Solar panels look black in full sunlight because they're "reflecting back little or none of the light that falls on them and absorbing all the energy instead."
10. It's best to wear white clothes on a hot day because "white reflect virtually all the light that falls on them, and absorb little or none."
11. Solar panels convert sunlight into electricity through "the photoelectric (or photovoltaic) effect."
12. Pursuing a career in Photonics could be exciting and rewarding as it involves "cutting-edge research" and offers "far-reaching possibilities limited only by a lack of imagination."

5.3. Exercise №18

Listen to a short lecture about lasers and decide which of the following points below the speaker talks about.

https://www.youtube.com/watch?v=oUEbMjtWc-A

- The unique characteristics of laser light.
- How laser light is different from ordinary light
- How lasers are used in the military.
- How lasers are useful in eye surgery.
- How laser was invented.
- Different types of lasers.
- The operation of a ruby laser.
- How electronic transitions create stimulated emission.

- How the light becomes intensified and narrowed in wavelength inside a laser cavity.
- Innovations and improvements in laser technology.

`Useful words:` hallmark - клеймо, проба, признак; range finder - дальномер; vitreous humor - стекловидное тело; tour de force - проявление таланта, мастерства; xenon arc - (электрическая) дуга в атмосфере ксенона; flash lamp - импульсная лампа, the crests and troughs - точки подъёма и спада; resonant cavity - резонансная полость; avalanche – лавина; decay- распад.

Solution

- The unique characteristics of laser light, enabling technologies like range finders, optical communications, bar code scanners, and medical procedures.
- The use of lasers in eye surgery, emphasizing the precision and safety of green laser light.
- The invention of the laser by Ted Maiman in 1960.
- The operation of a ruby laser, including stimulated emission and the creation of coherent light.
- The process of stimulated emission through electronic transitions.
- The intensification and narrowing of light within a laser cavity, resulting in coherent light with a nearly single wavelength.
- Ongoing innovations and improvements in laser technology while maintaining fundamental principles.

5.4. Exercise №19

Listen to the lecture again, take notes and answer the questions.

1. What examples does the speaker give to prove his point that ‘much of our technology today depends on lasers’?
2. What technology does he say highlights all other applications of lasers?
3. What are the advantages of a laser scalpel?
4. What are the three characteristics of laser light that the author calls‘a tour de force of engineering’?
5. How are these three characteristics made?

Solution

1. Examples of laser-dependent technology include range finding devices, optical communications, and bar code scanners.
2. Laser technology's application in eye surgery, such as retinal reattachment, showcases its unique characteristics and precision.
3. Advantages of a laser scalpel include the use of green laser light, which passes through the eye's lens and vitreous humor without causing damage, allowing for precise treatment of the retina without harming surrounding tissues.
4. The three characteristics of laser light termed 'a tour de force of engineering' are coherent light, a narrow beam, and nearly a single wavelength.
5. These characteristics are achieved through stimulated emission within a resonant cavity. Electrons returning to the ground state release light, initiating an avalanche of identical photons. Inside the cavity, reflection and alignment of light rays intensify and narrow the wavelength, resulting in coherent light.

Глава 6

Домашнее задание №3 29.02.24

6.1. Exercise №32

Summarise the text in English paying attention to the linking words and phrases

Solution

The text discusses the invention, properties, and use of lasers. Firstly, it outlines the history of laser invention, then transitions to its properties. Thirdly, it discusses the types of existing lasers and concludes by examining practical laser applications in various fields. While there is no definitive answer to who invented the laser, several scientists contributed to its creation. Despite initial expectations of mainly military use, lasers have found widespread application in areas such as warfare and medicine due to their ability to produce an extremely narrow beam of light. The text also highlights the role of lasers in computer science. Overall, lasers have a broad range of applications, from surgical procedures to vehicle speed control devices. In conclusion, the fact that "death rays" did not become a reality is ultimately beneficial.

The concept of "photonics" emerged in the late 20th century and has become part of everyday life, encompassing technologies like fiber optic communication lines, flat-screen TVs and computer monitors, smartphones, and more. Laser communication offers high quality, greater bandwidth, and strict confidentiality. Both lasers and fiber optics have become vital components of many industries, and their combined potential is rapidly expanding. Semiconductor lasers are used in fiber-optic telecommunication systems. Research in this field has led to advancements in areas such as quantum electronics, fiber optics, quantum optics, laser physics, laser chemistry, and more. The term "photonics" encompasses all these scientific and technical areas.

6.2. Exercise №35

Look at more examples of Participles from reading and complete the table. Try to define the meaning and function of the Participles in these examples.

1. The word "laser" stands for "light amplification by `stimulated` emission of radiation".
2. The idea of using lasers as death rays `employed` by creators of such blockbusters as X-Men and Star Wars still remains science fiction.

3. `Having been demonstrated` by Theodore Maiman in 1960, the first ruby laser was considered the first successful light laser.
4. `Having introduced` the concept of stimulated emission, Einstein laid the foundation for the laser.
5. `Laser-sighting` devices are `fitted` to military and police rifles to help soldiers hit their targets.
6. `Being installed` at one end of the laser tube, a mirror keeps the photons bouncing back and forth inside the crystal.
7. The `escaping` photons form a very `concentrated` beam of powerful laser light.
8. Light from conventional sources, such as a light bulb or the sun, diverges, `spreading` in all directions.

	Active	Passive
Present Participle (V+ing)	doing	doing
Perfect Participle* (having+V3)	having done	having been done
Past Participle (V3)		done

* There is also Perfect Continuous Participle form: having +been+ doing which focuses on the duration of the action as compared to Perfect Participle.

Solution

`Stimulated`: Past Participle (Active) - Having introduced the concept of stimulated emission, Einstein laid the foundation for the laser. In this context, "stimulated" describes the type of emission that Einstein introduced.
`Employed`: Past Participle (Passive) - The idea of using lasers as death rays employed by creators of such blockbusters as X-Men and Star Wars still remains science fiction. Here, "employed" indicates that the idea was utilized by creators.
`Having been demonstrated`: Perfect Participle (Passive) - Having been demonstrated by Theodore Maiman in 1960, the first ruby laser was considered the first successful light laser. This indicates that the first ruby laser was demonstrated by Theodore Maiman before being considered successful.
`Having introduced`: Perfect Participle (Active) - Having introduced the concept of stimulated emission, Einstein laid the foundation for the laser. This shows that Einstein introduced the concept before laying the foundation.
`Laser-sighting fitted`: Past Participle (Passive) - Laser-sighting devices are fitted to military and police rifles to help soldiers hit their targets. Here, "fitted" is used passively to describe the state of the devices after being installed.
`Being installed`: Present Participle (Passive) - Being installed at one end of the laser tube, a mirror keeps the photons bouncing back and forth inside the crystal. This indicates the ongoing action of installing the mirror in a passive voice.
`Escaping concentrated`: Present Participle (Active) - The escaping photons form a very concentrated beam of powerful laser light. Here, "escaping" and "concentrated" are used actively to describe the properties of the photons forming the laser beam.

6.3. Exercise №36

Compare the following pairs of phrases with Participle I and Participle II. Translate them into Russian.

1. developing industry - developed industry

2. changing distances - changed distances
3. a controlling device - controlled device
4. an increasing speed - an increased speed
5. a transmitting signal - a transmitted signal
6. a reducing noise - reduced noise
7. a moving object - a moved object
8. heating parts - heated parts

Solution

1. развивающаяся промышленность - развитая промышленность
2. изменяющиеся расстояния - изменённые расстояния
3. управляющее устройство - управляемое устройство
4. увеличивающаяся скорость - увеличенная скорость
5. передающий сигнал - переданный сигнал
6. уменьшающий шум - уменьшенный шум
7. движущийся объект - перемещённый объект
8. нагревающиеся детали - нагретые детали

6.4. Exercise №37

Choose the correct form.

1. `A:` Have you read that new book yet? `B:` Only some of it. It's very…
   a. bored b. boring
2. `A:` Did you enjoy your holiday? `B:` Oh, yes. It was very…
   a. relaxed b. relaxing
3. `A:` I'm going to a lecture tonight. Do you want to come? `B:` No, thanks. I'm not … in the subject.
   a. interested b. interesting
4. `A:` Did you hurt yourself when you fell? `B:` No, but it was very …
   a. embarrassed b. embarrassing
5. `A:` Was mother upset when you broke her vase? `B:` Not really, but she was very….
   a. annoyed b. annoying
6. `A:` How do you feel today? `B:` I still feel very ….
   a. tired b. tiring
7. `A:` You look ill. What's the matter? `B:` I've had a very …. day.
   a. tired b. tiring
8. Sit down - I've got some very …. news for you.
   a. excited b. exciting
9. He's got a very …. habit of always interrupting people.
   a. annoyed b. annoying
10. I'm very …. by your behaviour.
    a. disappointed b. disappointing

Solution

1. `A:` Have you read that new book yet? `B:` Only some of it. It's very…
   Correct answer: b. boring

2. `A:` Did you enjoy your holiday? `B:` Oh, yes. It was very…
   Correct answer: a. relaxed
3. `A:` I'm going to a lecture tonight. Do you want to come? `B:` No, thanks. I'm not … in the subject.
   Correct answer: a. interested
4. `A:` Did you hurt yourself when you fell? `B:` No, but it was very …
   Correct answer: b. embarrassing
5. `A:` Was mother upset when you broke her vase? `B:` Not really, but she was very….
   Correct answer: a. annoyed
6. `A:` How do you feel today? `B:` I still feel very ….
   Correct answer: a. tired
7. `A:` You look ill. What's the matter? `B:` I've had a very …. day.
   Correct answer: a. tired
8. Sit down - I've got some very …. news for you.
   Correct answer: b. exciting
9. He's got a very …. habit of always interrupting people.
   Correct answer: b. annoying
10. I'm very …. by your behaviour.
    Correct answer: a. disappointed

Глава 7

Семинар №4 29.02.24

7.1. Exercise №38

Fill in the Perfect Participle, Active or Passive, of the verbs in brackets. Explain the meaning of Perfect Participle phrases or translate the sentences into Russian.

1. `(Work)` all day, I was feeling very tired in the evening.
2. `(Live)` in an English-speaking country for a few years, she spoke English like a native speaker.
3. `(Rescue)`, an injured pilot was taken to hospital.
4. `(Write)` the test, the students handed in their papers.
5. `(Sign)` by the boss, the documents were sent to the customers.
6. `(Interrupt)` a few times, he was rather annoyed.
7. `(Stop)` the car, the police officer wanted to see the documents.
8. `(Arrive)` at the station, we called a taxi.
9. `(Check in)` for the flight, they were prepared for the passport control.
10. `(Buy)` the car, he stopped using public transport.

Solution

1. Having worked all day, I was feeling very tired in the evening.
2. Having lived in an English-speaking country for a few years, she spoke English like a native speaker.
3. Having been rescued, an injured pilot was taken to the hospital.
4. Having written the test, the students handed in their papers.
5. Having been signed by the boss, the documents were sent to the customers.
6. Having been interrupted a few times, he was rather annoyed.
7. Having stopped the car, the police officer wanted to see the documents.
8. Having arrived at the station, we called a taxi.
9. Having checked in for the flight, they were prepared for passport control.
10. Having bought the car, he stopped using public transport.

7.2. Exercise №39

Choose the correct form of the Participle. Translate the sentences into Russian.

1. They were trying to fix a USB cable _____ the instructions from a YouTube video.
2. Serious faults _____ in the project had to be corrected quickly.
3. The method _____ by the engineers at the moment has numerous advantages.
4. _____ no job and no money, he couldn't pay the rent.
5. _____ a new technique, scientists increased the accuracy of the results.
6. People should be careful, while _____ the street.
7. _____ the door, he left the house.
8. Utilising the principle of feedback, robots can change their operation in response to a changing environment.
9. _____ her work, she went home.
10. _____ an expert in the field of computers, he had no problem finding a well-paid job.

Solution

1. They were trying to fix a USB cable `following` the instructions from a YouTube video.
2. Serious faults `found` in the project had to be corrected quickly.
3. The method `being discussed` by the engineers at the moment has numerous advantages.
4. `Having had` no job and no money, he couldn't pay the rent.
5. `Having applied` a new technique, scientists increased the accuracy of the results.
6. People should be careful, `while crossing` the street.
7. `Having locked` the door, he left the house.
8. Utilising the principle of feedback, robots can change their operation in response to a changing environment.
9. `Having completed` her work, she went home.
10. `Being` an expert in the field of computers, he had no problem finding a well-paid job.

7.3. Exercise №41

Rewrite the following sentences with Participle Constructions according to the examples given below and identify the meaning of Participle Constructions

1. Walking in the woods, I suddenly realised that I had lost my way.
2. Having spent a lot of time doing my homework, I went to bed very late last night.
3. Given proper care, your car will operate smoothly for years.
4. Working in a bank, he was familiar with the best ways to invest money.
5. My sister is the one talking to the professor.
6. Having collected the data, he began analysing the results.
7. Having arrived at the site, the scientists discovered many fragments of the meteorite.
8. Being one of the most beautiful Russian monuments, St Basil's Basilica is a World Heritage site.
9. Trying to sell more goods for cash, the company is losing money.
10. Karel Capek described a mechanical device that looked like a human but lacking human sensibility could perform only automatic, mechanical operations.

Solution

1. While walking in the woods, I suddenly realized that I had lost my way.
2. Because I had spent a lot of time doing my homework, I went to bed very late last night.
3. If given proper care, your car will operate smoothly for years.
4. Being someone who worked in a bank, he was familiar with the best ways to invest money.
5. The one talking to the professor is my sister.
6. After having collected the data, he began analyzing the results.
7. Upon having arrived at the site, the scientists discovered many fragments of the meteorite.
8. St Basil's Basilica, being one of the most beautiful Russian monuments, is a World Heritage site.
9. In trying to sell more goods for cash, the company is losing money.
10. Karel Capek described a mechanical device resembling a human but lacking human sensibility, capable only of performing automatic, mechanical operations.

7.4. Exercise №42

Use a Participle Construction to add the information in italics to the main sentence.

`Example:` Sam left school early because he felt sick. → Feeling sick, Sam left school early. They spent all the money. So they couldn't afford to buy a car. → Having spent all the money, they couldn't afford buying a car.

1. As she felt tired, Anna went to bed early. _____, Anna went to bed early.
2. After the boss had explained the problem, he told the employee to deal with it. _____, the boss told the employee to deal with it.
3. While he was drinking his coffee, he was thinking about the problem. _____, he was thinking about the problem.
4. If it is looked after carefully, the plant can live through the winter. _____, the plant can live through the winter.
5. We filled up the car and continued our journey. _____, we continued our journey.
6. As the manager was impressed by my work, he extended my contract. _____, the manager extended my contract.
7. They have written two tests today and they are too tired to do the third one. _____, they are too tired to do the third one.
8. He was driving home. He had an accident. _____, he had an accident.
9. He was trapped in a dilemma and couldn't decide what to do. _____, he couldn't decide what to do.
10. After I dropped him off at the station, I drove straight to the supermarket. _____, I drove straight to the supermarket.
11. The teacher was impressed by Mike's work, so she gave him the highest mark. _____, the teacher gave him the highest mark.
12. As he had been to England before, he knew where to find a good hotel. _____, he knew where to find a good hotel.

Solution

1. Feeling tired, Anna went to bed early.
2. Having explained the problem, the boss told the employee to deal with it.

3. Drinking his coffee, he was thinking about the problem.
4. If carefully looked after, the plant can live through the winter.
5. Having filled up the car, we continued our journey.
6. Impressed by my work, the manager extended my contract.
7. Having written two tests today, they are too tired to do the third one.
8. Driving home, he had an accident.
9. Trapped in a dilemma, he couldn't decide what to do.
10. After dropping him off at the station, I drove straight to the supermarket.
11. Impressed by Mike's work, the teacher gave him the highest mark.
12. Having been to England before, he knew where to find a good hotel.

7.5. Study note

Participles Overview

- Participles are words derived from verbs that can function as adjectives and adverbs or as part of verb phrases to create verb tenses.
- The main types of Participles are:
  - Present Participle (Participle I), e.g., *coming*
  - Perfect Participle, e.g., *having completed*
  - Past Participle (Participle II), e.g., *used*
- Participles may also be identified with a particular Voice: active or passive.

Present and Past Participles as Adjectives

- Present and Past Participles can both be used as adjectives.
- The Present Participle describes what someone or something is (What kind?).
- The Past Participle describes how somebody feels (How do you feel?).

Perfect Participle

- The Perfect Participle (active and passive) is used to emphasize that one action happened before another.
- Perfect Participles are often used as part of Participle Constructions or Clauses that are equivalent to adverbial clauses within complex sentences.

Participle Constructions

- Participles are often used as part of Participle Constructions or Clauses, enabling a more economical presentation of information compared to complex sentences.
- Participle Constructions act as adjectives or adverbs within sentences and usually are reduced adverbial or relative clauses.
- They can be used after various conjunctions such as: when, while, if, though, etc.

Negative Participle Constructions

- Negative participle constructions are possible, where 'not' normally comes before the Participle.

Example Sentences

1. A humanoid drawn by Leonardo da Vinci is among the first verifiable automation.
2. Being fitted with vision equipment, robots are able to ‘see’.
3. I hurt my arm while playing tennis.
4. Remember to take all your belongings with you when leaving the train.
5. Not having seen the film, I could not take part in its discussion.

Глава 8

Домашнее задание №4 07.03.24

8.1. Exercise №43

Combine the following sentences into one using a negative Participle Construction:

`Example:` I didn’t want to hurt his feelings. I didn’t ask any questions. → Not wanting to hurt his feelings, I didn’t ask any questions.

1. As they haven't received all the applications yet, they are not ready to hire anyone.
2. I didn't want to lose my passport. I gave it to my father.
3. I didn't know how to reply. I didn't say a word.
4. He didn't see the accident ahead of him. He didn't stop his car.
5. They haven't followed the instructions. They have a problem with the cleaning robot.
6. They haven't found any flaws in the project. They can start it as soon as possible.
7. I had no phone. I couldn't call you.
8. He didn't notice a fuel warning light. He didn't fill up his car in time.
9. The method wasn't tested. It was not adopted.
10. He hadn't prepared for the exam. He failed it.

Solution

1. Not having received all the applications yet, they are not ready to hire anyone.
2. Not wanting to lose my passport, I didn't give it to my father.
3. Not knowing how to reply, I didn't say a word.
4. Not seeing the accident ahead of him, he didn't stop his car.
5. Not following the instructions, they have a problem with the cleaning robot.
6. Not finding any flaws in the project, they can start it as soon as possible.
7. Not having no phone, I couldn't call you.
8. Not noticing a fuel warning light, he didn't fill up his car in time.
9. Not being tested, the method was not adopted.
10. Not having prepared for the exam, he failed it.

8.2. Exercise №44

Put the verbs in brackets into the correct Participle form. (Some examples can have more than one correct answer with a difference in meaning). Identify Participle Constructions and explain their meaning.

1. _____ a lecture, the professor was not using any notes.
2. The problems _____ at the conference are very important.
3. The shop _____ next to our university will open soon.
4. _____ a car, she finds it easy to get around.
5. _____ the questions, he gave a lot of examples.
6. _____ his research, he was ready to write a report.
7. The equipment _____ by the company is of the highest standard.
8. _____ left or right, indicate it by using a turn signal.
9. _____ its maximum intensity, the volcano began to calm down.
10. _____ goodbye, he left the office.
11. _____ by millions of readers, this book has rightfully become a bestseller.

Solution

1. **Giving** a lecture, the professor was not using any notes.
2. The problems **discussed** at the conference are very important.
3. The shop **being built** next to our university will open soon.
4. **Having** a car, she finds it easy to get around.
5. **Having** answered the questions, he gave a lot of examples.
6. **Having** finished his research, he was ready to write a report.
7. The equipment **installed** by the company is of the highest standard.
8. **Turning** left or right, indicate it by using a turn signal.
9. **Having** reached its maximum intensity, the volcano began to calm down.
10. **Having** said goodbye, he left the office.
11. **Read** by millions of readers, this book has rightfully become a bestseller.

8.3. Exercise №45

Match the sentences with the terms, related to technology. Match the pictures with the sentences.

1. James Bond has demonstrated laser cutting in 1964 in Ian Flemings "Goldfinger".
2. These scanners use a laser beam that is scanned back and forth so rapidly that it appears as a line to the human eye.
3. These simple, pocket-sized lasers are used to highlight important areas during presentations.
4. The laser acts as a precise disc-reading mechanism.
5. The first use of a laser in medicine occurred in the early 1960s, when physicians used a laser on a human for the first time by destroying a retinal eye tumor with a ruby laser.
6. Both lasers and fiber optics have independently become vital components of many industries.
7. Laser shows produce visual displays by using beam effects; either by switching a stationary beam on and off or by creating dynamic beam effects.

Options

a. Laser Pointers
b. DVD and CD Players
c. Laser Light Shows and Holography
d. Surgery
e. Fiber Optical Communication
f. Barcode Scanner
g. Laser Cutting Machines

Solution

1. g
2. f
3. a
4. b
5. d
6. e
7. c

8.4. Exercise №46

`Устно`

Read and translate the sentences paying attention to the Participle Clauses.

1. When `completed` in 2010, the Burj Khalifa became the tallest tower in the world and one of the top attractions in Dubai.
2. Though `being` a school teacher of mathematics, Tsiolkovsky developed space travel principles that remain in use today.
3. If `compared` to today's TV pictures, the first black-and-white images had rather poor quality.
4. While `teaching` at school for the deaf, Bell became interested in sound and its transmission.
5. Though `discovered`, Newton's mistake had no influence on his theory.
6. While `conducting` experiments with communication devices and speech systems, Bell invented the telephone.
7. If `cooled` below zero degrees Celsius, water freezes.
8. While `working` on the quantum oscillator, Nikolay Basov and Alexander Prokhorov created the first microwave generator, which was the laser’s predecessor.

8.5. Exercise №47

Rewrite the following sentences with Participle Constructions adding an appropriate conjunction.

1. Being one of the key issues today, information protection is the centre of attention for today’s computer engineers.
2. Analysing the information on what is currently being tested, we can imagine what new robots will be like.

3. Being designed by researchers at the Stanford Research Institute in the late 1960s, an experimental model became one of the first real robots.
4. Having been added to vehicles, airbags saved numerous lives.
5. Being known to people from science fiction, robots didn't materialise until the invention of the computer in the 1940s.
6. After using a television camera as a visual sensor, the engineers constructed a robot capable of arranging blocks into stacks.
7. If equipped with microprocessors, computerised robots can handle the data being fed to them by various sensors.
8. Being fitted with new safety features, robotic vehicles will be much safer than before.
9. Being one of the main sources of pollution, petrol cars are still widely used today.
10. Increasing the commercial use of robots, we continue to expand their applications.

Solution

1. While being one of the key issues today, information protection is the center of attention for today's computer engineers.
2. While analyzing the information on what is currently being tested, we can imagine what new robots will be like.
3. Designed by researchers at the Stanford Research Institute in the late 1960s, an experimental model became one of the first real robots.
4. With airbags having been added to vehicles, numerous lives were saved.
5. Despite being known to people from science fiction, robots didn't materialize until the invention of the computer in the 1940s.
6. Having used a television camera as a visual sensor, the engineers constructed a robot capable of arranging blocks into stacks.
7. Equipped with microprocessors, computerized robots can handle the data being fed to them by various sensors.
8. With robotic vehicles being fitted with new safety features, they will be much safer than before.
9. Despite being one of the main sources of pollution, petrol cars are still widely used today.
10. By increasing the commercial use of robots, we continue to expand their applications.

Глава 9

Семинар №5 07.03.24

9.1. Exercise №30

Transforming Clauses into Participial Constructions

1. While Boris was driving home, he saw an accident.
2. After we had talked with Peter, we felt much better.
3. When John arrived at the station, he saw the train leave.
4. After he had left the house, he walked to the nearest metro station.
5. When I looked out of the window, I saw Mary coming.
6. As we finished our part of the work, we were free to go home.
7. As Ann had had no time to write us a letter, she sent a telegram.

Solution

1. Driving home, Boris saw an accident.
2. Having talked with Peter, we felt much better.
3. Arriving at the station, John saw the train leave.
4. Having left the house, he walked to the nearest metro station.
5. Looking out of the window, I saw Mary coming.
6. Having finished our part of the work, we were free to go home.
7. Not having had time to write us a letter, Ann sent a telegram.

9.2. Exercise №5

Choose the correct option.

1. I think I know the actor **played/playing** the main role in this new TV series.
2. The committee **believe** the answer **given/giving** by the politician wasn't the whole truth.
3. All the games **played/playing** on the second day of the competition ended in a draw. That had never happened before.
4. **Checked in/having checked in**, we unpacked and went to get something to eat.
5. **Having watched/after watched** his son win the competition, he was filled with pride.
6. She suddenly realized that the person **spoken/speaking** on the phone wasn't her husband but a complete stranger.
7. He was sitting on the sofa **doing/having done** a crossword.
8. **Having paid/paid** for the meal, we left the restaurant.
9. **Being/been** exhausted, he fell asleep on the bus.

10. While **watching/being watched** a play, he fell asleep.

Solution

1. I think I know the actor **playing** the main role in this new TV series.
2. The committee **believes** the answer given by the politician wasn't the whole truth.
3. All the games **played** on the second day of the competition ended in a draw. That had never happened before.
4. **Having checked in**, we unpacked and went to get something to eat.
5. **After watching** his son win the competition, he was filled with pride.
6. She suddenly realized that the person **speaking** on the phone wasn't her husband but a complete stranger.
7. He was sitting on the sofa **doing** a crossword.
8. **Having paid** for the meal, we left the restaurant.
9. **Being exhausted**, he fell asleep on the bus.
10. While **watching** a play, he fell asleep.

Глава 10

Исправление домашних заданий №1 21.03.24

10.1. Exercise №41

Rewrite the following sentences with Participle Constructions according to the examples given below and identify the meaning of Participle Constructions

1. Walking in the woods, I suddenly realised that I had lost my way.
2. Having spent a lot of time doing my homework, I went to bed very late last night.
3. Given proper care, your car will operate smoothly for years.
4. Working in a bank, he was familiar with the best ways to invest money.
5. My sister is the one talking to the professor.
6. Having collected the data, he began analysing the results.
7. Having arrived at the site, the scientists discovered many fragments of the meteorite.
8. Being one of the most beautiful Russian monuments, St Basil's Basilica is a World Heritage site.
9. Trying to sell more goods for cash, the company is losing money.
10. Karel Capek described a mechanical device that looked like a human but lacking human sensibility could perform only automatic, mechanical operations.

Old solution

1. While walking in the woods, I suddenly realized that I had lost my way.
2. Because I had spent a lot of time doing my homework, I went to bed very late last night.
3. If given proper care, your car will operate smoothly for years.
4. Being someone who worked in a bank, he was familiar with the best ways to invest money.
5. The one talking to the professor is my sister.
6. After having collected the data, he began analyzing the results.
7. Upon having arrived at the site, the scientists discovered many fragments of the meteorite.
8. St Basil's Basilica, being one of the most beautiful Russian monuments, is a World Heritage site.
9. In trying to sell more goods for cash, the company is losing money.
10. Karel Capek described a mechanical device resembling a human but lacking human sensibility, capable only of performing automatic, mechanical operations.

New solution

1. While walking in the woods, I suddenly realized that I had lost my way.
2. Because I had spent a lot of time doing my homework, I went to bed very late last night.
3. If given proper care, your car will operate smoothly for years.
4. Being someone who worked in a bank, he was familiar with the best ways to invest money.
5. The one talking to the professor is my sister.
6. After having collected the data, he began analyzing the results.
7. Upon having arrived at the site, the scientists discovered many fragments of the meteorite.
8. St Basil's Basilica, being one of the most beautiful Russian monuments, is a World Heritage site.
9. In trying to sell more goods for cash, the company is losing money.
10. Karel Capek described a mechanical device resembling a human but lacking human sensibility, capable only of performing automatic, mechanical operations.

10.2. Exercise №42

Use a Participle Construction to add the information in italics to the main sentence.

`Example:` Sam left school early because he felt sick. → Feeling sick, Sam left school early. They spent all the money. So they couldn't afford to buy a car. → Having spent all the money, they couldn't afford buying a car.

1. As she felt tired, Anna went to bed early. _____, Anna went to bed early.
2. After the boss had explained the problem, he told the employee to deal with it. _____, the boss told the employee to deal with it.
3. While he was drinking his coffee, he was thinking about the problem. _____, he was thinking about the problem.
4. If it is looked after carefully, the plant can live through the winter. _____, the plant can live through the winter.
5. We filled up the car and continued our journey. _____, we continued our journey.
6. As the manager was impressed by my work, he extended my contract. _____, the manager extended my contract.
7. They have written two tests today and they are too tired to do the third one. _____, they are too tired to do the third one.
8. He was driving home. He had an accident. _____, he had an accident.
9. He was trapped in a dilemma and couldn't decide what to do. _____, he couldn't decide what to do.
10. After I dropped him off at the station, I drove straight to the supermarket. _____, I drove straight to the supermarket.
11. The teacher was impressed by Mike's work, so she gave him the highest mark. _____, the teacher gave him the highest mark.
12. As he had been to England before, he knew where to find a good hotel. _____, he knew where to find a good hotel.

Old solution

1. Feeling tired, Anna went to bed early.
2. Having explained the problem, the boss told the employee to deal with it.

3. Drinking his coffee, he was thinking about the problem.
4. If carefully looked after, the plant can live through the winter.
5. Having filled up the car, we continued our journey.
6. Impressed by my work, the manager extended my contract.
7. Having written two tests today, they are too tired to do the third one.
8. Driving home, he had an accident.
9. Trapped in a dilemma, he couldn’t decide what to do.
10. After dropping him off at the station, I drove straight to the supermarket.
11. Impressed by Mike’s work, the teacher gave him the highest mark.
12. Having been to England before, he knew where to find a good hotel.

New solution

1. Feeling tired, Anna went to bed early.
2. Having explained the problem, the boss told the employee to deal with it.
3. Drinking his coffee, he was thinking about the problem.
4. If carefully looked after, the plant can live through the winter.
5. Having filled up the car, we continued our journey.
6. Impressed by my work, the manager extended my contract.
7. Having written two tests today, they are too tired to do the third one.
8. Driving home, he had an accident.
9. Trapped in a dilemma, he couldn’t decide what to do.
10. After dropping him off at the station, I drove straight to the supermarket.
11. Impressed by Mike’s work, the teacher gave him the highest mark.
12. Having been to England before, he knew where to find a good hotel.

10.3. Exercise №43

Combine the following sentences into one using a negative Participle Construction:

`Example:` I didn’t want to hurt his feelings. I didn’t ask any questions. → Not wanting to hurt his feelings, I didn’t ask any questions.

1. As they haven't received all the applications yet, they are not ready to hire anyone.
2. I didn't want to lose my passport. I gave it to my father.
3. I didn't know how to reply. I didn't say a word.
4. He didn't see the accident ahead of him. He didn't stop his car.
5. They haven't followed the instructions. They have a problem with the cleaning robot.
6. They haven't found any flaws in the project. They can start it as soon as possible.
7. I had no phone. I couldn't call you.
8. He didn't notice a fuel warning light. He didn't fill up his car in time.
9. The method wasn't tested. It was not adopted.
10. He hadn't prepared for the exam. He failed it.

Old solution

1. Not having received all the applications yet, they are not ready to hire anyone.
2. Not wanting to lose my passport, I didn't give it to my father.
3. Not knowing how to reply, I didn't say a word.

4. Not seeing the accident ahead of him, he didn't stop his car.
5. Not following the instructions, they have a problem with the cleaning robot.
6. Not finding any flaws in the project, they can start it as soon as possible.
7. Not having no phone, I couldn't call you.
8. Not noticing a fuel warning light, he didn't fill up his car in time.
9. Not being tested, the method was not adopted.
10. Not having prepared for the exam, he failed it.

New solution

1. Not having received all the applications yet, they are not ready to hire anyone.
2. Not wanting to lose my passport, I didn't give it to my father.
3. Not knowing how to reply, I didn't say a word.
4. Not seeing the accident ahead of him, he didn't stop his car.
5. Not following the instructions, they have a problem with the cleaning robot.
6. Not finding any flaws in the project, they can start it as soon as possible.
7. Not having a phone, I couldn't call you.
8. Not noticing a fuel warning light, he didn't fill up his car in time.
9. Not being tested, the method was not adopted.
10. Not having prepared for the exam, he failed it.

10.4. Exercise №44

Put the verbs in brackets into the correct Participle form. (Some examples can have more than one correct answer with a difference in meaning). Identify Participle Constructions and explain their meaning.

1. _____ a lecture, the professor was not using any notes.
2. The problems _____ at the conference are very important.
3. The shop _____ next to our university will open soon.
4. _____ a car, she finds it easy to get around.
5. _____ the questions, he gave a lot of examples.
6. _____ his research, he was ready to write a report.
7. The equipment _____ by the company is of the highest standard.
8. _____ left or right, indicate it by using a turn signal.
9. _____ its maximum intensity, the volcano began to calm down.
10. _____ goodbye, he left the office.
11. _____ by millions of readers, this book has rightfully become a bestseller.

Old solution

1. **Giving** a lecture, the professor was not using any notes.
2. The problems **discussed** at the conference are very important.
3. The shop **being built** next to our university will open soon.
4. **Having** a car, she finds it easy to get around.
5. **Having** answered the questions, he gave a lot of examples.
6. **Having** finished his research, he was ready to write a report.
7. The equipment **installed** by the company is of the highest standard.
8. **Turning** left or right, indicate it by using a turn signal.

9. **Having** reached its maximum intensity, the volcano began to calm down.
10. **Having** said goodbye, he left the office.
11. **Read** by millions of readers, this book has rightfully become a bestseller.

New solution

1. **Giving** a lecture, the professor was not using any notes.
2. The problems **discussed** at the conference are very important.
3. The shop **being built** next to our university will open soon.
4. **Having** a car, she finds it easy to get around.
5. **Having** answered the questions, he gave a lot of examples.
6. **Having** finished his research, he was ready to write a report.
7. The equipment **installed** by the company is of the highest standard.
8. **Turning** left or right, indicate it by using a turn signal.
9. **Having** reached its maximum intensity, the volcano began to calm down.
10. **Having** said goodbye, he left the office.
11. **Read** by millions of readers, this book has rightfully become a bestseller.

Глава II

Модуль №1

Глава 11

Семинар №6 21.03.24

11.1. Text 11A

Materials and Materials Science

(1) We define materials as substances having properties which make them useful in machines, structures, devices, and other products. It would be no exaggeration to say that human civilization has been shaped by breakthroughs in materials science. In ancient times the choice of material gave the name to the era, for example, the Stone Age, the Bronze Age, the Iron Age, etc. So, materials science is one of the oldest forms of technology and applied science, deriving from manufacture of ceramics. It is concerned with a wide range of substances, from relatively easily acquired wood or stone, to modern man made materials such as plastics and glass, or even more advanced smart materials involving nano- and biotechnology in their manufacture. Part of materials science deals with classifying materials, which are generally split into four main groups: metals, polymers, ceramics, and composites.

(2) In the modern world materials are ubiquitous, and so pervasive1 that we often take them for granted2. Virtually every segment of our daily life is influenced by materials. They have contributed to the advancement of a number of technologies, including medicine and health, information and communication, national security and space, transportation, textiles, personal hygiene, agriculture, food science and the environmental protection. Materials have a generality comparable3 to that of energy and information, and the three together comprise nearly all technology.

(3) Materials science also covers discovering and designing new materials and analysing their properties and structure. At present, it is a key discipline in the competitive global economy, a dynamic and exciting field with many remarkable new materials and discoveries. The power of materials advances can be illustrated by the following example: to build today's smartphone in the 1980s would have cost about $110 million, required nearly 200 kilowatts of energy (compared to 2kW per year today), and the device would have been 14 meters tall. So, materials science has virtually brought smartphones to the pockets of over 3.5 billion people. Important elements of modern materials science are products of the space race: the understanding and engineering of metallic alloys, silica and carbon materials, used in the construction of space vehicles.

(4) Today we are in the midst4 of a materials revolution. Materials are evolving faster today than at any time in history enabling engineers to improve the performance of existing products and to develop innovative technologies that will enhance every aspect of our lives. Scientists are using powerful simulation techniques, as well as sophisticated machine learning algorithms, to propel5 innovations forward at a blazing6 speed and point them toward possibilities they had never considered. These tools have helped create the metamaterials* used in

carbon fiber composites for lighter-weight vehicles, advanced alloys for more durable7 jet engines, and biomaterials to replace human joints8. We also see breakthroughs in energy storage and quantum computing. In robotics, new materials are helping us create the artificial muscles9 needed for humanoid, soft robots. Advances are currently happening at the macroscale down to microscale10 for metamaterials, and at the nanoscale with graphene11, carbon nanotubes12, composites, thin metallic- and semiconductor- based films13.

(5) To sum it up, we need to discover and develop new kinds of materials with the desired properties and at the relevant cost14 to meet the challenges of the current world. Materials science may be the most important technology of the next decade. Breakthroughs in materials science are likely to affect the future of technology significantly. A vast acceleration in our ability to create new, advanced materials will power industries from energy to manufacturing. Thus, the future is bright for materials science and engineering.

11.2. Exercise №2

Match the materials (1-7) to the descriptions (a-g).

1. compounds
2. exotic
3. ferrous
4. ceramics
5. alloy
6. non-metallic
7. polymers

a. materials that are not metal
b. iron and steel
c. combinations of materials
d. mixture of metals
e. plastic materials
f. minerals transformed by heat
g. rare or complex

Solution

1. c
2. g
3. b
4. f
5. d
6. a
7. e

11.3. Exercise №3

Find the right answers in column B to finish the sentences in column A. Use a dictionary if necessary.

A

1. The first materials people used were
2. In the past the bricks were made of
3. The first metals people got were
4. The materials people learned to produce were
5. The materials that we grow
6. The materials that we mine are
7. The materials made from chemicals that come from oil are
8. Some new materials are

`B`

a. coal, oil, and minerals
b. gold, bronze, iron
c. stones, wood, plants
d. sand, hay, clay
e. plastics, nylon, acrylic
f. silicon, fibreglass, liquid crystals
g. glass, metals and concrete
h. cotton, wool, paper

Solution

1. The first materials people used were `c.` **stones, wood, plants**.
2. In the past, the bricks were made of `d.` **sand, hay, clay**.
3. The first metals people got were `b.` **gold, bronze, iron**.
4. The materials people learned to produce were `g.` **glass, metals and concrete**.
5. The materials that we grow are `h.` **cotton, wool, paper**.
6. The materials that we mine are `a.` **coal, oil, and minerals**.
7. The materials made from chemicals that come from oil are `e.` **plastics, nylon, acrylic**.
8. Some new materials are `f.` **silicon, fibreglass, liquid crystals**.

11.4. Exercise №5

Choose the best option. Read the text and check your answers.

1. `What are materials?`
   a. useful substances
   b. natural resources
   c. liquids and solids
2. `Choose what materials science doesn't deal with.`
   a. using biological systems and living organisms to create different products
   b. discovering and designing new materials
   c. the properties and characteristics of all materials
3. `How does materials science relate to technology?`
   a. All materials are a form of technology.
   b. It has no relationship with technology.
   c. It helps to develop technology by choosing the right material for the job. And man-made materials are a form of technology themselves.

4. `Which of the following is not a classification of materials commonly used in materials science?`
   a. ceramics
   b. polymers
   c. gemstones
5. `In what way will the breakthroughs in materials science affect the future of technolo`
   a. Materials science won't play an important role in the future.
   b. They are likely to affect the future of technology significantly.
   c. They will revolutionise the diagnosis of diseases caused by genetic factors.

Solution

1. What are materials?
   Answer: `a.` useful substances
2. Choose what materials science doesn't deal with.
   Answer: `a.` using biological systems and living organisms to create different products
3. How does materials science relate to technology?
   Answer: `c.` It helps to develop technology by choosing the right material for the job. And man-made materials are a form of technology themselves.
4. Which of the following is not a classification of materials commonly used in materials science?
   Answer: `c.` gemstones
5. In what way will the breakthroughs in materials science affect the future of technology?
   Answer: `b.` They are likely to affect the future of technology significantly.

11.5. Exercise №7

Answer the following questions using the information from text 11A.

1. What are materials?
2. How important were materials in the past?
3. How old is materials science?
4. What does materials science primarily deal with?
5. What are the main groups of materials?
6. How do materials affect our daily life?
7. What can the role of materials in our life be compared with?
8. What examples of advanced materials does the author give and where are they used?
9. What tools are modern scientists using to create advanced materials?
10. In what fields do we see breakthroughs which are achieved due to the development of new materials?
11. How will materials help us meet the challenges of the current world?
12. Why can we say that the future is bright for materials science? Do you agree?

Solution

1. What are materials?
   `Materials are substances having properties that make them useful in machines, structures, devices, and other products.`

2. How important were materials in the past?
```
Materials were crucial in the past, shaping human civilization and even defining
eras such as the Stone Age, Bronze Age, and Iron Age.
```
3. How old is materials science?
```
Materials science is one of the oldest forms of technology and applied science,
deriving from the manufacture of ceramics.
```
4. What does materials science primarily deal with?
```
Materials science primarily deals with discovering and designing new materials,
analyzing their properties and structure, and classifying materials into groups
such as metals, polymers, ceramics, and composites.
```
5. What are the main groups of materials?
```
The main groups of materials are metals, polymers, ceramics, and composites.
```
6. How do materials affect our daily life?
```
Materials are ubiquitous in the modern world and influence virtually every segment
of daily life, contributing to the advancement of various technologies and
sectors including medicine, communication, transportation, agriculture, and more.
```
7. What can the role of materials in our life be compared with?
```
The role of materials in our life can be compared to the generality of energy and
information, as all three comprise nearly all technology.
```
8. What examples of advanced materials does the author give and where are they used?
```
Examples of advanced materials include metamaterials used in carbon fiber
composites for lighter-weight vehicles, advanced alloys for more durable
jet engines, and biomaterials to replace human joints. These materials are used
in various industries such as aerospace, healthcare, and
robotics.
```
9. What tools are modern scientists using to create advanced materials?
```
Modern scientists are using powerful simulation techniques, sophisticated machine
learning algorithms, and advancements in nanotechnology to create advanced
materials.
```
10. In what fields do we see breakthroughs which are achieved due to the development of new materials?
```
Breakthroughs are seen in fields such as energy storage, quantum computing,
robotics, and aerospace due to the development of new materials.
```
11. How will materials help us meet the challenges of the current world?
```
Materials will help us meet the challenges of the current world by discovering and
developing new materials with desired properties to power industries and
technologies, thus addressing various global challenges.
```
12. Why can we say that the future is bright for materials science? Do you agree?
```
The future is bright for materials science because breakthroughs in this field are
likely to significantly affect the future of technology, power industries,
and address global challenges. I agree with this statement considering the ongoing
advancements and innovations in materials science and engineering.
```

Глава 12

Домашнее задание №5 28.03.24

12.1. Exercise №6

Find the words and phrases in the text which have the following meanings.

§ 1

1. **a verb:** a physical material from which something is made, matter
2. **a noun:** a special quality or characteristic of something
3. **a noun:** an overstatement of the truth
4. **a passive verb:** to be formed or created
5. **a verb:** to have something as a source, to come from something
6. **a noun:** inorganic and nonmetallic materials that are essential to our daily lives
7. **a noun:** materials made up of two or more components

§ 2

8. **an adverb:** almost entirely, nearly
9. **a passive verb:** to be under the effect of something
10. **a verb:** to help something to happen or develop
11. **a noun:** the quality or state of being general
12. **a verb:** to be made up of something

§ 3

13. **a verb:** to include or deal with
14. **an adjective:** related to or based on competition
15. **a noun:** an ability to act or produce an effect
16. **a noun:** a substance composed of two or more metals or of a metal and a nonmetal
17. **a noun:** the dioxide of silicon SiO2
18. **a noun:** a nonmetallic chemical element with atomic number 6 that readily forms compounds with many other elements

§ 4, 5

19. **a verb:** to develop by a process of evolution
20. **a noun:** the act of doing a job, an activity, etc.
21. **a noun phrase:** the imitative representation of the functioning of a system or a process
22. **a noun:** something (such as an instrument or apparatus) used in performing an operation
23. **a verb:** to put something new in the place of something else
24. **a verb phrase:** to perform so as to succeed
25. **an adjective:** happening or existing now

26. **a verb:** to act on and cause a change in (someone or something)
27. **a noun:** the act or process of moving faster or happening more quickly

Solution

1. form
2. characteristic
3. exaggeration
4. to be formed or created
5. derive
6. minerals
7. compounds
8. virtually
9. to be under the effect of something
10. facilitate
11. generality
12. consist
13. encompass
14. competitive
15. capability
16. alloy
17. silica
18. carbon
19. evolve
20. operation
21. simulation of operation
22. apparatus
23. replace
24. to perform so as to succeed
25. current
26. influence
27. acceleration

12.2. Лексика

Text 11 A

1. acceleration (n)
2. acquire (v)
3. alloy (n)
4. applied science (n)
5. ceramics (n)
6. comparable (adj)
7. composite (n, adj)
8. compound (n, adj)
9. comprise (v)
10. contribution (n)
11. cover (v)
12. derive from (v)
13. enhance (v)

14. exaggerate (v)
15. exaggeration (n)
16. field of science (n)
17. general (adj)
18. generality (n)
19. materials science (n)
20. performance (n)
21. property (n)
22. relevant (adj)
23. shape (v)
24. simulation (n)
25. split (v)
26. substance (n)
27. take (v) something for granted
28. meet (v) the challenges
29. tool (n)

Text 11 B

1. (electrical) resistance (n)
2. resistant (adj)
3. cause (v)
4. coating (n)
5. confront (v)
6. join (v)
7. keep (v) cool
8. last (v)
9. provide (v) an answer
10. repair (v)
11. replicate (v)
12. save (v) money
13. similar (adj)
14. transparent (adj)
15. unlike (prep)
16. wrap (n, v)

Text 11 C

1. consequence(s) (n)
2. consequently (adv)
3. constitute (v)
4. transition (n)
5. critical (adj) temperature
6. encounter (v)
7. expel (v)
8. ground-breaking (adj)
9. levitate (v)
10. magnetic (adj) field (n)
11. occur (v)
12. precise (adj)

13. reduce (v)
14. stable (adj)
15. superconductivity (n)
16. vary (v)

12.3. Exercise №23

Check how well you remember the words from the list below. Read and translate them or explain their meaning. Try to recall how they were used in text 11A filling the gaps in the sentences.

1. We define materials as _____ having _____ which make them useful in machines, structures, devices, and other products.
2. It would be no _____ to say that human civilization has been _____ by breakthroughs in materials science.
3. Materials science is one of the oldest forms of technology and an _____ science, _____ from manufacture of ceramics.
4. It is concerned with a wide range of substances, from relatively easily _____ wood or stone, to modern man-made materials.
5. In the modern world materials are ubiquitous, and so pervasive that we often take them for _____.
6. Materials have a _____ comparable to that of energy and information, and the three together _____ nearly all technology.
7. Materials science also _____ discovering and/or designing new materials and analyzing their properties and structure.
8. Scientists are using powerful _____ techniques, as well as sophisticated machine learning algorithms.
9. These _____ have helped create the metamaterials used in carbon fiber _____ for lightweight vehicles.
10. We need to discover and develop new kinds of materials with the desired properties and at the _____ cost to _____ the challenges of the current world.
11. Today materials science is a dynamic and exciting _____ with many remarkable new materials and discoveries.
12. Innovative technologies enable engineers to improve the performance of existing products which will _____ every aspect of our lives.

Solution

1. We define materials as **substances** having **properties** which make them useful in machines, structures, devices, and other products.
2. It would be no **exaggeration** to say that human civilization has been **shaped** by breakthroughs in materials science.
3. Materials science is one of the oldest forms of technology and an **applied** science, **derived** from manufacture of ceramics.
4. It is concerned with a wide range of substances, from relatively easily **acquired** wood or stone, to modern man-made materials.
5. In the modern world materials are ubiquitous, and so pervasive that we often take them for **granted**.

6. Materials have a **generality** comparable to that of energy and information, and the three together **comprise** nearly all technology.
7. Materials science also **covers** discovering and/or designing new materials and analyzing their properties and structure.
8. Scientists are using powerful **simulation** techniques, as well as sophisticated machine learning algorithms.
9. These **tools** have helped create the metamaterials used in carbon fiber **composites** for lightweight vehicles.
10. We need to discover and develop new kinds of materials with the desired properties and at the **relevant** cost to **meet** the challenges of the current world.
11. Today materials science is a dynamic and exciting **field** with many remarkable new materials and discoveries.
12. Innovative technologies enable engineers to improve the performance of existing products which will **enhance** every aspect of our lives.

12.4. Exercise №24

Choose the words from Text 11A vocabulary list. Some phrases can be written as a solid word.

Across:

1. To consist of; be made up of.
2. To learn or develop (a skill, habit, or quality).
3. Something such as a piece of equipment or skill that is useful for doing a job.
4. An imitation of a more practical applications, for example: technology or inventions.
5. A discipline that is used to apply existing scientific knowledge to develop situation or process.
6. To give a particular shape or form to something.
7. Capable of or suitable for comparison.
8. An increase in speed or rate.

Down:

1. To assume that something is true without questioning it.
2. Physical material from which something is made.
3. A metal made by combining two or more metallic elements, especially to give greater strength or resistance to corrosion.
4. Belonging to or existing in the present time.
5. An attribute, quality, or characteristic of something.
6. To divide into two or more groups.
7. The action or process of performing a task or function.
8. A statement that represents something as better or worse than it really is.
9. To make something better or improve the condition of something.

Solution

1. Composite
2. Acquire
3. Tool
4. Simulation

5. Applied
6. Shape
7. Comparable
8. Acceleration
9. Takeforgranted
10. Substance
11. Alloy
12. Current
13. Property
14. Split
15. Derivefrom
16. Join
17. Repair
18. Exaggeration

12.5. Exercise №25

Read the sentences and choose the right option. Explain your choice or translate the sentences into Russian.

1. If a car turns a corner at a constant speed, it is **accelerating/assimilating** because its direction is changing.
2. This view is very pessimistic and tends to **exaggerate/enhance** the difficulties.
3. An example of a **simulation/stimulation** is a fire drill which is used to prepare people for an anticipated event.
4. Some examples of **tools/skills** that are often used today are the hammer, saws, shovel, telephone, and the computer.
5. The old word “abroad” which once meant “out of doors” has **accepted/acquired** a new meaning and today is used as an adverb meaning “beyond the boundaries of one’s country”.
6. I go to the gym regularly but I don’t like **comparative/competitive** sports.
7. The USA consists/**comprises** fifty states and one district.
8. A fire is **competitive/comparable** with the sun; both give light and heat.
9. Marie Curie is famous for her **connection/contribution** to science.
10. Some types of wood **shape/split** easily.
11. Bronze is an **alloy/compound** of copper and tin.
12. Water is a chemical **composite/compound** of hydrogen and oxygen.
13. I like games in **general/generality** and especially football.
14. Strength and wisdom **derive/drive** from life force.

Solution

1. If a car turns a corner at a constant speed, it is **accelerating** because its direction is changing.
2. This view is very pessimistic and tends to **exaggerate** the difficulties.
3. An example of a **simulation** is a fire drill which is used to prepare people for an anticipated event.
4. Some examples of **tools** that are often used today are the hammer, saws, shovel, telephone, and the computer.

5. The old word “abroad” which once meant “out of doors” has **acquired** a new meaning and today is used as an adverb meaning “beyond the boundaries of one’s country”.
6. I go to the gym regularly but I don’t like **competitive** sports.
7. The USA **comprises** fifty states and one district.
8. A fire is **comparable** with the sun; both give light and heat.
9. Marie Curie is famous for her **contribution** to science.
10. Some types of wood **split** easily.
11. Bronze is an **alloy** of copper and tin.
12. Water is a chemical **compound** of hydrogen and oxygen.
13. I like games in **general** and especially football.
14. Strength and wisdom **derive** from life force.

Глава 13

Домашнее задание №6 04.04.24

13.1. Упражнение №2

Значения терминов:

1. Memory cells: Ячейки памяти - это устройства, используемые для хранения данных в компьютерах. В контексте текста, они изготавливаются из сверхпроводящего материала и могут хранить информацию бесконечно долго.
2. Windings: Здесь речь идет о "витках" или "обмотках" - это проводник, намотанный в спираль, используемый для проведения электрического тока, например, в трансформаторах.
3. Coils: Катушки - это также спирально намотанные проводники, которые создают магнитное поле при прохождении электрического тока через них.

Соответствия из колонки B:

1. induce - e. bring about (вызывать)
2. remove - f. take off, away (удалять)
3. indefinitely - b. unlimitedly (бесконечно)
4. memory cell - g. the unit of computer which stores data for future use (ячейка памяти)
5. retrieve - a. find, get back (извлекать)
6. winding - d. length of wire wound in a spiral to conduct electric current (обмотка)
7. coil - c. spiral (катушка)

Синонимы в тексте:

1. Retrieve (извлечь) и get back (вернуть) в контексте извлечения информации из ячеек памяти.
2. Indefinitely (бесконечно) и unlimitedly (неограниченно) в описании возможности хранения информации в ячейках памяти.
3. Winding (обмотка) и coil (катушка) в описании частей трансформаторов, которые могут быть охлаждены для создания идеального трансформатора.

13.2. Упражнение №15

Определите, к какой части речи относятся слова.

1. resistant, resist, resistance, resistor, resistivity;

2. superconductivity, superconductive, superconductor, superconducting;
3. theory, theorist, theoretical, theorize;
4. physics, physicist, physical, physically;
5. explain, explainable, explanation;
6. store, storage, storable.

Решение

1. **resistant** - прилагательное
   resist - глагол
   resistance - существительное
   resistor - существительное
   resistivity - существительное

2. **superconductivity** - существительное
   superconductive - прилагательное
   superconductor - существительное
   superconducting - прилагательное

3. **theory** - существительное
   theorist - существительное
   theoretical - прилагательное
   theorize - глагол

4. **physics** - существительное
   physicist - существительное
   physical - прилагательное
   physically - наречие

5. **explain** - глагол
   explainable - прилагательное
   explanation - существительное

6. **store** - глагол
   storage - существительное
   storable - прилагательное

13.3. Упражнение №16

Найдите русскому слову соответствующее английское.

1. **достижение** - achievable, achievement, achieve;
2. **электронный** - electronics, electronic, electron;
3. **легче** - easily, easy, easier;
4. **удовлетворять** - satisfy, satisfactory, satisfaction;
5. **действительно** - reality, realise, really.

Solution

1. достижение - achievement
2. электронный - electronic
3. легче - easier
4. удовлетворять - satisfy
5. действительно - really

1. **достижение** (существительное) - achievable (прилагательное), achievement (существительное), achieve (глагол);
2. **электронный** (прилагательное) - electronics (существительное), electronic (прилагательное), electron (существительное);
3. **легче** (наречие) - easily (наречие), easy (прилагательное), easier (прилагательное);
4. **удовлетворять** (глагол) - satisfy (глагол), satisfactory (прилагательное), satisfaction (существительное);
5. **действительно** (наречие) - reality (существительное), realise (глагол), really (наречие).

13.4. Упражнение №17

Переведите слова с суффиксом -ward (-wards), обозначающим направление.

toward(s), forward(s), backward(s), afterward(s), downward(s), outward(s), northward(s), southward(s), rearward(s), home- ward(s), sideward(s), windward(s), upward(s).

Решение

- **toward(s)** --- к, в направлении
- **forward(s)** --- вперед, впереди
- **backward(s)** --- назад, позади
- **afterward(s)** --- после этого, впоследствии
- **downward(s)** --- вниз, внизу
- **outward(s)** --- наружу, вовне
- **northward(s)** --- на север, севернее
- **southward(s)** --- на юг, южнее
- **rearward(s)** --- назад, задне
- **homeward(s)** --- к дому, домой
- **sideward(s)** --- вбок, боком
- **windward(s)** --- навстречу ветру
- **upward(s)** --- вверх, вверху

13.5. Упражнение №18

Найдите слова с нестандартным образованием множественного числа.

There are a few words taken over from Latin and Greek that still retain their original plurals in English. In some cases we can use either. Formulas is seen more often than formulae.

Antenna - antennae (pl). Many think that media, strata and phenomena are all singular. They aren't. Data, a plural, is used both ways.

Here are some foreign singular and plural forms of words often used in English. Latin: medium (a means of mass communication) - media, nucleus (ядро атома) - nuclei; Greek: analysis analyses; axis - axes; crisis - crises; hypothesis - hypotheses; phenomenon - phenomena.

Решение

- **formula** (обычно множественное число - formulas, хотя иногда также используется formulae) - [fmjl] ([fmjlz], [fmjli])
- **antenna** (множественное число - antennae) - [æntn] ([æntni])
- **medium** (множественное число - media) - [midm] ([midi])
- **nucleus** (множественное число - nuclei) - [njukls] ([njuklia])
- **analysis** (множественное число - analyses) - [nælss] ([nælsiz])
- **crisis** (множественное число - crises) - [krass] ([krasiz])
- **hypothesis** (множественное число - hypotheses) - [hapss] ([hapsiz])
- **phenomenon** (множественное число - phenomena) - [fnmnn] ([fnmn])

13.6. Упражнение №19

Найдите синонимы и антонимы.

below - above; useful - useless; easy - difficult; field - sphere; to meet demands - to meet requirements (needs); full - complete; to use - to apply; to get - to obtain; moreover - be- sides; sufficient - enough; likely - unlikely; to continue - to dis- continue; conductivity - non conductivity; to vary - to change; to lead to - to result in; recent - latest; advantage - disadvantage; low - high; believable - unbelievable; to lose - to find; tiny - huge; liquid - solid; unexpected - expected; common - ordinary.

Решение

Синонимы:

- below - above
- to meet demands - to meet requirements (needs)
- to use - to apply
- to get - to obtain
- sufficient - enough
- to vary - to change
- to lead to - to result in
- recent - latest
- low - high
- to lose - to find
- liquid - solid

Антонимы:

- useful - useless
- easy - difficult
- field - sphere
- full - complete

- moreover - besides
- likely - unlikely
- to continue - to discontinue
- conductivity - non conductivity
- advantage - disadvantage
- believable - unbelievable
- tiny - huge
- unexpected - expected
- common - ordinary

13.7. Write 3-5 sentences using these word combinations

- the physics discoveries
- discoveries that led to
- the scientific advantage
- advantage could well come to nation
- to bring the mankind to
- mercury wire
- unexpected phenomenon
- to return to normal state
- by passing electric current
- by applying magnetic field
- to make a great contribution
- they introduced a model
- a model proved to be useful
- a theory won for them the Nobel Prize
- research in superconductivity
- research became especially active
- the achieved record of 23 K.

Solution

The recent physics discoveries have sparked interest worldwide. These discoveries, which led to groundbreaking advancements, provide a scientific advantage in various fields. Such an advantage could well come to our nation, bringing mankind closer to understanding complex phenomena. Researchers observed an unexpected phenomenon involving a mercury wire, which returned to its normal state when electric current passed through it or a magnetic field was applied. Their research in superconductivity became especially active, culminating in the achieved record of 23 K, making a great contribution to the field.

13.8. Табличка на словообразование - D

Заполните таблицу на словообразование.

Verb	Noun	Adjective
...	retrieval	...
...	removal	...
...	definition	...
...	resistance	...
...	applicant	...
...	conduction	...
...	presence	...
...	explanation	...
...	belief	...
...	introduction	...

Solution

Verb	Noun	Adjective
Retrieve	retrieval	retrievable
Remove	removal	removable
Define	definition	definable
Resist	resistance	resistant
Apply	applicant	applicable
Conduct	conduction	conductive
Present	presence	presentable
Explain	explanation	explanatory
Believe	belief	believable
Introduce	introduction	introductory

Глава 14

Семинар №7 04.04.24

14.1. Exercise №12

Match the words in column B with the correct definitions in column A:

A	B
1. thick	c (the opposite of thin)
2. expensive	d (costing a lot of money)
3. super-thin	e (extremely thin)
4. keep something (cool)	b (make or become less hot / colder)
5. unlike	a (different from)
6. cool down	f (cause to continue in a specific condition)

A	B
1. cotton, linen and wool	c (natural fabric(s))
2. similar	f (being almost the same)
3. a coating	a (a substance that covers a surface)
4. to save (e.g. money)	e (to keep for use in the future)
5. to repair	g (to put something damaged back into good condition)
6. elastic	b (able to stretch and return to its original shape)
7. to join	h (to connect things together)
8. to last	d (to continue to exist)

A	B
1. to cause	e (to make something happen)
2. wrap	c (material that is used to cover or protect objects)
3. resistance	d (a force that stops the progress of something)
4. to attract	h (to pull or draw something towards them)
5. to prevent	g (to keep from happening or existing)
6. to cut incidences	a (to make the events less frequent)
7. to replicate	b (to do something again in exactly the same way)
8. transparent	f (allowing light through so that objects can be seen through it)

Solution

```
1.
```

1. **Thick:** The opposite of thin.

2. **Expensive:** Costing a lot of money.
3. **Super-thin:** Extremely thin.
4. **Keep something (cool):** Make or become less hot/colder.
5. **Unlike:** Different from.
6. **Cool down:** Cause to continue in a specific condition.

`2.`

1. **Cotton, linen and wool:** Natural fabric(s).
2. **Similar:** Being almost the same.
3. **A coating:** A substance that covers a surface.
4. **To save (e.g. money):** Keep for use in the future.
5. **To repair:** Put something damaged back into good condition.
6. **Elastic:** Able to stretch and return to its original shape.
7. **To join:** To connect things together.
8. **To last:** To continue to exist.

`3.`

1. **To cause:** To make something happen.
2. **Wrap:** Material that is used to cover or protect objects.
3. **Resistance:** A force that stops the progress of something.
4. **To attract:** To pull or draw something towards them.
5. **To prevent:** To keep from happening or existing.
6. **To cut incidences:** To make the events less frequent.
7. **To replicate:** To do something again in exactly the same way.
8. **Transparent:** Allowing light through so that objects can be seen through it (e.g. glass).

14.2. Text 11 B

New Materials That Could Change Our Lives

`(1)` New, super-thin material cools buildings. A team of engineers has created a 3. super-thin material that could help 4. keep buildings cool even under direct sunlight. The engineers say the new material could provide an answer to air conditioners, which are 2. expensive to run and need a lot of water. The material is 5. unlike anything found in nature. It is a glass-polymer hybrid that is just fifty micrometers 1. thick. That's slightly thicker than the aluminium foil we use for cooking. The key advantage of this technology is that it works 24/7 with no electricity or water usage and can cool objects even under direct sunlight. Just ten to twenty square metres of this material on the rooftop could nicely 4. keep a house in summer.

`(2)` Scientists make self-repairing clothes. Humans have learnt many things from nature. These things have helped us in our daily life. The latest thing is self-repairing clothing. Scientists have developed a special way for clothing 8. to repair rips and tears by itself, without the need for sewing. It works with materials such as cotton, 1. linen , and wool. Scientists looked at how squid can cling on to things so well. The research team found a protein in the rings of teeth that cover the suckers on a squid. The protein is 2. similar to the one found in the silk that spiders use to make spider webs. It is very strong and 6. elastic. The new protein has been developed as part of a 3. coating , which is put on clothes. When the coating is dipped in water, the area around the rip or tear 7. joins together in less than a minute. This could help clothes 8. last longer and 4. save us money. It could also be useful for military and survival clothes.

(3) Self-Cleaning Plastic. A revolutionary new plastic could help 5. prevent bacteria and superbugs 4. to attract disease and illness. Scientists have developed a new kind of A. wrap, plastic wonder-wrap. They say it will drastically 6. cut incidences of microbe transfer in hospitals, restaurants, kitchens, bathrooms, and other places where bugs lie in wait. The material is like a conventional transparent B. transparent used to cover food. It can be shrink-wrapped to protect places that 4. attract bacteria, like worktops, door handles, taps, hospital equipment, and food containers. The researchers said the inspiration for their new material came from the lotus plant. They attempted 7. to replicate the method in which the leaves of this plant repelled water. As the world confronts the crisis of anti-microbial 3. resistance, new material will become an important part of the anti-bacterial toolbox.

14.3. Exercise №14

Read text 11 B again and answer the questions below choosing the best option according to the information given in the text. Compare your answers in pairs or groups.

1.

1. **Who created the super-thin material?**
   a) computer scientists
   b) a team of engineers
   c) Microsoft
2. **According to the text, what is not required for the cooling material to function?**
   a) sunlight
   b) human labour
   c) energy and water
3. **What concerns could the new material provide a solution to?**
   a) the meaning of life
   b) air conditioners
   c) shortage of water
4. **How thick is the new material?**
   a) 15 micrometres
   b) 50 millimetres
   c) 50 micrometres
5. **What is the new material slightly thicker than?**
   a) aluminium foil
   b) cardboard
   c) a piece of paper
6. **How often will this new material work?**
   a) five days a week
   b) during daylight hours
   c) twenty four hours, seven days a week
7. **How much of the material could cool down a house in summer?**
   a) enough to cover a football field

b) 10 to 20 square metres
c) 24/7

2.

1. **From what have humans gained a lot of knowledge?**
   a) books
   b) nature
   c) experiments
2. **What is needed for the self-repairing clothes to fix themselves?**
   a) water
   b) sewing
   c) glue
3. **According to the text, what natural material is commonly used for the clothes besides cotton and linen?**
   a) nylon
   b) viscose
   c) wool
4. **From which sea creature did scientists take inspiration for the concept of self-repairing clothes?**
   a) whale
   b) squid
   c) jellyfish
5. **What type of silk contains the protein similar to the one found in a squid?**
   a) spider web silk
   b) Japanese silk
   c) synthetic silk
6. **How long does it take for a rip or tear to join together?**
   a) an hour or so
   b) a few minutes
   c) less than a minute
7. **What potential benefits could the new invention offer us?**
   a) time
   b) money
   c) material

3.

1. **What could the new plastic prevent?**
   a) pandemics
   b) illnesses
   c) bacteria
2. **How much transparency does the revolutionary new plastic have?**
   a) completely non-transparent
   b) somewhat transparent
   c) fully transparent

3. **By how much did the article say the plastic would cut microbe transfer?**
    a) drastically
    b) a little
    c) totally
4. **What is done to the plastic before it is applied to surfaces?**
    a) it is sprayed with water
    b) it is shrunk
    c) it is folded
5. **What types of equipment did the article mention that the plastic could be used to cover?**
    a) hospital equipment
    b) computer equipment
    c) sports equipment
6. **What served as the inspiration for the development of this plastic?**
    a) the water lily
    b) the sunflower
    c) the lotus plant
7. **In what will the plastic play a significant role?**
    a) restaurant hygiene
    b) medicine
    c) an anti-bacterial toolbox

Solution

b) a team of engineers
c) energy and water
b) air conditioners
c) 50 micrometres
a) aluminium foil
c) twenty four hours, seven days a week
b) 10 to 20 square metres

b) nature
a) water
c) wool
b) squid
a) spider web silk
c) less than a minute
b) money

c) bacteria
c) fully transparent
a) drastically
b) it is shrunk
a) hospital equipment
c) the lotus plant
c) an anti-bacterial toolbox

14.4. Exercise №27

Replace the words in bold with their synonyms using the words given below. Translate the sentences into Russian.

1. This car has **comparable** features to the other one, but it is much cheaper.
2. If you **connect** the dots on the paper, you'll get a picture.
3. He is taking the car to the garage to have it **serviced** this afternoon.
4. All the information you need is **stored** in this folder.
5. She's very **different** from her sister.
6. Researchers tried many times to **repeat** the original experiment.
7. Make sure that shirt isn't **see-through** when it gets wet.
8. Many illnesses are **brought about** by poor diet and lack of exercise.
9. My friend found a well-paid job but asked me not to **tell anybody about it yet**.
10. When they arrived the meeting had been **going on** for two hours already.

Solution

1. Эта машина обладает **сопоставимыми** характеристиками с другой, но она намного дешевле.
2. Если вы **соедините** точки на бумаге, вы получите картину.
3. Он отвозит машину в гараж, чтобы **провести** техобслуживание этим вечером.
4. Вся информация, которая вам нужна, **хранится** в этой папке.
5. Она очень **отличается** от своей сестры.
6. Исследователи много раз пытались **воспроизвести** оригинальный эксперимент.
7. Убедитесь, что рубашка не **прозрачна**, когда она мокрая.
8. Многие заболевания **возникают** из-за неправильного питания и недостатка физических упражнений.
9. Мой друг нашел **хорошо оплачиваемую** работу, но попросил меня пока никому не рассказывать об этом.
10. Когда они прибыли, собрание уже **продолжалось** два часа.

14.5. Exercise №32

Summarise in English using some key words from the vocabulary section.

1. Американские и шведские инженеры создали мягкую роботизированную ткань, которая может запоминать и воспроизводить движения владельца. Ткань состоит из полимерной оболочки, обладающей весьма сложной структурой и слоя мягкого материала, для которого растяжение равносильно изменению электрического сопротивления. Также в материал встроена эластомерная трубка. Ткань получила название Omni Fiber. Ее волокна отличаются особой тонкостью и гибкостью. Ожидается, что ткань будут применять для создания оде□□ды для спорт□□менов или певцов.
2. Ученые придумали новое революционное применение древесины. Они придумали способ сделать её прозрачной. Это изобретение может полностью изменить то, как используются и производятся многие вещи в нашей жизни. Прозрачная древесина может однажды заменить стекло и использоваться в изготовлении окон и столов, для экранов телефонов и целого ряда других строительных материалов. Инновация возникла, когда исследователи экспериментировали с различными способами извлечения химических веществ из древесины, придающих ей цвет. Они были

очень удивлены тем, насколько прозрачной может быть древесина. Они считают, что эта «новая» древесина потенциально может заменить стекло и некоторые оптические материалы. Прозрачное дерево намного прочнее и менее

Solution

American and Swedish engineers developed a soft robotic fabric called Omni Fiber, composed of a polymer shell with a complex structure and a layer of stretchable material. It also incorporates an elastomeric tube. The fabric's fibers are exceptionally thin and flexible, expected to be used in sportswear or performance clothing.

Scientists devised a revolutionary application for wood, making it transparent, potentially replacing glass in windows, screens, and various construction materials. The innovation arose from experiments extracting chemicals from wood, making it surprisingly transparent. Transparent wood, stronger and safer than glass, provides better insulation and is biodegradable. This discovery is still in its early stages.

Conditional Sentences:

Study the examples of four types of Conditional sentences below and answer the questions.

1. If we created more advanced materials, they would accelerate the development of industries from energy to manufacturing.
2. If substances are used to make products, they are called materials.
3. If new materials hadn’t been discovered, a lot of products and technologies wouldn’t have been developed.
4. If new tools to create materials continue to be used, we will soon see more breakthroughs in different fields.

`Questions:`

- What do they all have in common?
- How are they different?
- Which example expresses
  - General truth;
  - Imagined future situation which is quite likely;
  - Hypothetical situation which is unlikely;
  - Hypothetical outcome.

`Answers:`

1. All examples express conditional statements using "if" clauses, with each portraying a different type of condition and outcome.
2. • Example 1: Imagined future situation which is quite likely.
   • Example 2: General truth.
   • Example 3: Hypothetical situation which is unlikely.
   • Example 4: Hypothetical outcome.

Глава 15

Домашнее задание №7 11.04.24

15.1. Exercise №34

Look at the examples of different types of Conditionals and fill in the blanks. Add 2-3 examples of your own of each type of Conditionals.

1. We use Type _____ to talk about future situations when we believe it is quite likely. (probable future)
2. We use Type _____ to talk about past situations that didn't happen. (unreal for the past)
3. We use Type _____ to talk about things that are true, that have happened, or are very likely to happen.
4. We use Type _____ to talk about the possible result of an imagined situation in the present or future. (unreal for the present or future)

Solution

1. We use Type **0** to talk about things that are true, that have happened, or are very likely to happen.
2. We use Type **3** to talk about past situations that didn't happen. (unreal for the past)
3. We use Type **1** to talk about future situations when we believe it is quite likely. (probable future)
4. We use Type **4** to talk about the possible result of an imagined situation in the present or future. (unreal for the present or future)

15.2. Exercise №35

Focus on the verb forms in different types of Conditionals in the examples below and fill in the table.

1. If we cool certain materials to absolute zero, they become superconductors. (Zero conditional)
2. If the economy is growing by 6%, then it is growing too fast. (Zero conditional)
3. If new technologies don’t guarantee safety, they won’t be adopted. (Type 1)
4. If car makers solve some technical problems, electric cars will soon replace petrol cars. (Type 1)
5. If science fiction became science fact immediately, we would be living in an age of flying cars. (Type 2)

6. If robots could think or decide to do things differently, they would replace humans. (Type 2)
7. If self-cleaning plastic was widely used, it would drastically cut the incidences of microbe transfer in hospitals and restaurants. (Type 2)
8. If robots hadn't been fitted with vision equipment, they wouldn't have been able to see. (Type 3)
9. If a laser had been used for the operation, it would have caused less harm. (Type 3)
10. If internal combustion engine had not been invented, electric cars would have dominated our roads. (Type 3)

Solution

Example	Type of Conditional	IF CLAUSE Verb Form	RESULT (MAIN) CLAUSE Verb Form
1	Zero	present simple	present simple
2	Zero	present simple	present simple
3	Type 1	present simple	future simple
4	Type 1	present simple	future simple
5	Type 2	past simple	would + base form
6	Type 2	past simple	would + base form
7	Type 2	past simple	would + base form
8	Type 3	past perfect	would have + past participle
9	Type 3	past perfect	would have + past participle
10	Type 3	past perfect	would have + past participle

15.3. Exercise №36

Look at more examples of Conditionals noticing the verb forms. Identify their types and decide whether the action expressed in the sentence is:

a) likely/possible
b) less likely/less possible
c) impossible

1. If scientists use modern tools to propel innovations forward, they will lead us to more remarkable possibilities.
2. If a new super-thin material was used to cool our buildings, we would be able to save a significant amount of energy and money.
3. If advanced materials hadn't been created, smartphones wouldn't have become accessible to billions of people.
4. Materials science wouldn't have played a key role in shaping human civilization if many remarkable new materials hadn't been developed.
5. If we had self-repairing clothes, there would be no need for sewing.
6. If a self-cleaning plastic were applied in hospitals, it could help prevent bacteria and superbugs from causing diseases.
7. If technology weren't advancing so rapidly, we wouldn't struggle so much to keep pace with it.
8. If a new technique for printing organic tissue was created, scientists would be able to reproduce the body's organs via the use of 3D printing.

9. If our climate keeps getting warmer, we will soon require new technologies to cool our buildings.
10. If humans had not learned from nature, they would not have invented so many incredible technologies.
11. If the problem of global warming is not dealt with, our world will be a much more dangerous and difficult place to live in.
12. If electric cars become dominant, our cities will turn into much cleaner and quieter places.

Solution

a) If scientists use modern tools to propel innovations forward, they will lead us to more remarkable possibilities.
Translation: Если ученые используют современные инструменты для продвижения инноваций вперед, они приведут нас к более замечательным возможностям.

b) If a new super-thin material was used to cool our buildings, we would be able to save a significant amount of energy and money.
Translation: Если бы для охлаждения наших зданий использовался новый сверхтонкий материал, мы могли бы сэкономить значительное количество энергии и денег.

c) If advanced materials hadn't been created, smartphones wouldn't have become accessible to billions of people.
Translation: Если бы передовые материалы не были созданы, смартфоны не стали бы доступны миллиардам людей.

c) Materials science wouldn't have played a key role in shaping human civilization if many remarkable new materials hadn't been developed.
Translation: Наука о материалах не сыграла бы ключевую роль в формировании человеческой цивилизации, если бы не было разработано много замечательных новых материалов.

b) If we had self-repairing clothes, there would be no need for sewing.
Translation: Если бы у нас была одежда с возможностью самостоятельного ремонта, не было бы необходимости шить.

b) If a self-cleaning plastic were applied in hospitals, it could help prevent bacteria and superbugs from causing diseases.
Translation: Если бы в больницах применялся самоочищающийся пластик, это могло бы помочь предотвратить бактерии и супербактерии, вызывающие заболевания.

b) If technology weren't advancing so rapidly, we wouldn't struggle so much to keep pace with it.
Translation: Если бы технологии не развивались так быстро, нам не пришлось бы так сильно бороться, чтобы быть в тренде.

b) If a new technique for printing organic tissue was created, scientists would be able to reproduce the body's organs via the use of 3D printing.
Translation: Если бы была создана новая техника для печати органической ткани, ученые смогли бы воспроизводить органы тела с помощью 3D-печати.

a) If our climate keeps getting warmer, we will soon require new technologies to cool our buildings.
Translation: Если наш климат будет продолжать нагреваться, нам скоро понадобятся новые технологии для охлаждения наших зданий.

b) If humans had not learned from nature, they would not have invented so many incredible technologies.

Translation: Если бы люди не учились у природы, они не изобрели бы так много невероятных технологий.

a) If the problem of global warming is not dealt with, our world will be a much more dangerous and difficult place to live in.
Translation: Если проблема глобального потепления не будет решена, наш мир станет гораздо более опасным и сложным местом для жизни.

a) If electric cars become dominant, our cities will turn into much cleaner and quieter places.
Translation: Если электромобили станут доминирующим□□, наши города станут намного чище и тише.

15.4. Exercise №37

Match the clauses below. Identify the types of Conditionals and explain their meaning.

A. Match the Clauses

1. If we had more students …
2. My teacher wouldn't have been angry with me …
3. If I have lots of money in the future …
4. She wouldn't have been given the current position in the company …
5. If you heat water to 100°C …
6. If the weather is fine …
7. If she doesn't get a good night's sleep …
8. If I still feel awful tomorrow …
9. If people didn't drive so fast on this road …

a. I'll take a trip around the world.
b. we would run the course.
c. if I had come to my class on time.
d. we can go to the country tomorrow.
e. she's always tired in the mornings.
f. there wouldn't be so many accidents.
g. if she had been lazy and talentless.
h. I'll take the day off work.
i. it boils.

B. Identify the Types of Conditionals

1. If she doesn't pass the exam this year …
2. If I had the time …
3. If he hadn't done engineering …
4. I would never have bought this car …
5. If you don't book now…
6. If the rent had been lower…
7. If the flight is late…
8. If it snows…
9. If you take another week off work …

a. if I'd known how much petrol it uses.

b. I'd love to learn to play tennis.
c. what would he have studied?
d. you won't get good tickets.
e. I would have taken the flat.
f. we'll miss our connection.
g. we get our skis out.
h. she can try again next year.
i. the boss will definitely fire you.

Solution

`A. Matching the clauses:`

1. If we had more students … (*f. there wouldn't be so many accidents.*) **Type:** Second Conditional
   Meaning: This is a second conditional statement, indicating a hypothetical situation in the present or future and its probable result.
2. My teacher wouldn't have been angry with me … (*c. if I had come to my class on time.*)
   Type: Third Conditional
   Meaning: This is a third conditional statement, expressing a situation that didn't happen in the past and its imaginary result.
3. If I have lots of money in the future … (*a. I`ll take a trip around the world.*) **Type:** First Conditional
   Meaning: This is a first conditional statement, presenting a likely future situation and its potential outcome.
4. She wouldn't have been given the current position in the company … (*g. if she had been lazy and talentless.*) **Type:** Third Conditional
   Meaning: This is a third conditional statement, indicating a situation in the past that didn't occur and its imaginary result.
5. If you heat water to 100°C … (*i. it boils.*) **Type:** Zero Conditional
   Meaning: This is a zero conditional statement, stating a general truth or scientific fact.
6. If the weather is fine … (*d. we can go to the country tomorrow.*) **Type:** First Conditional
   Meaning: This is a first conditional statement, presenting a likely future situation and its potential outcome.
7. If she doesn't get a good night's sleep … (*e. she's always tired in the mornings.*) **Type:** First Conditional
   Meaning: This is a first conditional statement, presenting a likely future situation and its potential outcome.
8. If I still feel awful tomorrow … (*h. I'll take the day off work.*) **Type:** First Conditional
   Meaning: This is a first conditional statement, presenting a likely future situation and its potential outcome.
9. If people didn't drive so fast on this road … (*b. we would run the course.*) **Type:** Second Conditional
   Meaning: This is a second conditional statement, indicating a hypothetical situation in the present or future and its probable result.

`B. Matching the clauses:`

1. If she doesn't pass the exam this year … (*h. she can try again next year.*) **Type:** First Conditional
   Meaning: This is a first conditional statement, presenting a likely future situation and its potential outcome.

2. If I had the time … (*b. I'd love to learn to play tennis.*) **Type:** Second Conditional
   Meaning: This is a second conditional statement, indicating a hypothetical situation in the present or future and its probable result.
3. If he hadn't done engineering … (*c. what would he have studied?*) **Type:** Third Conditional
   Meaning: This is a third conditional statement, expressing a situation that didn't happen in the past and its imaginary result.
4. I would never have bought this car … (*a. if I'd known how much petrol it uses.*) **Type:** Third Conditional
   Meaning: This is a third conditional statement, expressing a situation that didn't happen in the past and its imaginary result.
5. If you don't book now… (*d. you won't get good tickets.*) **Type:** First Conditional
   Meaning: This is a first conditional statement, presenting a likely future situation and its potential outcome.
6. If the rent had been lower… (*e. I would have taken the flat.*) **Type:** Third Conditional
   Meaning: This is a third conditional statement, expressing a situation that didn't happen in the past and its imaginary result.
7. If the flight is late… (*f. we'll miss our connection.*) **Type:** First Conditional
   Meaning: This is a first conditional statement, presenting a likely future situation and its potential outcome.
8. If it snows… (*g. we get our skis out.*) **Type:** Zero Conditional
   Meaning: This is a zero conditional statement, stating a general truth or scientific fact.
9. If you take another week off work … (*i. the boss will definitely fire you.*) **Type:** First Conditional
   Meaning: This is a first conditional statement, presenting a likely future situation and its potential outcome.

Глава 16

Семинар №8 11.04.24

16.1. Exercise №38

Put the verbs in the correct tense. Translate the sentences into Russian.

`Conditional 1:`

1. If I _____ (finish) early, I will call you.
2. I _____ (catch) the 9:00 train, if I hurry up.
3. She will get the answer, if she _____ (try) to understand.
4. If you _____ (be) free earlier, we can go for a walk.
5. If you are hungry, I _____ (make) some sandwiches.
6. If he _____ (study) hard, he'll do well in the exam.
7. If you _____ (not be) back by 5pm, we'll leave without you.

`Conditional 2:`

1. If I _____ (be) a star, I would help those in need.
2. He _____ (buy) a house if he had a job.
3. She _____ (be) happy, if she married him.
4. If I _____ (be) you, I would ask for help.
5. If I had more time, I _____ (go) to the gym.
6. I _____ (not/have to walk) everywhere, if I bought a car.
7. If people used bikes instead of cars, there _____ (not/be) so much pollution.

`Conditional 3:`

1. If he _____ (be) more careful, he would not have had that terrible accident.
2. I _____ (pass) the exam if I had worked harder.
3. If he _____ (not learn) to play the guitar, he wouldn't have joined the band.
4. If the government _____ (spend) all the money given, all the roads _____ (be paved).
5. We wouldn't have been able to answer your questions if we _____ (read/not) the book.
6. If he had left earlier, he _____ (arrive) on time.
7. If they _____ (book) earlier, they could have found better seats.

Solution

`Conditional 1:`

1. **If I finish early, I will call you.** - *Если я закончу рано, я позвоню тебе.*
2. **I will catch the 9:00 train, if I hurry up.** - *Я поймаю поезд в 9:00, если я потороплюсь.*
3. **She will get the answer, if she tries to understand.** - *Она получит ответ, если попытается понять.*
4. **If you are free earlier, we can go for a walk.** - *Если ты освободишься раньше, мы сможем пойти погулять.*
5. **If you are hungry, I will make some sandwiches.** - *Если ты голоден, я приготовлю немного бутербродов.*
6. **If he studies hard, he'll do well in the exam.** - *Если он усердно учится, он хорошо справится с экзаменом.*
7. **If you are not back by 5pm, we'll leave without you.** - *Если ты не вернёшься к 5 вечера, мы уйдем без тебя.*

`Conditional 2:`

1. **If I were a star, I would help those in need.** - *Если бы я был звездой, я бы помогал нуждающимся.*
2. **He would buy a house if he had a job.** - *Он бы купил дом, если бы у него была работа.*
3. **She would be happy if she married him.** - *Она была бы счастлива, если бы вышла за него замуж.*
4. **If I were you, I would ask for help.** - *Если бы я был на твоем месте, я бы попросил помощи.*
5. **If I had more time, I would go to the gym.** - *Если бы у меня было больше времени, я бы ходил в спортзал.*
6. **I wouldn't have to walk everywhere if I bought a car.** - *Мне бы не пришлось ходить пешком везде, если бы я купил машину.*
7. **If people used bikes instead of cars, there wouldn't be so much pollution.** - *Если бы люди использовали велосипеды вместо машин, не было бы такого загрязнения.*

`Conditional 3:`

1. **If he had been more careful, he would not have had that terrible accident.** - *Если бы он был осторожнее, у него не было бы этой ужасной аварии.*
2. **I would have passed the exam if I had worked harder.** - *Я бы сдал экзамен, если бы усерднее готовился.*
3. **If he hadn't learned to play the guitar, he wouldn't have joined the band.** - *Если бы он не научился играть на гитаре, он бы не вступил в группу.*
4. **If the government had spent all the money given, all the roads would have been paved.** - *Если бы правительство потратило все выделенные средства, все дороги были бы вымощены.*
5. **We wouldn't have been able to answer your questions if we hadn't read the book.** - *Мы бы не смогли ответить на ваши вопросы, если бы не прочли книгу.*
6. **If he had left earlier, he would have arrived on time.** - *Если бы он ушел раньше, он бы прибыл вовремя.*
7. **If they had booked earlier, they could have found better seats.** - *Если бы они забронировали билеты раньше, они могли бы найти лучшие места.*

16.2. Exercise №39

Decide what contraction ’d stands for: would or had.

`Example:` If I'd known you were in hospital, I'd have visited you. → If I had known you were in hospital, I would have visited you. I'd have bought you a present if I'd known it was your birthday. → I would have bought you a present if I had known it was your birthday.

1. If you'd given me your e-mail, I'd have written to you.
2. If you’d asked me, I’d have phoned the customers to let them know.
3. If I was rich, I’d spend all my time travelling.
4. You could have changed your opinion if you’d stayed longer.
5. I’d help you if I knew how.
6. If he’d listened to what his friends had been telling him he wouldn’t have lost so much money.
7. They’d have got the job done more quickly if they’d had more people working on it.
8. If I saw a snake, I’d be terrified.

Solution

1. If you had given me your e-mail, I would have written to you.
2. If you had asked me, I would have phoned the customers to let them know.
3. Incorrect usage. It should be "If I were rich, I would spend all my time traveling."
4. You could have changed your opinion if you had stayed longer.
5. Incorrect usage. It should be "I would help you if I knew how."
6. If he had listened to what his friends had been telling him, he wouldn’t have lost so much money.
7. They would have got the job done more quickly if they had had more people working on it.
8. Incorrect usage. It should be "If I see a snake, I am terrified."

16.3. Exercise №42

Read the following examples paying attention to the synonyms of ‘if’. Explain their meaning or translate the sentences into Russian.

1. Provided that there are enough seats, anyone can go on the trip.
2. Provided that the plane takes off on time, we should reach Irkutsk by morning.
3. So long as a tiger stands still, it is invisible in the jungle.
4. The bank lent the company 100,000 pounds on condition that they would repay the money within six months.
5. You can get a senior citizen’s concession providing you’ve got an ID card.
6. Supposing I don’t arrive till after midnight, will the hotel still be open?
7. They may do whatever they like provided that it is legal.
8. Supposing you lost your passport while travelling, you’d have to go to the embassy, wouldn’t you?
9. In case I forget later, here are the keys to the garage.
10. Let’s take our swimming costumes in case there’s a pool at the hotel.

Solution

1. **Provided that there are enough seats, anyone can go on the trip.** *Meaning:* If there are sufficient seats available, everyone is allowed to go on the trip. *Translation:* При условии, что есть достаточно мест, любой может поехать в поездку.
2. **Provided that the plane takes off on time, we should reach Irkutsk by morning.**
   Meaning: If the plane departs punctually, we expect to arrive in Irkutsk by morning.
   Translation: При условии, что самолет взлетит вовремя, мы должны добраться до Иркутска к утру.
3. **So long as a tiger stands still, it is invisible in the jungle.**
   Meaning: If a tiger remains stationary, it is difficult to spot it amidst the jungle foliage.
   Translation: Пока тигр стоит неподвижно, он невидим в джунглях.
4. **The bank lent the company 100,000 pounds on condition that they would repay the money within six months.**
   Meaning: The bank provided a loan of 100,000 pounds with the stipulation that the company must repay it within six months.
   Translation: Банк выдал компании кредит на 100 000 фунтов при условии, что они вернут деньги в течение шести месяцев.
5. **You can get a senior citizen's concession providing you've got an ID card.**
   Meaning: If you possess an ID card, you are eligible for a discount as a senior citizen.
   Translation: Вы можете получить льготу для пенсионеров, при условии, что у вас есть удостоверение личности.
6. **Supposing I don't arrive till after midnight, will the hotel still be open?**
   Meaning: If I arrive after midnight, is it likely that the hotel will still be open?
   Translation: Предположим, что я приеду после полуночи, отель все еще будет открыт?
7. **They may do whatever they like provided that it is legal.**
   Meaning: They are permitted to engage in any activity as long as it conforms to the law.
   Translation: Они могут делать что угодно, при условии, что это законно.
8. **Supposing you lost your passport while traveling, you'd have to go to the embassy, wouldn't you?**
   Meaning: If you were to lose your passport during travel, you would need to visit the embassy, correct?
   Translation: Предположим, что вы потеряли свой паспорт во время путешествия, вам придется пойти в посольство, верно?
9. **In case I forget later, here are the keys to the garage.**
   Meaning: If I happen to forget later, the keys to the garage are provided now.
   Translation: На случай, если я забуду позже, вот ключи от гаража.
10. **Let's take our swimming costumes in case there's a pool at the hotel.**
    Meaning: We should bring our swimsuits just in case there is a pool available at the hotel.
    Translation: Давай возьмем купальные костюмы на всякий случай, если в отеле будет бассейн.

16.4. Exercise 44

Use your own ideas to complete the sentences. Think of your own examples with different types of Conditionals.

1. I like hot weather provided _____
2. I'd walk to university unless _____

3. You can borrow the money provided _____
4. You won't get a good job, unless _____
5. I could go out tonight if _____
6. If I was free now _____
7. If I saved a large sum of money _____
8. If I had never studied English _____
9. If I had not come to this university _____
10. If I had been born 60 years ago _____
11. If there was a power cut in this building _____
12. If I found myself alone on a desert island _____

Solution

1. I like hot weather provided there's a cool breeze to balance it out.
2. I'd walk to university unless it's pouring rain outside.
3. You can borrow the money provided you pay it back by the end of the month.
4. You won't get a good job unless you have relevant experience or qualifications.
5. I could go out tonight if I finish my work early.
6. If I was free now, I'd probably catch up on some reading.
7. If I saved a large sum of money, I'd invest it in real estate.
8. If I had never studied English, I wouldn't be able to communicate effectively with people from around the world.
9. If I had not come to this university, I might have pursued a different career path.
10. If I had been born 60 years ago, I would have experienced a vastly different world without modern technology.
11. If there was a power cut in this building, we'd have to rely on flashlights and candles.
12. If I found myself alone on a desert island, I'd try to build a shelter and find a source of fresh water.

16.5. Exercise №45

Paraphrase the following sentences according to the model.

`Example:` If he calls, give him all the necessary details. → Should he call, give him all the necessary details.

1. If I had known about the meeting, I would have attended.
2. If he had been there, he could have helped them.
3. If she had not applied early, she wouldn't have been accepted.
4. If you had not left an hour early, you would have been late for the meeting.
5. If I see him, I'll pass on the message to him.
6. If you need anything, please call me.
7. If he calls you, I also want to speak to him.
8. If the test drive of an Uber car had been successful, self-driving vehicles would have developed more rapidly.

Solution

1. Had I known about the meeting, I would have attended.
2. Had he been there, he could have helped them.

3. Had she not applied early, she wouldn't have been accepted.
4. Had you not left an hour early, you would have been late for the meeting.
5. Should I see him, I'll pass on the message to him.
6. Should you need anything, please call me.
7. Should he call you, I also want to speak to him.
8. Had the test drive of an Uber car been successful, self-driving vehicles would have developed more rapidly.

Глава 17

Домашнее задание №8 18.04.24

17.1. Exercise №40

Put the verbs in brackets into the correct form and explain their meaning or translate the sentences into Russian.

`Example:`

- If you (*to park*) here, your car (*to get*) towed. (Zero conditional) → If you park here, your car gets towed.
- If you (*to catch*) the fast train, you (*to get*) home early. (*Type 2*) → If you catch the fast train, you will get home early.
- If we asked him, he would help us. (*Type 2*) → If we asked him, he would help us.
- If I (*to know*) you were coming, I (*to buy*) a cake. (*Type 3*) → If I had known you were coming, I would have bought a cake.

1. If materials (*to be*) not so pervasive, we (*to be taking*) them for granted. (*Type 2*)
   Если материалы не были бы такими всеобъемлющими, мы бы относились к ним более равнодушно.
2. If materials science (*to be developing*) so dynamically, it (*to become*) a key discipline. (*Type 3*)
   Если бы наука о материалах развивалась так динамично, она стала бы ключевой дисциплиной.
3. If we (*to continue*) to develop materials with desired properties, materials science (*to be*) the most important technology of the next decade. (*Type 1*)
   Если мы продолжим развивать материалы с желаемыми свойствами, наука о материалах будет самой важной технологией следующего десятилетия.
4. If clear safety rules for self-driving cars (*to be created*), they (*to keep*) our roads safe. (*Type 1*)
   Если будут созданы четкие правила безопасности для автономных автомобилей, они будут сохранять безопасность на наших дорогах.
5. The accident (*not/to happen*) if you (*to test*) your brakes. (*Type 3*)
   Авария не произошла бы, если бы вы проверили свои тормоза.
6. If computers (*not/to be invented*), lots of new jobs (*not/to appear*). (*Type 3*)
   Если бы компьютеры не были изобретены, множество новых рабочих мест не появилось бы.
7. When the sun (*to go*) down, it (*to get*) dark. (*Type 0*)
   Когда солнце заходит, становится темно.

8. What (*to happen*) if the Internet (*to be invented*) 100 years ago? (*Type 3*)
   Что бы произошло, если бы интернет был изобретен 100 лет назад?
9. If unprecedented developments in AI technology (*to continue*), smart machines (*to take*) over millions of our jobs in the near future. (*Type 1*)
   Если безпрецедентные достижения в технологии искусственного интеллекта продолжатся, умные машины захватят миллионы наших рабочих мест в ближайшем будущем.
10. If he (*not/to run*) a red light, the accident (*to happen*). (*Type 3*)
    Если бы он не проехал на красный свет, авария не произошла бы.

- If materials were not so pervasive, we would be taking them for granted. (*Type 2*)
- If materials science had been developing so dynamically, it would have become a key discipline. (*Type 3*)
- If we continue to develop materials with desired properties, materials science will be the most important technology of the next decade. (*Type 1*)
- If clear safety rules for self-driving cars are created, they will keep our roads safe. (*Type 1*)
- The accident would not have happened if you had tested your brakes. (*Type 3*)
- If computers had not been invented, lots of new jobs would not have appeared. (*Type 3*)
- When the sun goes down, it gets dark. (*Type 0*)
- What would happen if the Internet had been invented 100 years ago? (*Type 3*)
- If unprecedented developments in AI technology continue, smart machines will take over millions of our jobs in the near future. (*Type 1*)
- If he had not run a red light, the accident would not have happened. (*Type 3*)

17.2. Exercise №41

Write Conditional sentences of type 2 or 3 using the sentences given below according to the example. Answers may vary.

`Example:` The weather is bad. The flight is cancelled. → If the weather was not bad, the flight wouldn't be cancelled. There was no lifeboat. Sailors couldn't keep afloat. → The sailors could keep afloat if there was a lifeboat.

1. I didn't prepare for the seminar. I couldn't answer the teacher's questions.
2. The inaccurate values were used. The result was an error.
3. There aren't many currents in this part of the ocean. Organic material isn't pulled down into the trenches.
4. It is much easier to compute satellite orbits. The Earth is perfectly spherical and has no atmosphere.
5. The research team used a free-falling autonomous camera system. Many new species of animals were documented.
6. No satellites were launched. The transmissions of microwaves across the oceans were impossible.
7. The Earth doesn't stay in one place in its orbit. Day and night change in length.
8. The technology is developing fast. It is hard to keep up with technology these days.
9. The vehicle was built with a new type of alloy. It wasn't badly damaged in a car crash.
10. Many ships were lost at sea. Their sailors didn't know how to find out their location.

Solution

1. If I had prepared for the seminar (*Type 3*), I could have answered the teacher's questions (*Type 2*).
2. If the accurate values had been used (*Type 3*), the result wouldn't have been an error (*Type 2*).
3. If there were many currents in this part of the ocean (*Type 2*), organic material would be pulled down into the trenches (*Type 2*).
4. If it weren't much easier to compute satellite orbits (*Type 2*), the Earth wouldn't be perfectly spherical and have no atmosphere (*Type 2*).
5. If the research team hadn't used a free-falling autonomous camera system (*Type 3*), many new species of animals wouldn't have been documented (*Type 2*).
6. If satellites had been launched (*Type 3*), the transmissions of microwaves across the oceans wouldn't have been impossible (*Type 2*).
7. If the Earth stayed in one place in its orbit (*Type 2*), day and night wouldn't change in length (*Type 2*).
8. If technology weren't developing fast (*Type 2*), it wouldn't be hard to keep up with technology these days (*Type 2*).
9. If the vehicle hadn't been built with a new type of alloy (*Type 3*), it would have been badly damaged in a car crash (*Type 2*).
10. If the sailors had known how to find out their location (*Type 3*), many ships wouldn't have been lost at sea (*Type 2*).

17.3. Exercise №43

Change the following sentences so that each sentence contains the word 'unless'.

`Example:` You'll catch a cold if you don't wear warm clothes. → Unless you wear warm clothes, you'll catch a cold.

1. You won't get in if you don't have a ticket.
2. The match will be called off if the weather doesn't clear up.
3. I wouldn't get the job if I didn't pass my driving test.
4. If your English doesn't improve, you'll fail the exam.
5. If you don't slow down, you will have an accident.
6. If it doesn't rain soon, all the plants are going to die.
7. If you don't ask questions, you won't learn to think critically.
8. If we hadn't made a booking weeks in advance, we wouldn't have been able to get a flight.
9. We might need to cancel the show if we don't sell more tickets at the last minute.
10. If he hadn't recognised us, he might never have spoken to us.

Solution

1. Unless you have a ticket, you won't get in.
2. The match will be called off unless the weather clears up.
3. Unless I pass my driving test, I wouldn't get the job.
4. Unless your English improves, you'll fail the exam.
5. Unless you slow down, you will have an accident.

6. Unless it rains soon, all the plants are going to die.
7. Unless you ask questions, you won't learn to think critically.
8. Unless we made a booking weeks in advance, we wouldn't have been able to get a flight.
9. Unless we sell more tickets at the last minute, we might need to cancel the show.
10. Unless he recognized us, he might never have spoken to us.

17.4. Exercise №59

1. If we had invested in new technology,
2. If people didn't suffer from range anxiety,
3. If new materials hadn't been discovered,
4. Unless so many different means of transport had been developed,
5. If they had told me about the problem earlier,
6. If I had studied English at school,
7. If you really wanted to go there,
8. If I had taken his advice,
9. If they had caught an earlier train,
10. If the Tu-144 hadn't been withdrawn,

a. people wouldn't be travelling so extensively today.
b. I wouldn't be in this mess now.
c. we would still be competitive.
d. everything would be all right now.
e. they would be here now.
f. more electric cars would have been produced.
g. I wouldn't find it so difficult to learn now.
h. our flights to distant parts of the country would be much shorter today.
i. materials science wouldn't be such an exciting and dynamic field as it is today.
j. you would have booked the trip long ago.

Solution

1. If we had invested in new technology, we would still be competitive.
2. If people didn't suffer from range anxiety, more electric cars would have been produced.
3. If new materials hadn't been discovered, materials science wouldn't be such an exciting and dynamic field as it is today.
4. Unless so many different means of transport had been developed, our flights to distant parts of the country would be much shorter today.
5. If they had told me about the problem earlier, I wouldn't be in this mess now.
6. If I had studied English at school, I wouldn't find it so difficult to learn now.
7. If you really wanted to go there, you would have booked the trip long ago.
8. If I had taken his advice, everything would be all right now.
9. If they had caught an earlier train, they would be here now.
10. If the Tu-144 hadn't been withdrawn, people wouldn't be travelling so extensively today.

17.5. Check yourself

1. What type of material is it?

1. **Polymer**: A chemical compound or mixture of compounds formed by polymerization and consisting essentially of repeating structural units. They include plastic and rubber materials.
2. **Ceramic**: Compounds made up of either metallic or nonmetallic elements, such as earthenware, porcelain, or brick, that have been shaped and then hardened by heating to high temperatures.
3. **Composite**: Composed of two or more individual materials which allow them to achieve a combination of properties that is not displayed by any single material.
4. **Concrete**: A building material made from a mixture of broken stone or gravel, sand, cement, and water, which can be spread or poured into molds and forms a mass resembling stone on hardening.
5. **Alloy**: A material that is made up of at least two different chemical elements, one of which is a metal, e.g., steel.

Solution

1. **Polymer**: A chemical compound or mixture of compounds formed by polymerization and consisting essentially of repeating structural units. They include plastic and rubber materials.
2. **Ceramic**: Compounds made up of either metallic or nonmetallic elements, such as earthenware, porcelain, or brick, that have been shaped and then hardened by heating to high temperatures.
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5. **Alloy**: A material that is made up of at least two different chemical elements, one of which is a metal, e.g., steel.

3. True or False?

1. **Materials science** is a discipline that studies the properties of matter and its applications.
2. This science **does not** study the relationships between the structure of materials at atomic or molecular scales.
3. **Materials science** is studied at many universities and has become part of forensic engineering or failure analysis.
4. **Materials science** is **not** the most important technology today.
5. **Smart materials** are materials that are used for manufacturing smart devices.
6. **Smart materials** can be also called *shape memory materials* because they react to changes in their environment.
7. **Materials science** can be divided into different disciplines that study different materials and their properties: *metallurgy, biomaterials*, etc.
8. Breakthroughs in **materials science** are likely to affect the future of technology significantly.
9. The examples of revolutionary materials include **graphene, composites, and wood**.
10. **Composites** exist in nature, for example, a piece of wood is a composite.

Solution

- True
- False
- True
- False
- True
- True
- True
- True
- True
- True

4. Choose ten materials and find products made of these materials. Complete the table.

Compare your examples.

Solution

Material	Product	Use
Wood	Furniture	Used for sitting, sleeping, storage, and decoration purposes in homes and offices.
Steel	Automobiles	Used for constructing car bodies, chassis, and various components for transportation.
Glass	Windows	Provides visibility while insulating against weather and allowing natural light in.
Plastic	Bottles	Used for containing and transporting liquids such as water, beverages, and chemicals.
Ceramic	Tiles	Used for covering floors, walls, and other surfaces in buildings for decoration.
Leather	Shoes	Worn for protection and comfort, primarily on feet, and as a fashion accessory.
Fabric	Clothing	Worn for protection, modesty, and fashion, including shirts, pants, dresses, etc.
Aluminum	Cans	Used for packaging beverages such as sodas, beers, and canned foods for preservation.
Rubber	Tires	Used for providing traction, support, and cushioning for vehicles on roads.
Concrete	Buildings	Used as a primary construction material for building foundations, walls, and floors.

7. Complete sentence b in each pair so that it has a similar meaning to sentence a.

`Example:` Bus lanes were introduced. Travelling by public transport was made easier. → Unless bus lanes had been introduced, travelling by public transport wouldn't have been made easier.

1. a) It's likely that there is life on other planets. If so, we are not alone.
   b) If _____ life on other planets, we _____ not be alone.
2. a) The world's population will probably continue to increase. If so, we will need more food.
   b) If the world's population _____ to increase, we _____ more food.
3. a) Other intelligent beings might inhabit the universe. If so, they would be very different from us.
   b) If other intelligent beings _____ the universe, they _____ very different from us.
4. a) There aren't many TV programmes about science, some people don't know much about it.
   b) If there _____ more TV programmes about science, people _____ more about it.
5. a) We shouldn't have spent so much money on space research. Instead, we could have solved many other serious problems.
   b) If we _____ less on space research, we could have solved many other serious problems.
6. a) Robotic vehicles have been used in dangerous environments for decades. The idea to create self-driving cars appeared.
   b) Unless robotic vehicles _____ the idea to create self-driving cars _____.
7. a) A few accidents involving self-driving cars have happened. People decided that they were not safe.
   b) Unless a few accidents involving self-driving cars _____, people _____ that they were not safe.
8. a) Neural networks take inspiration from the human brain. AI software is quite good at learning about scenarios it has never faced.
   b) If neural networks _____ inspiration from the human brain, AI software _____ quite good at learning about scenarios it has never faced.

Solution

1. If there were life on other planets, we would not be alone.
2. If the world's population continues to increase, we will need more food.
3. If other intelligent beings inhabit the universe, they would be very different from us.
4. If there were more TV programmes about science, people would know more about it.
5. If we had spent less on space research, we could have solved many other serious problems.
6. Unless robotic vehicles had been used in dangerous environments for decades, the idea to create self-driving cars would not have appeared.
7. Unless a few accidents involving self-driving cars had happened, people would not have decided that they were not safe.
8. If neural networks take inspiration from the human brain, AI software is quite good at learning about scenarios it has never faced.

17.6. Progress test

Vocabulary. Decide which answer a, b or c best fits into each gap.

Today we are taking _____ many thousands of manufactured objects that _____ our comfort in everyday life: the vehicles that we travel in; the clothes that we wear; the machines in our homes and offices; the sport and gym equipment we use; the computers and phones that we can't live without; and more importantly, the medical technology that keeps us

alive. Everything we see and use is made from materials _____ from the Earth or created by people. These materials can be split into four main groups: metals, polymers, ceramics, and _____ . The technological advances that have transformed our world over the last 20 years have been founded on the developments in Materials Science and Engineering. Materials are _____ faster today than at any time in history, enabling engineers to improve the _____ of existing products and to develop innovative technologies that will _____ all the aspects of our lives. Materials Science and Engineering has become a key discipline in the _____ global economy and is recognised as one of the technical disciplines. Due to the achievements in materials science we are _____ to develop new products and technologies that will make our lives safer, more convenient, more enjoyable and that will allow us to _____ the challenges of the future.

a. will…push
b. would… push
c. had… pushed

a. part in
b. advantage
c. for granted

a. comprise
b. contribute to
c. cover

a. derived
b. shaped
c. split

a. concrete
b. composites
c. superconductors

a. evolving
b. occurring
c. involving

a. acceleration
b. role
c. performance

a. cover
b. acquire
c. join

a. general
b. competitive
c. comparable

a. current
b. certain
c. unlike

a. solve
b. avoid
c. meet

Solution

c. for granted
b. contribute to
a. derived
b. composites
a. evolving
c. performance
c. join
b. competitive
a. current
c. meet

Grammar. Decide which answer a, b or c best fits into each gap.

1. If a material that becomes superconducting at much higher temperatures was found that _____ almost certainly _____ things along.

   a. will…push
   b. would… push
   c. had… pushed

2. If mercury wire _____ to absolute zero, it loses resistivity.

   a. was cooled
   b. is cooled
   c. will be cooled

3. If we apply a strong magnetic field to a superconducting material, it _____ to the normal state.

   a. returned
   b. will be returned
   c. would be returned

4. If superconductivity occurred at room temperatures, we _____ losses in transporting energy.

   a. could reduce
   b. could have reduced
   c. can reduce

5. Unless the theory of superconductivity _____, we wouldn't have been able to understand the behavior of superconducting materials.

   a. hadn't been created
   b. was created
   c. had been created

6. Unless lasers _____ nobody would have believed that science fiction could become science fact.

   a. had been predicted
   b. hadn't been predicted
   c. were predicted

7. If new superconducting materials _____, superconductivity wouldn't have become so important.

a. had been discovered
b. hadn’t been discovered
c. weren’t discovered

8. If driverless cars became commonplace, it _____ fundamentally _____ car use and traffic accidents would be prevented.

   a. will change
   b. can change
   c. would change

9. Provided robots _____ emotions, they could become our perfect companions.

   a. ‘d understood and felt
   b. would understand and feel
   c. understood and felt

10. If Ford had not created an affordable car, they _____ mass produced.

    a. wouldn’t be
    b. wouldn’t have been
    c. would have been

1. **b.** would... push (*Second conditional*)
   Type: Second conditional
2. **a.** was cooled (*Simple past for hypothetical situations*)
   Type: Second conditional
3. **c.** would be returned (*Future in the past*)
   Type: Second conditional
4. **a.** could reduce (*Conditional mood for possibility*)
   Type: First conditional
5. **c.** had been created (*Past perfect for unreal past condition*)
   Type: Third conditional

Глава III

Модуль №3

Глава 18

Семинар №9 25.04.24

18.1. Text 12B

What's the Big Idea?

(1) With the active development of robotics, we are increasingly seeing the emergence of more user-friendly home robots. Whether it will be something like the ASIMO robot from Honda designed to help and communicate with people, or we are talking about machines that will replace people in some work positions (for example, waiters, reception workers), one thing is clear: the development of robotics will not stop. Relatively soon, in addition to televisions, computers, washing machines, and microwaves, a small army of robot personal assistants will become an integral part of almost every home on the planet.

(2) Developers at Samsung are trying to one-up Google Glass, the technology that delivers the Internet via a pair of eyeglasses, by creating contact lenses capable of displaying the same electronic information. Engineers have mounted a light-emitting diode on an off-the-shelf soft contact lens, using a material the researchers developed: a transparent, highly conductive, and stretchy mix of graphene and silver nanowires. In addition to displaying the Internet, and a host of accompanying applications, electronic contact lenses could give off even more promising results in the medical field. Such lenses are currently being developed in order to filter light to compensate for vision problems. And while current efforts are limited to displaying one pixel on a given lens, it is a necessary first step toward making more complex versions in the future.

(3) The Norwegian coast may be beautiful but with more than a thousand fjords cutting into it, getting from one place to another often requires lengthy journeys. Norway has an ambitious plan to solve the problem by building the world's first floating submerged tunnel system about 30 meters (100ft) underwater. The first-of-its-kind structure will be made up of two 1,200-meter (4,000ft) curved concrete tubes, floating up to 30 meters (100ft) below the surface. The tubes will be supported by pontoons on the surface and kept stable with connecting trusses. For extra stability, the construction might be bolted to the bedrock as well. On the surface, there would be wide gaps between the pontoons to allow ferries to pass through. Having this connection means that people there do not have to wait for a helicopter to go to the hospital.

(4) Scientists say that a new kind of robot can reproduce, i.e. create 'baby' robots. This is an example of science fiction becoming science fact. The scientists created the world's first "living" robots from the stem cells of an African frog. Its scientific name – "xenopus laevis" – gave the xenobot its name. The xenobots are less than a millimeter wide. They can move, work together in groups and self-heal. Although they are not what we imagine robots to be, scientists say they are technically robots. They are a machine-animal hybrid.

The scientists say xenobots are "an entirely new life-form". The xenobots are very early technology. However, they could change science, medicine, technology and the way we live. They could carry out tasks inside our body to repair damage to organs. They could also help the environment by attacking micro-plastics in our oceans, or by cleaning up oil spills. Despite the possible benefits, some people are worried about robots that can reproduce.

(5) Roads of the future could be lit by glowing trees instead of streetlamps, thanks to a breakthrough in creating bioluminescent plants. Experts injected specialized nanoparticles into the leaves of a watercress plant, which caused it to give off a dim light for nearly four hours. To create their glowing plants, engineers turned to an enzyme called “luciferase”. Luciferases make up a class of oxidative enzymes found in several species that enable them to be bioluminescent, or emit light. For example, fireflies are able to emit light via a chemical reaction with the luciferase enzyme. The reaction is highly efficient, meaning nearly all the energy put into the reaction is rapidly converted to light. Researchers believe with further tweaking, the technology could also be used to provide lights bright enough to illuminate a workspace or even an entire street, as well as low-intensity indoor lighting. Lighting accounts for around 20 percent of worldwide energy consumption, so using bioluminescent plants for lighting will represent a significant cut to CO2 emissions.

Translation

(1) С активным развитием робототехники мы все чаще наблюдаем появление более удобных в использовании домашних роботов. Будет ли это что-то вроде робота ASIMO от Honda, предназначенного для помощи и общения с людьми, или же речь идет о машинах, которые заменят людей на некоторых рабочих позициях (например, официантов, работников ресепшена), ясно одно: развитие робототехника не остановится. Сравнительно скоро, помимо телевизоров, компьютеров, стиральных машин и микроволновых печей, неотъемлемой частью почти каждого дома на планете станет небольшая армия личных помощников-роботов.

(2) Разработчики из Samsung пытаются превзойти Google Glass, технологию, обеспечивающую доступ в Интернет через очки, создавая контактные линзы, способные отображать ту же электронную информацию. Инженеры установили светодиод на готовую мягкую контактную линзу, используя разработанный исследователями материал: прозрачную, высокопроводящую и эластичную смесь графена и серебряных нанопроволок. Помимо отображения Интернета и множества сопутствующих приложений, электронные контактные линзы могут дать еще более многообещающие результаты в области медицины. Такие линзы в настоящее время разрабатываются для фильтрации света и компенсации проблем со зрением. И хотя текущие усилия ограничиваются отображением одного пикселя на конкретном объективе, это необходимый первый шаг к созданию более сложных версий в будущем.

(3) Норвежское побережье, может быть, и красиво, но, поскольку его прорезают более тысячи фьордов, добраться из одного места в другое часто приходится издалека. У Норвегии есть амбициозный план решения этой проблемы путем строительства первой в мире системы плавучих подводных туннелей на глубине около 30 метров (100 футов). Первая в своем роде конструкция будет состоять из двух изогнутых бетонных труб длиной 1200 метров (4000 футов), плавающих на глубине до 30 метров (100 футов) под поверхностью. Трубы будут поддерживаться понтонами на поверхности и сохранять устойчивость с помощью соединительных ферм. Для большей устойчивости конструкцию можно прикрепить болтами к скале. На поверхности между понтонами должны были быть широкие промежутки, позволяющие проходить парамам. Наличие этой связи означает, что людям не придется ждать вертолета, чтобы отправиться в

больницу.

(4) Ученые говорят, что новый вид роботов может воспроизводиться, то есть создавать «детских» роботов. Это пример того, как научная фантастика становится научным фактом. Ученые создали первых в мире «живых» роботов из стволовых клеток африканской лягушки. Его научное название — «xenopus laevis» — дало ксеноботу его имя. Ксеноботы имеют ширину менее миллиметра. Они могут передвигаться, работать вместе в группах и самоисцеляться. Хотя они не такие, какими мы представляем себе роботов, ученые говорят, что технически они являются роботами. Они представляют собой гибрид машины и животного. Ученые говорят, что ксеноботы — это «совершенно новая форма жизни». Ксеноботы — очень ранняя технология. Однако они могут изменить науку, медицину, технологии и образ жизни. Они могли бы выполнять задачи внутри нашего тела по восстановлению повреждений органов. Они также могли бы помочь окружающей среде, уничтожая микропластик в наших океанах или очищая разливы нефти. Несмотря на возможные преимущества, некоторых людей беспокоят роботы, способные размножаться.

(5) Дороги будущего смогут освещаться светящимися деревьями вместо уличных фонарей благодаря прорыву в создании биолюминесцентных растений. Эксперты ввели специальные наночастицы в листья кресс-салата, в результате чего он светился тусклым светом в течение почти четырех часов. Чтобы создать светящиеся растения, инженеры обратились к ферменту под названием «люцифераза». Люциферазы составляют класс окислительных ферментов, обнаруженных у нескольких видов, которые позволяют им быть биолюминесцентными или излучать свет. Например, светлячки способны излучать свет посредством химической реакции с ферментом люциферазой. Реакция очень эффективна: почти вся энергия, вложенная в реакцию, быстро преобразуется в свет. Исследователи полагают, что при дальнейшей доработке эту технологию также можно будет использовать для обеспечения достаточно яркого света, чтобы осветить рабочее пространство или даже всю улицу, а также для освещения помещений низкой интенсивности. На освещение приходится около 20 процентов мирового потребления энергии, поэтому использование биолюминесцентных растений для освещения будет означать значительное сокращение выбросов CO2.

Solution

(1)

- *an integral part*

(2)

- *capable of doing something*
- *mounted*
- *give off*
- *prove promising*

(3)

- *to account for*
- *to keep stable*

(4)

- *to reproduce*
- *entirely*

- *to repair damage*

  `(5)`

- *to give off*

18.2. Exercise №12

Read text 12B in depth and answer the questions below choosing the best option according to the information given in the text. Compare your answers in pairs or groups.

1. What is certain regarding robots?
   a. their development will not stop
   b. unmanned robots are already taking over the world
   c. they will replace people
2. What types of robots will become an integral part of almost every home?
   a. ASIMO robots
   b. robots that will replace waiters and reception staff
   c. robot personal assistants
3. What features will the contact lenses currently under development by Samsung scientists offer?
   a. delivering the Internet
   b. monitoring health condition
   c. replacing Google Glass
4. Where else could electronic contact lenses prove to be more beneficial?
   a. displaying the Internet
   b. being used in a variety of applications
   c. in the medical field
5. What will set apart the Norwegian transport tunnel?
   a. it will be the world's first floating underwater tunnel system
   b. it will be the deepest
   c. it will use a helicopter
6. What won’t xenorobots be able to do?
   a. to repair damage to our organs
   b. to help the environment
   c. to replace humans
7. What are some people worried about?
   a. robots being a new life-form
   b. robots being able to reproduce
   c. using robots for attacking micro-plastics in the oceans
8. What roads of the future could be lit by?
   a. streetlamps
   b. fireflies
   c. bioluminescent plants

9. What did specialised nanoparticles injected into the leaves of a plant cause it to do?
    a. to emit light
    b. to replace electricity
    c. to repair damage
10. What do researchers believe the bioluminescent plants will not be able to do?
    a. to illuminate workplace
    b. to provide indoor lighting
    c. to provide indoor heating

Solution

a. their development will not stop
b. robot personal assistants
c. delivering the Internet
d. in the medical field
e. it will be the world's first floating underwater tunnel system
f. to repair damage to our organs
g. robots being able to reproduce
h. bioluminescent plants
i. to emit light
j. to provide indoor heating

18.3. Exercise №13

In pairs discuss the following questions. Add two or three more questions to this list. Take notes. Summarise your partner`s answers.

1. What trends in the development of robotics are we seeing?
2. What robots will become an integral part of almost every home?
3. What will new contact lenses be capable of?
4. What materials are used by the engineers who are working on these contact lenses?
5. What other applications apart from displaying the Internet do electronic contact lenses promise?
6. Do you think electronic contact lenses will be a useful technology?
7. How does the Norwegian government plan to solve the problem of lengthy journeys?
8. What will xenobots be able to do and what makes the technology revolutionary?
9. Where does the name “xenobot” come from?
10. What could xenobots help us with in the future?
11. What are some people worried about?
12. What do you think about the possibility of developing robots that can reproduce?
13. What could roads of the future be lit by?
14. What technology did engineers use to create their glowing plants?
15. What do researchers believe the technology could be used for in the future?
16. How might replacing conventional lighting with bioluminescent plants benefit people?

Solution

`Trends in Robotics Development:`

- We're seeing a shift towards more user-friendly home robots.
- There's a focus on developing robots for various tasks, including assistance and communication.
- Advancements are being made in creating robots that can work alongside humans in different industries.

`Robots for Every Home:`

- Robot personal assistants are expected to become an integral part of almost every home.
- These robots could assist with daily tasks, communication, and possibly even replace certain human roles like receptionists or waiters.

`Capabilities of New Contact Lenses:`

- The new contact lenses are capable of delivering the Internet.
- They could potentially offer a wide range of applications beyond just displaying electronic information.

`Materials Used in Contact Lens Engineering:`

- Engineers are using a mix of graphene and silver nanowires, which are transparent, highly conductive, and stretchy.

`Other Applications of Electronic Contact Lenses:`

- Apart from displaying the Internet, electronic contact lenses promise benefits in the medical field, such as filtering light to compensate for vision problems.

`Opinions on Electronic Contact Lenses:`

- Some believe electronic contact lenses will be a useful technology due to their potential applications in various fields.
- Others may have concerns about privacy, comfort, or safety issues.

`Norwegian Government's Solution to Lengthy Journeys:`

- The Norwegian government plans to build the world's first floating submerged tunnel system to connect places separated by fjords, reducing travel times.

`Xenobots and Their Revolutionary Potential:`

- Xenobots are capable of movement, group cooperation, and self-healing, all from stem cells.
- Their creation represents a blend of machine and biological components, marking a significant advancement in robotics.

`Origin of the Name "Xenobot":`

- The name "xenobot" comes from the scientific name of the African frog whose stem cells were used in their creation, "xenopus laevis."

`Potential Future Applications of Xenobots:`

- Xenobots could potentially carry out tasks inside the human body, such as repairing damaged organs or cleaning up environmental hazards like oil spills.

`Concerns Raised by Some People:`

- Some individuals are worried about the implications of robots that can reproduce, possibly raising ethical or safety concerns.

`Opinions on Reproducing Robots:`

- There may be differing opinions on the possibility of developing robots that can reproduce, considering the potential impact on society and the environment.

`Future Lighting Solutions:`

- Roads of the future could potentially be lit by bioluminescent plants, offering a more sustainable and environmentally friendly alternative to conventional lighting.

`Technology Used in Creating Glowing Plants:`

- Engineers injected specialized nanoparticles into the leaves of plants, causing them to emit light.

`Future Uses of Bioluminescent Technology:`

- Researchers believe bioluminescent technology could be used for various purposes, including illuminating workspaces, streets, and indoor environments.

`Benefits of Bioluminescent Lighting:`

- Replacing conventional lighting with bioluminescent plants could significantly reduce energy consumption and CO2 emissions, leading to a more sustainable environment.

18.4. Exercise №28

Find the following words or phrases in text 12B. In pairs practise giving their definitions and use these words in your own examples.

1. §1 - **to an ever greater degree**
2. §1 - **planned for a specific purpose**
3. §1 - **belonging as a part of the whole**
4. §2 - **having an ability to do something**
5. §2 - **to attach to something for use or as equipment**
6. §2 - **to be successful in the future**
7. §2 - **an adjective which describes something involving a lot of different parts**
8. §3 - **to need something**
9. §3 - **having the form of a curve (not straight)**
10. §3 - **ensure that they are firmly fixed**
11. §4 - **to produce a copy**
12. §4 - **completely**
13. §4 - **to put into good order**
14. §4 - **advantages**
15. §5 - **to emit**
16. §5 - **to make up a particular amount or part of something**

Solution

1. **to an ever greater degree**: increasingly
2. **planned for a specific purpose**: designed
3. **belonging as a part of the whole**: integral
4. **having an ability to do something**: capable
5. **to attach to something for use or as equipment**: mounted
6. **to be successful in the future**: promising
7. **an adjective which describes something involving a lot of different parts**: complex
8. **to need something**: require
9. **having the form of a curve (not straight)**: curved
10. **ensure that they are firmly fixed**: bolted
11. **to produce a copy**: reproduce
12. **completely**: entirely
13. **to put into good order**: organize
14. **advantages**: benefits
15. **to emit**: give off
16. **to make up a particular amount or part of something**: account for

18.5. Exercise №31

Complete the sentences with the correct form of the word in capitals at the end of each sentence.

1. The _____ that the world would end in 2000 turned out completely wrong. **PREDICT**
2. It is _____ difficult to say anything new about the nature of politics. **NOTORIOUS**
3. If you _____ further explanation, you should ask your tutor. **REQUIRE**
4. _____ information concerning environmental issues is difficult to obtain. **MEANING**
5. The traditional ways of selling in a number of areas have recently been _____ by switching to the Internet. **DISRUPTIVE**
6. In my letter I thanked him for his kind comments about my performance which were very _____. **REASSURE**
7. If you _____ someone, you offer them something they want in order to encourage them to do what you want. **TEMPT**
8. The commercial future of the company looks very _____. **PROMISING**
9. When he returned to his home town after the war, he found that it had changed beyond _____. **RECOGNISE**
10. A _____ is a strange and interesting sight or performance. **SPECTACLE**

Solution

1. prediction
2. notoriously
3. require
4. meaningful
5. disrupted
6. reassuring
7. tempt
8. promising
9. recognition

10. spectacle

Translation

1. Прогноз, что мир закончится в 2000 году, оказался полностью ошибочным.
2. Говорить что-то новое о сути политики является известной сложной задачей.
3. Если вам нужно дополнительное объяснение, вы должны спросить вашего репетитора.
4. Получение значимой информации о проблемах окружающей среды сложно.
5. Традиционные способы продажи в ряде областей недавно были нарушены переходом в Интернет.
6. В моем письме я поблагодарил его за добрые комментарии о моем выступлении, которые были очень успокаивающими.
7. Если вы соблазняете кого-то, вы предлагаете им то, что они хотят, чтобы побудить их делать то, что вы хотите.
8. Коммерческое будущее компании выглядит очень многообещающим.
9. Когда он вернулся в свой родной город после войны, он обнаружил, что он изменился до неузнаваемости.
10. Зрелище - это странное и интересное зрелище или выступление.