Noncommercial
Joint Stock
Company

ALMATY UNIVERSITY OF POWER ENGINEERING AND TELECOMMUNICATIONS NAMED AFTER GUMARBEK DAUKEEV

Department
for Language Studies

FOREIGN LANGUAGE

Methodological guidelines for performing self-study assignments for the students of B1 level

Almaty 2022

AUTHOR: Abdykadyrova G.I. Foreign language. Methodological guidelines for performing self-study assignments for the students of B1 level. – Almaty: AUPET, 2022. – 29 p.

The present methodological guidelines are intended for the first-year students of pre-intermediate and intermediate level.

Special attention is drawn to the translation of authentic professional texts, compilation of terminological vocabulary, as well as doing lexical, grammar exercises.

Reviewer: Associate Professor, Department of E.E. A.S. Baimaganov,

Published according to the plan of publications of noncommercial JSC «Almaty University of Power Engineering and Telecommunications» named after Gumarbek Daukeev, 2022.

Introduction

The present methodological guidelines are intended for the first-year students of intermediate level. Here you can find variety of useful and interesting texts. They might be used during the lesson as well as a self-study assignment. Energy is incredible because we use it for everything that we do. Energy can make things work, make things move, and make things happen. All the texts are actual and connected with their future specialty, especially for future power engineers. All the main topics are discussed concerning power engineering. Students may find the same themes here which they study. People use energy to work and to play. When people do things like cook food, listen to music, and use a lamp, they are using heat energy, sound energy, and light energy. Reading the texts and doing exercises afterwards introduces students with it much closer. After text exercises contain variety of tasks checking up understanding of the text. If you know what aspects you have difficulty with, go straight to the texts that deal with them, which provide interesting and educational content, with activities and project work. Using the Contents, you can find the relevant text. You can use the texts in several ways. You can just read the text and translate it with a vocabulary below. On the other hand, if the text is not difficult for you it is not necessary to search for the words in vocabulary but to do the exercises instead, for better understanding of the text. All the texts contain up-to-date information and actual in modern life. Now read and discover more about incredible energy!

Read and translate the text.

Electricity

How often do you use televisions, lights, and computers? Without electricity, these and many other machines can`t work! Electricity is a very useful type of energy that gives us heat energy, light energy, sound energy, and kinetic energy.

What is electricity? Inside atoms there are parts called electrons. Electrons can move from one atom to another, and when they do this, they make electricity.

Lightning is a type of electricity. It happens when the wind makes atoms of ice inside clouds move around and crash into each other. Electrons move quickly from one atom to another, and we see this movement of electricity as a flash of lightning.

And now let us observe how electricity moves. Power stations are factories that make electricity. The electricity goes through cables and pylons to our homes. This electricity makes the machines in our homes work. Some materials are called conductors – electricity can move easily through these materials. Most metals, like copper and gold, are good conductors. Other materials, like rubber and air, are called insulators – electricity can't move easily through these materials.

Some animals are dangerous because they make their own electricity. Electric eels store electricity in their body and use it to kill other fish!

Using electricity is actual nowadays. Electricity gives us different types of energy. In a toaster, electricity it used to make heat energy to cook bread. Wires inside a toaster are made from a type of metal that slows down the electricity so that some of its energy is converted into heat. In a hairdryer, electric wires give us heat energy and then electricity turns a fan. The fan uses kinetic energy to push the heat out of the hairdryer so that we can dry our hair. In many electric lamps, electricity moves slowly through a thin, curly wire inside a light bulb. This makes the wire so hot that it becomes white, and it glows to give us light.

Most of the electricity that moves through the wire in a light bulb is converted into heat, not light!

Using batteries has sense. Some machines, like calculators and music players, use batteries for their electrical energy. Batteries only give us small amounts of electricity, but they are useful because they can store electricity to use in machines that we take with us when we travel around. Small batteries are useful in small machines like watches. Bigger batteries have more potential energy, and we can use them in machines like flashlights. Some machines need two or more batteries. Batteries store chemical energy. The chemical energy is converted into electricity when we turn on a machine. The chemicals inside a battery are dangerous, so never play with a battery or open a battery.

Vocabulary.

Electricity – a type of energy (электричество).

Kinetic energy – energy that's moving (кинетическая энергия).

Atom – everything is made of parts called atoms, but atoms are so small that we can't see them.

Electron – a very small part of an atom.

Ice – frozen water (лед).

Power station – a building where electricity is made (электростанция).

Cable – a metal rope that electricity moves through.

Conductor – a material that electricity can move through (проводник).

Metal – a hard material made from minerals.

Insulator – a material that stops heat, electricity, or sound leaving something (непроводник).

Wire – a thin, metal string (проволока).

Convert – to become different; to make something different (преобразовывать).

Hairdryer – a machine that people use to make their hair dry (фен).

Fan – a machine with parts that go round and round to make air move (вентилятор).

Bulb – the part of an electric lamp that produces light (лампочка).

Glow – to make a small amount of light (накаливаться, светиться).

Battery – something that goes inside machines to make them work.

Store – to keep something to use later (сохранить, накапливать).

Chemical – a solid or liquid that's made by chemistry; made from chemicals (химический продукт).

Exercise 1. Complete the sentences with the words: movement, electrons, lightning, electricity.

1. Inside atoms there are parts called _____.
2. When electrons move from one atom to another, they make _____.
3. One type of electricity is _____.
4. A flash of lightning is the _____ of electricity.

Exercise 2. Decide if the sentences are true (T) or false (F).

1. Power stations are factories that make electricity. T/F.
2. Electricity can't move easily through materials called conductors. T/F.
3. Most metals are bad conductors. T/F.
4. Electricity cables are made of metal. T/F.
5. Electricity can't move easily through materials called insulators. T/F.

Exercise 3. Put the words in the right order.

1. is used/ In a toaster, / to cook bread. / electricity
2. slow down electricity/ is converted/ Metal wires/ so that/ some of its energy/ in a toaster/ into heat.

3. give us heat. / electric wires/ In a hairdryer,

4. a hairdryer/ Electricity turns/ to dry hair. / to push heat/ out of/ a fan

5. a wire/ so hot/ white and glows. / electricity makes/ In a lamp, / that it becomes

Exercise 4. Answer the questions.

1. What do small machines like calculators use for their electrical energy?
2. Why are batteries useful?
3. When is the chemical energy in a battery converted into electricity?
4. Why shouldn't you play with a battery or open a battery?

Read and translate the text.

Robotics revolution

Many of the robots in use today do jobs that are especially difficult for human workers. These are the types of jobs that require great strength or pose danger. For example, robots are particularly useful in the auto-manufacturing industry where parts of automobiles must be welded together. A welding tool used by a human worker weigh about 100 pounds or more and is difficult to handle. As mechanical supermen, robots may be called upon to do anything from moving heavy components between workstations on a factory floor to carrying bags of cement.

Spray painting is another task suited to robots because robots do not need to breathe. Unlike human painters, they are unaffected by the poisonous fumes. Robots are better at this task, not because they are faster or cheaper than humans, but because they work in a place where humans cannot.

Third in the list of useful jobs for robots is the assembly of electronic parts. Robots shine at installing chips in printed circuit boards because of a capability that robots have that people don't. A robot, once properly programmed, will not put a chip in the wrong place. This automatic accuracy is particularly valuable in this kind of industry because locating and fixing mistakes is costly.

Earlier robots were usually blind and deaf but newer types of robots are fitted with video cameras and other sensing devices that can detect heat, texture, size and sound. These robots are used in space projects, nuclear reactor stations, and underwater exploration research.

In their efforts to expand the range of robotic applications, researchers are looking beyond traditional designs to examine a variety of potential models from the biological world. The industrial arm is a classic example. Scientists have been able to model robots to imitate the vertebrate spine of a snake in an order to paint the interior of automobiles. They have simulated the muscle structure and movement of elephant's trunk to create a robotic arm capable of lifting heavy objects. Scientists have also emulated the flexibility of an octopus where the tentacles can conform to the fragile objects of any shape and hold them with

uniform, gentle pressure. A variation of this design can be used to handle animals, turn hospital patients in their beds, or lift a small child.

The challenge of equipping robots with the skills to operate independently, outside of a factory or laboratory, has taxed the ingenuity and creativity of academic, military, and industrial scientists for years. Simply put, robot hands- like robot legs, or eyes, or reasoning powers- have a long way to go before they can approach what biological evolution has achieved over the course of hundreds of millions of years. Much more will have to happen in laboratories around the world before robots can be compared to nature's handiwork.

In the meantime, the robotics revolution is already beginning to change the kind of work that people do. The boring and dangerous jobs are now assumed by robots. By the turn of the century, more and more humans will be required for tasks that machines cannot do. There are some industrialists who hope that by the year 2000 all their employees will be knowledge workers, no longer standing on assembly lines but rather sitting at desks and computer terminals to deal with information. These changes are already under way, and their pace accelerates every year.

Vocabulary.

Assume – take power or responsibility – (принимать на себя)

Assembly line – (сборочный конвейер)

Chip – a tiny semi conducting material used to make an integrated circuit – (микросхема)

Circuit board – a printed circuit – (монтажная плата)

Welded – (of pieces of metal) joined together by heating – (приваривать)

Conform – be similar in form or type – (приспосабливаться)

Emulate – imitate – (подражать)

Fume – an amount of gas that is dangerous to inhale – (дым, копоть Shine at- do very well at – (блистать)

Handiwork – making things by hand – (ручная работа)

Has taxed – has made heavy demands on – (выставить серьезные требования)

Install – place or fix in position ready – (помещать, устанавливать)

Interior – inner – (внутренний)

Ingenuity – the quality of being inventive – (изобретательность)

Octopus – sea-animal eight arms (tentacles) – (осьминог)

Pace – a single step – (шаг)

Simulate – imitate – (имитировать)

Spine – (спинной хребет)

Spray painting – paint with a spray – (пульверизация)

Tentacle – flexible limb in an animal, especially around the mouth, used for grasping or moving about – (щупальце)

Trunk – the elongated nose of an elephant – (хобот слона)

To handle – control – (обращаться)

Unaffected – not harmed or influenced – (непринужденный)

Vertebrate – an animal distinguished by the possession of a backbone or spinal column - (позвоночный)

Exercise 1. Summarize the reasons that certain jobs and environments are suitable for robots by completing the table below.

Job or environment	Reason
Welding	
Carrying components, etc.	
Spray painting	
Assembling components	
In nuclear reactors, underwater, etc.	

Exercise 2. These are answers to questions about the text. Write the questions.

1. About 100 pounds.
2. Because locating and fixing mistakes is costly.
3. In space projects, for example.
4. They are examining the potential of certain biological models.
5. No, they cannot be compared yet.
6. They will be doing intellectual rather than manual work.

Exercise 3. Fill in this table with details of the animals mentioned in the text.

Choices	1	2	3
Animal			
Aspect			
Reason			

Exercise 4. Match the similarities.

1. Manipulate	1. Imitate
2. Correcting	2. Emulate
3. Expensive	3. Fragile
4. Increase	4. Fixing mistakes
5. Copy	5. Handle
6. Reproduced artificially	6. Expand
7. Easily damaged	7.Valuable
8. Gets faster	8. Accelerate

Read and translate the text.

Sound and light

Sound and light are types of energy that travel in the air. We use sound energy to hear, to listen to music, and to communicate by telephone. We use light energy from the sun to see during the day, and light from lamps to see when it's dark.

What can be learned about sound? Sound happens when something vibrates. When we hit a drum, it vibrates and this makes the air around the drum vibrate, too. The vibrations of sound travel through the air in all directions. These movements are called sound waves. Sound waves are invisible-we can't see them. We hear the drum when the sound waves reach our ears.

What are radio waves? Sounds lose energy and get weaker when they move. That's why we can only hear people speaking if they are near us. To send sounds from one place to another, sound waves are converted into radio waves. Radio waves are a type of energy that can travel a long distance through the air. Like sound waves, radio waves are invisible.

When you use a cell phone, the phone converts sound waves into radio waves. It sends the radio waves to a cell tower near you. The cell tower sends them to a base station that sends them on to a cell tower near the person you are calling. Their cell phone converts the radio waves back into sound waves so that they can hear you!

What is new about the light? When something is luminous, it gives off light. Lamps, candles, fires, televisions, and the sun are luminous. Light energy travels from luminous things in straight lines. Light can move through transparent things like air, water, and windows. It can't move through opaque things like walls, trees, or people.

Shadows happen when something opaque stops light moving through it. Shadows happen on the other side of an opaque thing, where light can't reach. For example, when we stand outside on a sunny day, we block the sunlight, and we make a shadow. Some transparent materials can make a thin shadow because they stop some light.

What are lasers? A laser is a type of light that we get from machines. It's a very thin beam of light that has a lot of light energy and heat energy. Lasers have more energy than sunlight! We use lasers in many machines, like CD players and DVD players. Lasers have so much energy that some factories use them to cut through metal, and doctors use lasers to operate on some parts of the body, like eyes. In clothes factories, people use lasers to cut through hundreds of pieces of fabric at the same time.

Vocabulary.

Sound wave-a movement of sound through air (звуковая волна).

Energy– we need energy to move and grow, and machines need energy to work.

Vibrate – to move very quickly up and down, or forward and backward (вибрировать).

To hit a drum – играть на барабане.

Invisible – something that we can't see (невидимый).

Convert – change the form, character, or function of something (превращать).

Luminous – something that produces light; lamps and candles are luminous (светящийся, яркий).

Straight lines – прямые линии

Transparent – you can see through it (прозрачный).

Shadow – a dark, flat shape that something makes when it stops light (тень).

Opaque – you can't see through it (непрозрачный, темный).

Block – загораживать

Exercise 1. Complete the chart with the words: windows, walls, water, trees, doors, air.

Things that are transparent:	Things that are opaque:
Windows	

Exercise 2. Put the words in the right order.

1. that travel in the air. / are types of energy/ Sound and light
2. when something/ Sound happens/ vibrates.
3. it makes the air/ around the drum vibrate, too. / When a drum vibrates,
4. travel through the air/ The vibrations/ in all directions. / of sound
5. are called/ in the air/ The vibrations/ sound waves. / of sound

Exercise 3. Correct the sentences.

1. Sounds get more energy and get stronger when they move.
2. To send sounds from one place to another, light waves are converted into radio waves.
3. Radio waves are visible. We can see them.
4. Cell phones convert radio waves back into sound waves so that we can see the sound.

Exercise 4. Decide if the sentences are true (T) or false (F).

1. When something is luminous, it gives off light. T/F.
2. Lamps, candles, and fires are not luminous. T/F.
3. Shadow happens when something opaque stops light moving through it. T/F.
4. A laser is type of light that we get from the sun. T/F.
5. A laser beam has very little energy. T/F.

6. Doctors use lasers to operate on some parts of the body. T/F.

Exercise 5. Write about sounds that you like.

Read and translate the text.

Visions of Tomorrow

First, safety. Radiation screens are available and have been for some years. Most of them place an emissions barrier between you and the front of your display, while others encase the entire monitor, protecting you from side and rear emissions as well. Many offices already have these screens available for their workers.

The paperless office is still a dream, but the basic tools are in place. We receive mail in two basic forms: on paper in an envelope, or electronically on our computers. Most of us have access to e-mail in one form or another. That's half the battle won. The other half is a bit more difficult, but it can be, and is being, done. All mail can be opened in the mail room and scanned into the computer using optical character recognition (OCR). Then a document-image –processing program takes over and lets you accomplish electronically what you would normally do with paper. Various personal computer products are available for this purpose.

Pen-based computing is coming into its own. Pen-input capabilities are beginning to show up in hardware, applications, and operating systems. You can't take notes that will go directly into your computer, and the technology wouldn't know what to do with your doodles, but it would know that a doodle isn't a valid word. And that's a start – a good one.

Multimedia really needs no explanation. There are many packages that help you create multimedia presentations, and the tools to create customized multimedia training programs are also plentiful. CD-ROM disks, such as Ziff-Davis's Computer Select and Microsoft's Bookshelf, let you access mountains of information with ease.

Computers are already much smaller than they used to be, and you can't go to an industry show these days without finding some company promoting its small footprint. When you start talking about laptops, notebooks, and palmtops, the question becomes, "How small is too small?" FAX capabilities are already available on boards that you can plug into your computer. When you combine the technologies present in internal modems with voice recognition, the basics for having your computer replace your phone-voice line are in place.

Voice recognition is another technology that may appear limited in its present form, but it shows great promise for the future. Current voice-recognition systems can handle speaker-dependent continuous speech or speaker-independent discrete speech.

Speaking to your computer will be a major factor in the office of the future. In some locations, it is already a major factor in the office of today. Stock is traded in some brokerage houses by verbal command from the broker to the computer. So,

you ask your computer a question, and it answers you – verbally. Depending on the rate of speech sampling used and the resolution the A/D converter uses for each sample, we can already create a credible approximation of human speech with digitized sound.

Large display screens? You can get screens of up to 35 inches now, and between Barco and Mitsubishi competing for the honor of having the largest monitor, it's hard to predict just how big they will get in the future. As for color, some companies offer upwards of 16 million. Somewhere in that number must lie the perfect color for reducing eyestrain.

The real disaster that most of us still have to deal with is the traditional keyboard, which is the cause of much pain and suffering in the form of carpal tunnel syndrome and other repetitive-strain injuries. Wrist rests are available to alleviate the problem, and new designs for strange-looking keyboards, *Star Trek* – style, are moving from the drawing board to the factory.

Enterprise networks are proliferating almost as fast as LANs did just a year or two ago. Public data networks are ripe for the dialing up and signing on. And the Internet already exists, with several of the research and educational facilities on its membership rolls.

Worldwide connectivity is already available in the enterprise networks of some major corporations (e.g., DEC's DECnet and IBM's System Network Architecture). Admittedly, these are proprietary networks, but they are living proof that the concept can and does work.

Vocabulary.

Admittedly – something is the case (признаться, правда)

Brokerage houses – companies that buy and sell shares for clients (компании которые покупают и продают акции для клиентов).

Carpal tunnel syndrome – chronic wrist-strain caused by repetitive movement, such as typing (хроническое напряжение запястья из-за повторяющихся движений, например печатать).

Converter – a person or thing that converts something (преобразователь)

Credible – to be believed (достоверный)

Discrete – individually separate (обособленный)

Doodle – meaningless drawing (каракули)

Encase – cover in a close – fitting surround (заковывать)

Enterprise – a business or company (предприятие)

Plug – to fill in (уложить)

Proliferating – increased in number (распространенный)

Proprietary – protected by a registered trade name (фирменный)

rear – at the back (задняя часть, сторона)

Rear – at the back (задняя часть, сторона)

Star Trek – futuristic American television series of the 1970s/1980s. (цикл американских телевизионных программ 1970/1980 годов)

Stock – the shares of company or industry (акции, фонды)
To alleviate – make a problem less severe (облегчать)

Exercise 1. Match the opposites.

1. Danger	1. Create
2. Destroy	2. Safety
3. Rare	3. Major
4. Separate	4. Combine
5. Minor	5. Customized
6. Enjoyment	6. Alleviate
7. Aggravate	7. Suffering

Exercise 2. Choose the correct word to complete each sentence. You may have to change some words slightly.

1. *consider, considered, consideration, considerable, considerably*

a. We'll have to _____ using another company if they can't provide the software we need.

b. The company has invested a _____sum of money in economic workstations.

c. The CEO has submitted this proposal_____.

d. This computer is_____faster than the old one.

2. *apply, applying, applicant, application, applicable*

a. We have interviewed five_____for the new position.

b. The last part of the form is not_____to foreign students.

c. My student is thinking of_____for a government grant to continue his research.

d. This new book uses business_____to teach computer studies.

3. *explain, explained, explaining, explanation, explanatory*

a. The package includes an _____booklet.

b It will only take a couple of minutes to _____how the program works.

4. depend, depending, dependent, dependence, dependable, dependably

a. The company has supplied us _____for over ten years.

b. We must reduce our_____on imported goods.

c. This is very _____equipment. We have never had a serious breakdown.

d. Today, many companies_____more on FAXes than on mail.

Exercise 3. Give the annotation to the text "Visions of tomorrow".

Read and translate the text.

Energy everywhere

Energy is incredible because we use it for everything that we do. Energy can make things work, make things move, and make things happen. People use energy to work and to play. When people do things like cook food, listen to music, and use a lamp, they are using heat energy, sound energy, and light energy.

Energy is everywhere and energy is in everything. We can't make energy and we can't destroy it. When we use energy to make something happen, we don't lose it. It becomes a different type of energy.

Converting energy is one of the types of energy, it is when one type of energy can be converted into another. For example, when we move, we use energy from the food that we eat. When runners use this energy to run fast in a race, some of it is converted into heat energy. That's why runners look and feel so hot at the end of a race! When people run, only 25% of the energy in their legs is used to make them move. Most of it is converted into heat energy.

There are also other types of energy. There are many different types of energy, for example electrical energy and heat energy. Two important types of energy are kinetic energy and potential energy.

Kinetic energy is a type of energy that's moving. All things that move have kinetic energy. Wind is moving air. We use the kinetic energy in wind to fly kites and to sail boats.

Things that are not moving also have energy. Potential energy is stored energy. It's energy inside something that's waiting to be used. It's energy that has the potential to do work. We have potential energy stored in our bodies. When we run, some of this potential energy is converted into kinetic energy to make our legs move.

Let us look at how potential energy works. When we stretch a rubber band, we give it energy. The energy that we use to stretch the rubber band is stored inside it as potential energy. When we let go of the rubber band, it moves. When we stretch the rubber band more, it has more potential energy, and it can move more.

When we jump on a trampoline, this stretches the trampoline springs. This gives the springs potential energy. When the springs can't be stretched any more, this potential energy is converted into kinetic energy. The springs move back, and this throw us up into the air!

From high to low: some things have potential energy because they are high up. When we lift a picture off the floor and put it on a wall, some of the energy that we use for lifting goes into the picture. If the picture falls off the wall, that potential energy is converted into kinetic energy. When something is very high up, it has a lot of potential energy. The water at the top of a high waterfall has a lot of potential energy. When it falls, it moves very fast because it has a lot of kinetic energy. Angel Falls in Venezuela is the highest waterfall in the world. The water falls almost 1 kilometer from top to bottom!

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

Vocabulary.

Combustion – the process of burning (воспламенение, сгорание).

Component – one part of a system or whole.

Convert – to become different; to make something different (превращать).

Convey – to transport from one place to another; to transmit or make known (переправлять, перевозить).

Discretely – separately, distinctly (обособлено).

Energy – we need energy to move and grow, and machines need energy to work.

Kinetic energy – energy that`s moving (кинетическая энергия).

Low – not high (низкий, низко).

Potential energy – a type of energy that is stored (потенциальная энергия).

Permeate – to spread or flow throughout; to pass through or penetrate (пропитывать, проникать, просачиваться).

Rotate – to turn around, to take turns in sequence (вращаться, чередоваться).

Solar – of or relating to the sun (солнечный).

Source – the point of origin or creation (источник).

Trigger – to set off or initiate (вызывать, влечь за собой).

Exercise 1. Decide if the sentences are true (T) or false (F).

1. When we use energy, we lose it. T/F.
2. When we use energy, it becomes a different type of energy. T/F.
3. When we move, we use energy from the food that we eat. T/F.
4. When runners run, some of their energy is converted into light energy. T/F.

Exercise 2. Complete the sentences with the words: sailing boats, stored, energy, Potential, Wind, kinetic.

1. There are many different types of _____.
2. All things that move have _____ energy.
3. _____ has kinetic energy.
4. Kinetic energy makes _____ move.
5. _____ energy is stored energy.
6. When we run, potential energy that`s _____ in our body is converted into kinetic energy.

Exercise 3. Put the words in the right order.
1.stretch a / we give it energy. / When we / rubber band,
2.jump on a / When we / its springs. / this stretches / trampoline,
3.potential energy. / the springs / When we stretch / this gives / a trampoline
4.When springs / is converted into kinetic energy. / potential energy / can`t be stretched any more,

Exercise 4. Underline the correct words.
1.Some things have potential / kinetic energy because they are high up.
2.When you lift something off the floor, some of the energy / time that you use goes into it.
3.When something falls, potential energy is converted into kinetic / heat energy.
4.When something is very high up, it has a lot of potential / kinetic energy.
5.Water in a high waterfall moves fast because it has a lot of potential / kinetic energy.

Exercise 5. Answer the questions.
1. What does the author say about solar power?
a) It produces more electricity than any other source.
b) It is relatively small source of energy for heating water in steam turbines.
c) Electricity producers are trying to use it more regularly.
d) Researchers are trying to make it cheaper to use.
2. The word transformer probably refers to a:
a) truck
b) generator that produces electricity
c) type of turbine
d) device that changes electric currents

Exercise 6. Translate the following sentences using the key words from the vocabulary above.
1. It is often difficult to convey the meaning of a poem to a large audience.
2. The source of the gossip was someone inside this office.
3. Her bad mood that day permeated the atmosphere in the laboratory.
4. The internal combustion engine revolutionized the way automobiles run.

5. A cigarette triggered the explosion.

Read and translate the text.

Fuels for energy

Coal, oil, and gas are fossil fuels. We use fossil fuels and nuclear fuels to make electricity. We use fossil fuels to heat homes and to powers cars, buses, and trucks.

What are fossil fuels? Fossil fuels are made from plants and animals that lived on Earth millions of years ago. Coal was made like this. When giant plants in ancient jungles died, they sank into mud. Slowly, over millions of years, the mud became hard and changed into rock. The heavy rock pressed down on the plants, and heat from inside Earth helped to change the plants into black coal. Oil and gas were also made like this, but they come from animals that lived in ancient oceans.

How to get coal: miners are people who get coal from under the ground. They use machines to cut holes and tunnels in the ground. Then they cut pieces of coal out of the rock from under the ground. Trucks and trains take coal to power stations or to people's homes, where the coal is burned to give us heat.

Getting oil and gas must be standard. People get oil from oil rigs in the ocean, and they get gas and more oil from wells on land. The oil and gas move through long pipes to where people need it. People mostly use gas for heating and cooking. They usually use oil to make gasoline and to make new chemicals. One of the longest gas pipes in the ocean goes 1,200 kilometers from Norway to the United Kingdom.

Fossil fuels for electricity, what are they? Most large power stations use the chemical energy in coal to make electricity. In a coal power station, people use heat energy from burning coal to boil water. The boiling water makes steam that has lots of kinetic energy. The steam turns a turbine. The turbine turns a generator, and this makes electricity. Cold water then cools the steam and converts it back into water. Some water is heated up again by burning more coal to make more steam. The electricity moves through cables to our homes and other buildings where we can use it.

Nuclear energy: nuclear energy doesn't come from fossil fuels. It's a different type of energy. Nuclear fuel is a metal called uranium. We get nuclear energy when atoms inside uranium are broken. Every atom has a part called the nucleus, and this is where nuclear energy is. When a uranium atom breaks open, the energy comes out as heat. When many atoms break open at the same time, large amounts of heat are made. Heat from nuclear energy is used to make steam that turns turbines and generators in a nuclear power station. In nuclear submarines, the steam turns propellers that move the submarine forward.

Vocabulary.

Atom – everything is made of parts called atoms; but atoms are so small that we can't see them.

Chemical – a solid or liquid that's made by chemistry; made from chemicals.

Coal – a hard, black fossil fuel (уголь).

Fossil fuels –things like coal or oil, that come from plants or animals that are millions of years old (полезные ископаемые).

Gas – a fossil fuel from under the ground; not a solid or liquid; like air.

Gasoline – a liquid that burns and powers an engine.

Generator – a machine that makes electricity.

Mud – wet soil (грязь, слякоть).

Miner – a person who takes coal, metals, and other materials from under the ground (шахтер).

Nuclear – a type of energy that people use to make electricity (ядерная энергия).

Oil – a liquid fossil fuel from under the ground (нефть).

Power station – a building where electricity is made (электростанция).

Pipe – a long, round thing that has a tunnel going through it (труба).

Propeller – a machine that turns quickly to power a ship or aircraft.

Well – a hole that people make to take oil or water from the ground (колодец).

Turbine – a machine that is used to help make electricity.

To boil – to heat a liquid like water until it's so hot that it changes into steam (кипеть).

To cool – to become colder; to make something colder (охлаждать).

To convert – to become different; to make something different (преобразовывать).

Exercise 1. Underline the correct words.

1. Coal, oil, and gas / water are fossil fuels.
2. Coal is made from plants / animals that lived millions of years ago.
3. Oil and gas come from animals that lived in ancient forests / oceans.
4. People who collect coal are called miners / doctors.
5. People cut coal out of the rock under the ground / ocean.
6. People mostly / never use gas for heating and cooking.
7. People usually use oil / coal in cars and other vehicles.

Exercise 2. Put the words in the right order. Then answer the questions.

1. What do / electricity? / large power stations / use to make
2. Coal power station? / burn coal / in a / Why do people
3. have? / does steam / of energy / What type / from boiling water
4. power station, / In a / steam turn? / what does
5. make electricity? / help to / a turbine / How does

Exercise 3. Decide if the sentences are true (T) or false (F).

1. We get nuclear energy when atoms inside uranium are joined. T/F.
2. Nuclear fuel is a metal called uranium. T/F.
3. Nuclear energy is in the nucleus of an atom. T/F.
4. When a fuel atom breaks open, the energy comes out as heat. T/F.

Read and translate the text.

Saving energy

Let us observe the problems of saving energy. There are problems with fossil fuels and nuclear fuels, and we need to use more renewable energy. Renewable energy comes from things like wind, water, and sunlight. These are types of energy that will not run out.

What is solar energy? People use the sun's energy, or solar energy, to heat water and to make electricity. In some homes, solar panels use the sun to heat water. The panels take heat from the sun and then they heat the water in pipes. Some types of solar panel have photovoltaic cells inside. The photovoltaic cells convert sunlight into electricity. They can be used in small machines like laptops, or on a roof to make electricity. Many photovoltaic cells together can make electricity for thousands of people.

What is wind energy? Wind is moving air. To catch wind energy, people build wind turbines in windy places, like high hills or near beaches. Wind turbines are tall and they have three or four blades at the top. The blades turn like a propeller when the wind blows on them. The blades then turn a generator inside the wind turbine to create electricity. When many wind turbines are built together to make a lot of electricity, this is called a wind farm.

Winds are stronger when they are higher in the sky, so scientists are inventing wind energy machines that look like kites! They send electricity to Earth through long cables.

How can we get energy from water? People can use the kinetic energy of moving water to make electricity. For example, water that moves down mountains moves very quickly and so it has a lot of kinetic energy. In a hydroelectric power station, this water moves quickly into pipes, which push it through turbines. The water turns turbines that turn generators to make electricity. Some hydroelectric power stations are next to rivers. A large wall called a dam holds the water, so it becomes a store of potential energy. When the water stored behind a dam is pushed through pipes and turbines, the potential energy is converted into kinetic energy that can be used to make electricity.

The Hoover Dam is one of the biggest hydroelectric power stations in the USA. It makes electricity for about 1.3 million people.

What can we do? We can all help to save energy. We can use fewer fossil fuels every day by changing some of the things that we do. For example, we can save oil by walking, riding bicycles, sharing rides to school, or travelling by bus instead of making all our journeys by car. This will also reduce the amount of air

pollution and greenhouse gases that go into the air. We can use less electricity by turning off lights and electric machines when we aren't using them. In the future, there will be more people on Earth and we will need more electricity and more energy for our vehicles. What will you do to help to save energy for the future?

Vocabulary.

Air pollution – when the air around us is made dirty.

Cable – a metal rope that electricity moves through.

Convert – to become different, to make something different (преобразовывать).

Electricity – a type of energy.

Energy – we need energy to move and grow, and machines need energy to work.

Fossil fuels – things like coal or oil, that come from plants or animals that are millions of years old (полезные ископаемые).

Generator – a machine that makes electricity.

Greenhouse gas – a gas that keeps Earth warm.

Kinetic energy – energy that's moving (кинетическая энергия).

Nuclear – a type of energy that people use to make electricity (ядерная энергия).

Photovoltaic cell – something that converts light into electricity.

Pipe – a long, round thing that has a tunnel going through it (труба).

Potential energy – a type of energy that is stored (потенциальная энергия)

Reduce – to make something smaller or less (уменьшать).

Renewable – will not run out (возобновляемый).

Run out – when there is no more of something because it is finished (заканчивается).

Roof – the top part of a building (крыша).

Turbine – a machine that is used to help make electricity.

Vehicle – something that moves things or people (машина).

Exercise 1. Match. Then write the sentences.

1. We need to use fewer	A. will not run out.
2. Renewable energy comes	B. to heat water and to make electricity.
3. Renewable energy	C. heat from the sun to warm water.
4. People use solar energy	D. convert sunlight into electricity.
5. Solar panels in a roof use	E. fossil fuels.
6. Photovoltaic cells	F. from wind, water, and sunlight.

Exercise 2. Complete the sentences with the words: propeller, blades, air, tall, generator, turbines.

1. Wind is moving_____.

2. To catch wind energy, people build wind _____ in wind places.
3. Wind turbines are_____.
4. Wind turbines have three or four_____ at the top.
5. The blades turn like a_____ when the wind blows on them.
6. The blades turn a_____ inside the wind turbine to create electricity.

Exercise 3. Answer the questions.
1. What type of energy does moving water have?
2. What happens in a hydroelectric power station?
3. What does a dam do?
4. What happens when water behind a dam is pushed through turbines?
5. How much electricity does the Hoover Dam make?

Exercise 4. Write about the things you do to save energy. What other things could you do to save energy for the future?

Read and translate the text.

Problems with fuels

About 75% of the energy that people use for power stations and vehicles around the world is made from fossil fuels. Fossil fuels and nuclear fuels are very useful, but there are problems with using both. Non-renewable fuels: one problem with fossil fuels is that they are non-renewable. Fossil fuels are made from plants and animals that lived millions of years ago. When we have used all the fossil fuels that are on Earth now, there will not be any more. Some scientists say that oil will run out in 40 to 70 years, and gas in 50 to 150 years. Coal will run out in about 1.000 years.

Dirty air: when fossil fuels are burned, they make different gases that make the air dirty. This is called air pollution. Air pollution is bad for plants, animals, and people. Power stations and vehicles make air pollution. When gasoline is burned in cars and other vehicles, people who are walking or riding bicycles in the streets sometimes start to cough. The problem is worse in cities, where there are many cars. In some cities you can see the air is dirty. Some people wear a mask over their face so that they don't breathe the pollution. There are 700 million cars in the world. There may be 1,400 million in 30 years! Greenhouse gases are mixture of gases in the air around Earth. When heat from the sun warms Earth, some of it bounces off Earth and goes back into space. Greenhouse gases stop some of this heat going back into space. Greenhouse gases are useful because they store the heat, and they keep Earth warm. Without greenhouse gases, Earth would be so cold that we would not be able to live here!

Greenhouse gas problems: when lots of fossil fuels are burned, they put too many greenhouses' gases into the air. This makes it warmer on Earth and it can

change the world's climate. This is called global warming. Many scientists think that global warming has started forest fires, has created more floods, and is melting glaciers and ice in the Arctic and Antarctic. If polar bears in the Arctic don't have ice to climb onto, they could die.

Nuclear problems: the biggest problem with nuclear fuel is that after uranium has been used, it makes dangerous radioactive waste. The radioactive waste stays dangerous for hundreds of years, so it must be stored very, very carefully. The radioactive waste is invisible, but it's very dangerous and it can kill living things.

Vocabulary.

Air pollution – when the air around us is made dirty.

Coal – a hard, black fossil fuel (уголь).

Energy – we need energy to move and grow, and machines need energy to work.

Fossil fuels – things like coal or oil, that come from plants or animals that are millions of years old (полезные ископаемые).

Forest fire – when trees burn in a large area of land that is covered with trees (лесные пожары).

Flood – when there is a lot of water where it is usually dry (наводнение).

Gas – a fossil fuel from under the ground; not a solid or liquid; like air.

Gasoline – a liquid that burns and powers an engine.

Greenhouse gas – a gas that keeps Earth warm (газ в результате парникового эффекта).

Global warming – the way that Earth's temperature is getting higher (глобальное потепление).

Ice – frozen water (лед).

Invisible – something that we can't see (невидимый).

Living thing – something that lives; people, plants and animals are living things.

Non-renewable – something which will be run out (не возобновляемый).

Oil – a liquid fossil fuel from under the ground (нефть).

Power station – a building where electricity is made (электростанция).

To run out – when there is no more of something because it is finished (кончаться, кончиться).

To cough – кашлять

To breathe – дышать

To store – to keep something to use later (накапливать).

To melt – to become liquid because of being hot (таять).

To melt – to become liquid because of being hot (таять).

Uranium – a metal that is used to make nuclear energy.

Vehicle – something that moves things or people (экипаж, машина).

Waste – things that we throw away (мусор).

Exercise 1. Correct the sentences.

1. Fossil fuels make different gases that make the air clean.
2. Air pollution is good for plants, animals, and people.
3. Power stations and vehicles stop air pollution.
4. Air pollution is worse in cities where there are few cars.
5. In some cities, people wear a mask over their bicycle.

Exercise 2. Match. Then write the sentences.

1. Greenhouses gases store	A. warms Earth.
2. Greenhouses gases stop	B. and goes back into space.
3. Some heat bounces off Earth	C. some heat going back into space.
4. Heat from the sun	D. heat and keep Earth warm.

Exercise 3. Complete the sentences with the words: fires, uranium, warming, ice, invisible, air, climate.

1. Burning fossil fuels puts more greenhouse gases into the _____.
2. More greenhouses gases can change the world's __ _____.
3. This is called global_____.
4. In some countries, global warming has started forest_____.
5. The _____ is melting at the Arctic and Antarctic.
6. After _____ has been used, it makes radioactive waste.
7. Radioactive waste is _____.

Read and translate the text.

Heat energy

We use heat energy for many things. Heat energy makes our homes warm, cooks our food, and makes hot water that we can use for drinking and washing.

Let us look at how we get heat energy. We can get heat energy in different ways. Heat energy from the sun makes Earth warm. We can also get heat energy when we burn wood. When things move, some kinetic energy is converted into heat energy. Inside our body we make heat energy to keep us warm.

When heat is added to something, its temperature gets higher. When something has a high temperature it's very hot. Things are cold when they have less heat energy. When something is cold, it has a low temperature.

What is happening inside hot things? Everything in the world is made of parts called atoms. Atoms join together to make molecules. Atoms and molecules are so small that we can't see them, but they are inside everything - rocks, water, air, and people.

When water is frozen, it becomes solid ice because it has very little heat energy. Molecules in ice are very near each other and they don't move very much. When heat energy is added to something, it makes the molecules inside move more.

When heat energy is added to ice, molecules inside it move more. The ice melts and becomes liquid water again. If more heat is added to the water so that it boils, the molecules move so much that the water changes into a gas called steam.

And now let us examine how heat energy moves. Heat energy doesn't stay still. It moves from things that are warmer to things that are cooler. When heat moves between things that are touching, it's called conduction. Heat moves between two things until they are the same temperature.

Heat moves quickly and easily through some materials, like metal. For example, heat from a stove moves quickly through a metal pan to heat the food inside it. When we pick up a metal spoon from a table it feels cold because heat moves from our fingers into the spoon. Heat moves slowly through other materials, like wood. We use wooden spoons to stir food so that heat from the pan does not move into our hands.

And now everything about insulators: to keep our homes warm when it's cold, we must stop heat energy moving from the inside to the outside. In cold countries, people put insulators in the roofs of their homes. Insulators are materials that stop heat moving from warm places to cold places. Insulators in a roof stop heat moving from the rooms inside the home to the cold air outside.

Heat moves slowly through air, so air can be used as an insulator, too. When we wear a jacket in winter, the jacket holds air next to our body. The air stops heat leaving our body and so it helps to keep us warm.

Vocabulary.

Atom – everything is made of parts called atoms, but atoms are so small that we can’t see them.

Gas – a fossil fuel from under the ground; not a solid or a liquid; like air (газ).

Ice – frozen water (лед).

Insulator – a material that stops heat, electricity, or sound leaving something (непроводник).

Keep – to stay; to make something stay (держать, оставлять).

Liquid – not a solid or a gas; like water.

Melt – to become liquid because of being hot (жидкость, жидкий).

Metal spoon – металлическая ложка

Molecule – a very small thing that’s made of two or more atoms (молекула).

Pan – сковорода

Roof – the top part of a building (крыша).

Stove – печь

Stir – to move something around.

Temperature – how hot or cold something is.

Exercise 1. Find the end of the sentence.

1. Heat energy from the sun	a. makes our homes warm.
2. Inside our body, heat energy	b. it has a low temperature.
3. We can use heat energy to	c. keeps us warm.
4. When heat is added to something	d. makes Earth warm.
5. When something is cold	e. its temperature gets higher.

Exercise 2. Underline the correct words.

1. Everything in the world is made of parts called atoms / air.
2. Atoms join together to make molecules / rocks.
3. Atoms and molecules are very big / small.
4. When heat energy is added to something, it makes the molecules inside move more / less.

Exercise 3. Complete the sentences with the words: conduction, temperature, wood, cooler, materials.

1. Heat energy moves from things that are warmer to things that are _____.
2. When heat moves between things that are touching, it's called _____.
3. Heat moves between two things until they are the same _____.
4. Heat moves quickly through _____ like metal.
5. Heat moves slowly through materials like _____.

Exercise 4. Answer the questions.

1. What do we have to do to keep our homes warm when it's cold?
2. What do insulators do?
3. Why can we use air as an insulator?
4. How do jackets help to keep us warm in winter?

Read and translate the text.

Chemical energy

Chemical energy is a type of potential energy. Wood and gasoline have chemical energy. Chemical energy is very useful because we can convert it into many other types of energy.

Using chemical energy properly is that we have to do. When a material has chemical energy, we call this material fuel. Fuels like wood and gasoline have a lot of chemical energy. When we burn gasoline in a car engine, chemical energy from the fuel is converted into kinetic energy that makes the car move. When we burn wood in a fire, chemical energy is converted into heat energy to keep us warm. The engine in a rocket converts chemical energy from fuel into kinetic energy to send the rocket into space!

Fireworks and what can we learn about them? Inside a firework there are powders that use chemical energy in different ways. When we burn a firework, these different types of chemical energy are converted into an amazing, colorful display of kinetic energy, light energy, and sound energy!

The first thing that burns in a firework is fuel. This gives us the kinetic energy that sends the firework up into the sky. Then, different metals start to burn, and they make sparks of different colors. For example, when copper burns it makes blue sparks. Some chemicals inside the firework make loud sounds when they burn.

What is food energy? Food has chemical energy, too. Our body converts the chemical energy in our food into chemical energy that we can use to live, to move, and to grow. The chemical energy in our food, and in the food that other animals eat, comes from plants.

What are food chains? Plants convert light energy from the sun into chemical energy that they can use as food. Plants also store chemical energy. When an animal, like a gazelle, eats plants, it uses some of the chemical energy from the plant. When a lion eats a gazelle, it uses some of the chemical energy from the gazelle's body. When energy from food moves from one living thing to another like this, it's called a food chain.

Chemicals in the ocean, what are they? Most food chains start with energy from the sun, but some food chains in the ocean start with a different type of energy. The rock under deep oceans is very, very hot. When water goes underground through small holes, the rock makes the water as hot as the inside of a pizza oven. The hot water dissolves some of the chemicals in the rock. So the chemicals become part of the water. When water with chemicals dissolved in it comes out of the rock, living things called bacteria feed on the chemicals. Other animals in the ocean feed on the bacteria. Deep in the ocean, some bacteria live inside the bodies of giant worms that can be 3 meters long! The bacteria make food for the worms.

Vocabulary.

Bacteria- very simple living things (бактерии).

Burn – to make flames and heat (сжигать).

Chemical – a solid or liquid that's made by chemistry; made from chemicals (химический продукт, химикат).

Convert – to become different; to make something different (преобразовывать).

Copper – a soft, orange, or yellow metal (медь).

Dissolve – to mix with water and become part of it (смешивается).

Firework – a thing with powder inside that makes colored lights and loud sounds when it burns (фейерверк).

Fuel – something that we use to produce heat or energy (топливо).

Gasoline – a liquid that burns and powers an engine (бензин).

Grow- to get bigger (расти).

Giant worms- гигантские черви
Kinetic – energy that’s moving (кинетическая энергия).
Oven – you cook food inside of it (печь).
Potential – a type of energy that is stored (потенциальная энергия).
Spark – a very small piece of material that’s burning (искра).
Store – to keep something to use later (сохранять).

Exercise 1. Match. Then write the sentences.

1.We use chemical energy from food	A. chemical energy
2. Most living things need energy	B. from the sun into chemical energy.
3. Plants convert light energy	C. of the chemical energy from the plant.
4. Plants store	D. moves from one living thing to another.
5. Animals eat plants to use some	E. to live, to move, and to grow.

List of literature

1 Куликов Ю. “Справочник по электрическим сетям”. – Москва, 2020.

2 Мышкин В. “Электрические контакты”. – Москва, 2018.

3 Голдберг Л. Д. “Электрооборудование электрических станций и подстанций”. – Москва, 2018.

4 Hemberly A. R. “Computational electro-energetic plasma physics research”. – Pearson, 2019.

5 Jian Lee “Advanced electrical and electronics engineering”. – Springer, 2012.

Contents

Summary plan 2022, pos. 27

Abdykadyrova Gulzhan Izbasarovna

FOREIGN LANGUAGE

Methodological guidelines for performing self-study assignments for the students of B1 level

Editor: Karashina G.T.
Standardization specialist: Anuarbek Zh.A.

Signed to print
Circulation 50 copies
Volume 2,0 publishing sheets

Format 60x84 1/16
Typographical paper № 1
Order_____Price 1000 tg

Multiple copying office of
Non-Profit Joint Stock Company
“Almaty University of Power Engineering and Telecommunications
named after Gumarbek Daukeev”
050013, Almaty, Baytursynov st. 126/1