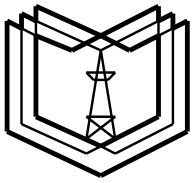

МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ
РОССИЙСКОЙ ФЕДЕРАЦИИ
ФЕДЕРАЛЬНОЕ
государственное образовательное учреждение
высшего профессионального образования
«КАЗАНСКИЙ ГОСУДАРСТВЕННЫЙ
ЭНЕРГЕТИЧЕСКИЙ УНИВЕРСИТЕТ»

ELECTRICAL ENGINEERING TODAY

Учебное пособие для энергетических специальностей

Казань 2016

Учебное издание

Галиахметова Альбина Тагировна
Лутфуллина Гюльнара Фирдависовна
ELECTRICAL ENGINEERING TODAY

Учебное пособие по курсу
«Иностранный язык»

Кафедра иностранных языков КГЭУ

Редактор издательского отдела
Компьютерная верстка

Подписано в печать
Формат 60×84/16. Бумага «Business». Гарнитура «Times». Вид печати РОМ.
Усл. печ. л. 5,7. Уч.-изд. л. 5,9. Тираж Заказ № .

Издательство КГЭУ, 420066, Казань, Красносельская, 51
Типография КГЭУ, 420066, Казань, Красносельская, 51

МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ
РОССИЙСКОЙ ФЕДЕРАЦИИ
ФЕДЕРАЛЬНОЕ
государственное образовательное учреждение
высшего профессионального образования
«КАЗАНСКИЙ ГОСУДАРСТВЕННЫЙ
ЭНЕРГЕТИЧЕСКИЙ УНИВЕРСИТЕТ»

Галиахметова А.Т., Лутфуллина Г.Ф.,

ELECTRICAL ENGINEERING TODAY

Учебное пособие
по курсу
«Иностранный язык»

Казань 2016

УДК 811.111
ББК 81.2
Л 82
Рецензенты:

кандидат филологических наук, доцент
кафедры переводоведения Казанского (федерального) государственного университета *О.Г.Палутина*;
кандидат филологических наук, доцент кафедры «Иностранные языки» Казанского государственного энергетического университета *И.В. Марзоева.*

Галиахметова А.Т., Лутфуллина Г.Ф.
Л 82 **ELECTRICAL ENGINEERING TODAY** Английский язык для энергетических специальностей: Учебное пособие/, А.Т.Галиахметова, Г.Ф.Лутфуллин. – Казань: Казан. гос. энерг. ун-т, 2016. – 80 с.

Цель данного пособия – выработать у студентов навыки чтения и перевода текстов энергетической тематики. Данное учебное пособие предусматривает представление материала по тематическому принципу на базе современных научно-популярных текстов.

Данное пособие может быть использовано в качестве основного или дополнительного при обучении студентов по энергетическим специальностям.

УДК 811.111
ББК 81.2

ПРЕДИСЛОВИЕ

Отличительной чертой пособия является его «аутентичность», т.е. неадаптированность текстового материала. Тексты взяты из сайтов Интернета, научно-технической литературы и представляют достижения современных ученых. Профориентированность пособия позволяет студентам пополнить знания по основной специальности, создает возможности для изучения терминологических особенностей. Данное пособие может служить основной и дополнительной литературой по дисциплине «Иностранный язык», предусмотренной учебной программой при обучении студентов по энергетическим специальностям.

Пособие ставит целью помочь студентам ориентироваться в огромном потоке информации по энергетической специализации. В пособии уделяется внимание расширению словарного запаса по энергетическим специальностям. Целью данного учебного пособия является выработка у студентов навыков чтения и перевода текстов энергетической тематики. Современные тексты научно-популярного характера взяты из тематических изданий современных авторов. Пособие состоит из 6 уроков. Каждый урок включает тексты, словари к текстам, задания после текстов, позволяющие определить уровень понимания, не прибегая к переводу. Специальные упражнения на перевод терминов обеспечивают адекватность их последующего употребления в речи.

Приложение в конце пособия предоставляет возможность самостоятельной подготовки сообщения по своей научной работе.

В процессе обучения по данному пособию у студент формируются и следующие общекультурные и профессиональные компетенции:

- способность к обобщению, анализу, восприятию информации, постановке цели и выбору путей ее достижения;
- способность к письменной и устной коммуникации на государственном языке: умением логически верно, аргументированно и ясно строить устную и письменную речь; готовностью к использованию одного из иностранных языков;
- способность к коммуникации в устной и письменной формах на русском и иностранном языках для решения задач межличностного и межкультурного взаимодействия, включая профессиональное взаимодействие.

UNIT 1. ELECTRICITY GENERATION

TEXT 1.1.

Electricity generation is the process of generating electric energy from other forms of energy.

The fundamental principles of electricity generation were discovered during the 1820s and early 1830s by the British scientist Michael Faraday. His basic method is still used today: electricity is generated by the movement of a loop of wire, or disc of copper between the poles of a magnet.

For electric utilities, it is the first process in the delivery of electricity to consumers. The other processes, electricity transmission, distribution, and electrical power storage and recovery using pumped-storage methods are normally carried out by the electric power industry.

Electricity is most often generated at a power station by electromechanical generators, primarily driven by heat engines fueled by chemical combustion or nuclear fission but also by other means such as the kinetic energy of flowing water and wind. There are many other technologies that can be and are used to generate electricity such as solar photovoltaics and geothermal power.

Active vocabulary

Nouns and noun phrases	
electricity generation	производство электроэнергии
scientist	ученый
electric utilities	электроэнергетика
delivery	доставка
consumer	потребитель
electricity transmission	электропередача
electricity distribution	распределение электроэнергии
electrical power storage a	хранение электрической энергии
recovery using	восстановление с помощью
pumped-storage methods	гидроаккумулирующие методы
electric power industry	электроэнергетика.
power station	электростанция
electromechanical generator	электромеханический генератор
heat engine	тепловой двигатель
chemical combustion	химическая сгорания
nuclear fission	ядерное деление
kinetic energy o	кинетическая энергия
flowing water	текущая вода

solar photovoltaics	солнечные фотоэлектрические батарейки
geothermal power	геотермальнакя энергия
Verbs and verbal phrases	
to fuel	заправить

Questions:

Recalling. (общие вопросы по тексту)

1. What kind of process is electricity generation?
2. When were discovered the fundamental principles of electricity generation?
3. Is this method of electricity generation still used today?
4. How is electricity generated today?
5. What processes are engaged in the delivery of electricity to consumers? Name them.
6. How is electricity most often generated at a power station?
7. What other technologies are used to generate electricity?

Interpreting. (вопросы Почему – на размышления по поводу темы)

8. Why do people need electricity?
9. Why is electricity easy to transmit?
10. Why the method of electricity generation invented by the British scientist Michael Faraday is actual today?
11. Why people try to invent and use other methods of electricity generation?

Extending. (вопросы на запрос доп. информации)

12. What do you know about Michael Faraday and his inventions?
13. What other methods of electricity generation do you know? Tell us about one of them?
14. How do you understand the term – renewable energy sourses?
15. Do you think how long will we be able to generate electricity by the method of Michael Faraday?

Scanning. Search!

Scan the text and write out fact which refers to this date:

1830 –

Activity.

Electricity generation in our region

Write a short story about the power station nearest to your place of live

TEXT 1.2.

Electric energy is energy newly derived from electrical potential energy. When loosely used to describe energy absorbed or delivered by an electrical circuit (for example, one provided by an electric power utility) "electrical energy" refers to energy which has been converted from electrical potential energy. This energy is supplied by the combination of electric current and electrical potential that is delivered by the circuit. At the point that this electrical potential energy has been converted to another type of energy, it ceases to be electrical potential energy. Thus, all electrical energy is potential energy before it is delivered to the end-use. Once converted from potential energy, electrical energy can always be described as another type of energy (heat, light, motion, etc.).

A power station (also referred to as a generating station, power plant, powerhouse or generating plant) is an industrial facility for the generation of electric power. At the center of nearly all power stations is a generator, a rotating machine that converts mechanical power into electrical power by creating relative motion between a magnetic field and a conductor. The energy source harnessed to turn the generator varies widely. It depends chiefly on which fuels are easily available, cheap enough and on the types of technology that the power company has access to. Most power stations in the world burn fossil fuels such as coal, oil, and natural gas to generate electricity, and some use nuclear power, but there is an increasing use of cleaner renewable sources such as solar, wind, wave and hydroelectric. Central power stations produce AC power, after a brief Battle of Currents in the 19th century demonstrated the advantages of AC distribution.

A thermal power station is a power plant in which the prime mover is steam driven. Water is heated, turns into steam and spins a steam turbine which drives an electrical generator. After it passes through the turbine, the steam is condensed in a condenser and recycled to where it was heated; this is known as a Rankine cycle. The greatest variation in the design of thermal power stations is due to the different fuel sources. Some prefer to use the term energy center because such facilities convert forms of heat energy into electricity. Some thermal power plants also deliver heat energy for industrial purposes, for district heating, or for desalination of water as well as delivering electrical power. A large part of human CO2 emissions comes from fossil fueled thermal power plants; efforts to reduce these outputs are various and widespread.

Almost all coal, nuclear, geothermal, solar thermal electric, and waste incineration plants, as well as many natural gas power plants are thermal. Natural gas is frequently combusted in gas turbines as well as boilers. The waste heat from a gas turbine can be used to raise steam, in a combined cycle plant that improves overall efficiency. Power plants burning coal, fuel oil, or natural gas are often

called fossil-fuel power plants. Some biomass-fueled thermal power plants have appeared also. Non-nuclear thermal power plants, particularly fossil-fueled plants, which do not use co-generation are sometimes referred
to as conventional power plants.

Commercial electric utility power stations are usually constructed on a large scale and designed for continuous operation. Electric power plants typically use three-phase electrical generators to produce alternating current (AC) electric power at a frequency of 50 Hz or 60 Hz. Large companies or institutions may have their own power plants to supply heating or electricity to their facilities, especially if steam is created anyway for other purposes. Steam-driven power plants have been used in various large ships, but are now usually used in large naval ships. Shipboard power plants usually directly couple the turbine to the ship's propellers through gearboxes. Power plants in such ships also provide steam to smaller turbines driving electric generators to supply electricity. Shipboard steam power plants can be either fossil fuel or nuclear. Nuclear marine propulsion is, with few exceptions, used only in naval vessels. There have been perhaps about a dozen turbo-electric ships in which a steam-driven turbine drives an electric generator which powers an electric motor for propulsion.

Combined heat and power (CH&P) plants, often called co-generation plants, produce both electric power and heat for process heat or space heating. Steam and hot water lose energy when piped over substantial distance, so carrying heat energy by steam or hot water is often only worthwhile within a local area, such as a ship, industrial plant, or district heating of nearby buildings.

Active vocabulary

Nouns and noun phrases	
potential energy	потенциальная энергия
absorbed	поглощенная
electrical circuit	электрическая цепь
electric power utility	электрическая энергетическая компания
combination	сочетание
electric current	электрический ток
electrical potential	электрический потенциал
end-use	конечное применение
motion	движение
industrial facility	промышленный объект
generator	генератор
rotating machine	вращающаяся машина

mechanical	механический
relative motion	относительное движение
magnetic field	магнитное поле
conductor	проводник
fossil fuels	ископаемое топливо
coal	уголь
oil	нефть
natural gas	природный газ
nuclear power	ядерная энергия
renewable sources	возобновляемые источники
advantage	преимущество
thermal power station	тепловая электростанция
prime mover	первичный двигатель
steam	пар
condenser	конденсатор
recycled	повторный
design	дизайн
fuel source	источник топлива
district heating	районное отопление
desalination	опреснение
emission	излучение, испускание
output	выход, производительность
gas turbine	газовая турбина
boiler	котел
combined cycle plant	станция с комбинированным циклом
overall efficiency	общая эффективность
fossil-fuel power plant	ТЭЦ
conventional power plants	обычные электростанции
continuous operation	непрерывная работа
three-phase	трехфазный
purpose	цель
naval ship	военный корабль
ship's propeller	винт судна
gearboxe	панель управления
propulsion	толчок, стимул
space heating	отопление помещений
industrial plant	промышленное предприятие

Verbs and verbal phrases	уменьшить
to reduce	использовать
to harness	иметь доступ
to have access	сжечь
to burn	описать
to describe	преобразовать
to convert	обеспечить
to supply	получить
to derive	конденсироваться
to be condensed	сжигать
to combust	
Adverbs	свободно
loosely	

Questions:

Recalling.

1. What does electrical energy mean?
2. What does "electrical energy" refer to?
3. What is an electrical energy?
4. When does energy cease to be electrical potential energy?
5. When can electrical energy be described as another type of energy?
6. What is a power station?
7. What are there at the center of nearly all power stations?
8. What fossil fuels do most power stations in the world use? such as coal, oil, and natural gas to generate electricity, and some use nuclear power, but there is an increasing use of cleaner renewable sources such as solar, wind, wave and hydroelectric.
9. What is a thermal power station?
10. Describe a Rankine cycle.
11. What is the greatest variation in the design of thermal power stations due?
12. Why some to use the term energy center?
13. What do some thermal power plants deliver heat energy for?
14. What kind of plants are called fossil-fuel power plants?
15. What electrical generators do electric power plants typically use?
16. Where have steam-driven power plants been used?
17. What do you know about combined heat and power (CH&P) plants?

Interpreting.

1. What is your attitude towards thermal power plants?
2. Why are thermal power plants the most popular?

Extending.

1. Do you know the thermal efficiency of thermal power plants?
2. How much pollution do thermal power plants produce?
3. Are there any thermal power plants in our Republic?

Scanning. Search!

Scan the text and write what does these abbreviations mean?
(AC) , (CH&P)

A story within a story. In the text there are many types of thermal power plants. You can ask yourself some about them.

Activity.

Electricity generation in our region

Write a short story about the power station nearest to your place of live

TEXT 1.3.

Economics of generation and production of electricity.

The selection of electricity production modes and their economic viability varies in accordance with demand and region. Hydroelectric plants, nuclear power plants, thermal power plants and renewable sources have their own pros and cons, and selection is based upon the local power requirement and the fluctuations in demand.

Thermal energy is economical in areas of high industrial density, as the high demand cannot be met by renewable sources. The effect of pollution is also minimized as industries are usually located away from residential areas. These plants can also withstand variation in load and consumption by adding more units or temporarily decreasing the production of some units.

Nuclear power plants can produce a huge amount of power from a single unit, but since most of the power plants built before 1990 use hard water as a coolant, setting them up near a source of hard water is the only viable economic option. Recent disasters in Japan have raised concerns over the safety of nuclear power.

Hydroelectric power plants are located in areas where the potential energy from flowing water can be harnessed for moving turbines and the generation of power. It is not an economically viable source of production where the load varies

too much during the annual production cycle and the ability to stop the flow of water is limited.

Renewable sources other than hydroelectricity (solar power, wind energy, tidal power, etc.) are currently expensive to produce, though with advancements in technology their cost of production is coming down. Many governments around the world provide subsidies to offset the high cost and make their production economically feasible.

The production of electricity in 2009 was 20,053TWh, which was 11% of the solar energy the earth receives in one hour (174,000TWh). Sources of electricity were fossil fuels 67%, renewable energy 16% (mainly hydroelectric, wind, solar and biomass), and nuclear power 13%, and other sources were 3%. The majority of fossil fuel usage for the generation of electricity was coal and gas. Oil was 5.5%, as it is the most expensive common commodity used to produce electrical energy. Ninety-two percent of renewable energy was hydroelectric followed by wind at 6% and geothermal at 1.8%. Solar photovoltaic was 0.06%, and solar thermal was 0.004%.

Active vocabulary

Nouns and noun phrases	
selection	выбор
production mode	режим производства
economic viability	экономическая жизнеспособность спрос
demand	местное потребление энергии колебания
local power requirement	спроса
fluctuations in demand	промышленные
industrial density	промышленная плотность
residential area	жилой район
load	нагрузка
consumption	потребление
hard water	жесткая вода
coolant	охлаждающая жидкость
viable economic option	рентабельный экономической вариант
disaster	катастрофа
annual production cycle	годовой цикл производства
ability	способность
expensive	дорогой
advancement	продвижение
cost	стоимость
feasible	возможный

Questions:

Recalling.

1. What does the selection of electricity production modes and their economic viability vary in accordance with?
2. What is selection based upon?
3. Where is thermal energy considered to be economical?
4. Why is the effect of pollution minimized?
5. How can these plants withstand variation in load and consumption?
6. Now much power can nuclear power plants produce?
7. Why do they have to be built near a source of water?
8. Where are hydroelectric power plants located?
9. Is it an economically viable source of production?
10. Are renewable sources expensive to produce?
11. What can you say about the production of electricity in 2009?

Interpreting.

1. Why are renewables sources of power production not widely used?
2. Do you agree that we have to expand thermal energy production?
3. Do you want one more thermal power plant to be built in our republic?
4. Which power source should be developed in our republic?

Extending.

1. Are there any hydroelectric power plant in our republic?

Scanning. Search!

Scan the text and write out fact which refers to these figures:
20,053TWh, 11%, 174,000TWh, 67%, 16%, 13%, 3%, 5.5%, 6% 1.8%, 0.06%, 0.004%.

Writing.

Write a short story about the hydroelectric power station to your place of live

UNIT 2 ENERGY TRASMISSION

TEXT 2.1.

Electric-power transmission is the bulk transfer of electrical energy, from generating power plants to electrical substations located near demand centers. This is distinct from the local wiring between high-voltage substations and customers, which is typically referred to as electric power distribution.

Transmission lines, when interconnected with each other, become transmission networks. **In the US,** these are typically referred to as "power grids" or just "the grid." **In the UK,** the network is known as the "National Grid." **North America** has three major grids, the Western Interconnection, the Eastern Interconnection and the Electric Reliability Council of Texas (ERCOT) grid, often referred to as the Western System, the Eastern System and the Texas System.

Historically, transmission and distribution lines were owned by the same company, but starting in the 1990s, many countries have liberalized the regulation of the electricity market in ways that have led to the separation of the electricity transmission business from the distribution business.

Most **transmission lines** use high-voltage three-phase alternating current (AC), although single phase AC is sometimes used in railway electrification systems. High-voltage direct-current (HVDC) technology is used for greater efficiency in very long distances (typically hundreds of miles (kilometres), or in submarine power cables (typically longer than 30 miles (50 km). HVDC links are also used to stabilize against control problems in large power distribution networks where sudden new loads or blackouts in one part of a network can otherwise result in synchronization problems and cascading failures.

Electricity is transmitted at high voltages (110 kV or above) to reduce the energy lost in long-distance transmission. Power is usually transmitted through overhead power lines. Underground power transmission has a significantly higher cost and greater operational limitations but is sometimes used in urban areas or sensitive locations.

A key limitation in the distribution of electric power is that, with minor exceptions, **electrical energy cannot be stored,** and therefore must be generated as needed. A sophisticated control system is required to ensure electric generation very closely matches the demand. If the demand for power exceeds the supply, generation plants and transmission equipment can shut down which, in the worst cases, can lead to a major regional blackout, such as occurred in the US Northeast blackouts of 1965, 1977, 2003, and in 1996 and 2011. To reduce the risk of such failures, electric transmission networks are interconnected into regional, national or continental wide networks thereby providing multiple redundant alternative routes for power to flow should (weather or equipment) failures occur. Much analysis is

done by transmission companies to determine the maximum reliable capacity of each line (ordinarily less than its physical or thermal limit) to ensure spare capacity is available should there be any such failure in another part of the network.

Active vocabulary

Nouns and noun phrases	
electric-power transmission	передача электроэнергии
bulk	объем
electrical substations	электрические подстанции
demand center	центр спроса
local wiring	местная проводка
high-voltage substation	высоковольтная подстанция
electric power distribution	распределение электроэнергии
transmission lines	линий электропередачи
interconnected	взаимосвязаный
power grid	энергосистема
network	сеть
alternating current	переменный ток
railway electrification system	электрификация железных дорог
direct-current	постоянный ток
submarine power cables	подводная электрокабели
blackout	перебой электроснабжения, отключение
synchronization	синхронизация
cascading	каскадные
failure	отказ, отключение энергии
underground power transmission	подземная электропередача
operational limitations	эксплуатационные ограничения
urban area	городской район
sensitive location	сейсмически опасный район
reliable capacity	надежный потенциал
Verbs and verbal phrases	
to transfer	перевести
to be owned distinct	быть в собственности
to be stored	храниться
to exceed	превышать

Questions:

Recalling.

1. What is an electric-power transmission?
2. What is electric power distribution?
3. What are transmission networks?
4. How are transmission networks called in the US?
5. How are transmission networks called in the UK?
6. How many grids are there in North America?
7. Who are the owners of transmission and distribution lines?
8. Why is electricity transmission business separated from distribution business?
9. What current do most transmission lines use?
10. Why is electricity transmitted at high voltages?
11. What is power usually transmitted through?
12. Why do we use underground power transmission?
13. What is s key limitation in the distribution of electric power?
14. Can electrical energy be stored?
15. Why is a sophisticated control system required?
16. When can transmission equipment shut down?
17. What is done to reduce the risk of failures?
18. What is done by transmission companies to determine the maximum reliable capacity of each line?

Interpreting.

1. Which transmission system is more reliable – underground or obergraound?
2. Which business is more profitable - transmission business or distribution business?
3. Do you remember any failure in power supply in our region?

Extending.

1. Find out the information about the latest power supply failure in our region?
2. What can the most effective way to reduce the risk of failures?
3. How can you translate into English the name of our local transmission system?

Scanning. Search!

Scan the text and write what does these abbreviations mean?

AC, HVDC

Activity.

1. **Electrical grid of our Republic**

Make a list of power stations working in our republic.

Writing.

The best way of electricity transmission from my point of view (write a composition - expressing opinion).

TEXT 2.2.

Overhead power line

High-voltage overhead conductors are not covered by insulation. The conductor material is nearly always an aluminium alloy, made into several strands and possibly reinforced with steel strands. Copper was sometimes used for overhead transmission but aluminium is lighter, yields only marginally reduced performance, and costs much less. **Overhead conductors** are a commodity supplied by several companies worldwide. Improved conductor material and shapes are regularly used to allow increased capacity and modernize **transmission circuits.** Conductor sizes range from 12 mm2 to 750 mm2, with varying **resistance** and **current-carrying capacity**. Thicker wires would lead to a relatively small increase in capacity due to the **skin effect,** that causes most of the current to flow close to the surface of the wire. Because of this current limitation, multiple parallel cables (called bundle conductors) are used when higher capacity is needed. **Bundle conductors** are also used at high voltages to reduce energy loss caused by corona discharge.

Today, transmission-level voltages are usually considered to be 110 kV and above. Lower voltages such as 66 kV and 33 kV are usually considered subtransmission voltages but are occasionally used on long lines with light loads. Voltages less than 33 kV are usually used for distribution. Voltages above 230 kV are considered extra high voltage and require different designs compared to equipment used at lower voltages.

Since overhead transmission wires depend on air for insulation, design of these lines requires minimum clearances to be observed to maintain safety. Adverse weather conditions of high wind and low temperatures can lead to **power outages.** Wind speeds as low as 23 knots (43 km/h) can permit conductors to encroach operating clearances, resulting in a flashover and loss of supply. Oscillatory motion of the physical line can be termed gallop or flutter depending on the frequency and amplitude of oscillation.

Active vocabulary

Nouns and noun phrases	
overhead conductor	высотный проводник
insulation	изоляция
conductor material	токопроводящий материал
aluminium alloy	алюминиевый сплав
to be reinforced	быть усилена
copper	медь
performance	производительность
commodity	товар
shape	форма
transmission circuit	схема передачи
resistance	сопротивление
current-carrying capacity	токопропускная способность
wire	провод
surface	поверхность
cable	кабель
bundle conductor	многослойный проводник
energy loss	потери энергии
corona discharge	коронный разряд
transmission-level voltage	напряжение уровня передачи
subtransmission voltage	напряжение последующей передачи
equipment	оборудование
clearances	зазор
flashover	поверхностный пробой
oscillatory motion	колебательное движение
gallop	галоп
flutter	флаттер
frequency	частота
amplitude	амплитуда

Questions:

Recalling.

1. Are high-voltage overhead conductors covered by insulation?
2. Which material is used to produce conducters?
3. Why is aluminium alloy considered as the best material;?
4. Who are overhead conductors supplied by?
5. Why are conductor material and shapes regularly improved?

6. How big are conductors?
7. Why are thicker wires not used?
8. How can you understand the term “skin effect”?
9. Why are bundle conductors used?
10. What are today’s transmission-level voltages?
11. What are usually considered subtransmission voltages?
12. What voltages are used for distribution?
13. What are overhead transmission wires depend on?

Interpreting.

1. What material can be used to produce high-voltage overhead conductors in future?
2. Do you think is it dangerous to provide power transmission?
3. What safety measure should be taken?

Extending.

1. What material is used for high-voltage overhead conductors in our region?
2. What can be done to reduce energy losses?

Scanning. Search!

Scan the text and write out fact which refers to these figures:
12 mm2, 750 mm2, 1,590,000 circular mils area, 110 kV, 66 kV, 33 kV, 230 kV, 23 knots (43 km/h)

Activity.

1. **Discussion. What do you think?**

The group is divided into 4 teams. Each team is in favour of certain kind of energy. Make a list of your points and then disccuss.

Writing.

The best material of high-voltage overhead conductors production from my point of view (write a composition - expressing opinion).

TEXT 2.3.

Bulk power transmission

A transmission substation decreases the voltage of incoming electricity, allowing it to connect from long distance high voltage transmission, to local lower voltage distribution. It also reroutes power to other transmission lines that serve local markets.

Engineers design **transmission networks** to transport the energy as efficiently as feasible, while at the same time taking into account economic factors,

network safety and redundancy. These networks use components such as power lines, cables, circuit breakers, switches and transformers. The transmission network is usually administered on a regional basis by an entity such as a regional transmission organization or transmission system operator.

Transmission efficiency is hugely improved by devices that increase the voltage, and proportionately reduce the current in the conductors, thus keeping the power transmitted nearly equal to the power input. The reduced current flowing through the line reduces the losses in the conductors. According to **Joule's Law,** energy losses are directly proportional to the square of the current. Thus, reducing the current by a factor of 2 will lower the energy lost to conductor resistance by a factor of 4.

This change in voltage is usually achieved in AC circuits using a **step-up transformer**. HVDC systems require relatively costly conversion equipment which may be economically justified for particular projects, but are less common currently.

A transmission grid is a network of power stations, transmission lines, and substations. Energy is usually transmitted within a grid with three-phase AC. Single-phase AC is used only for distribution to end users since it is not usable for large polyphase induction motors. In the 19th century, two-phase transmission was used but required either four wires or three wires with unequal currents. Higher order phase systems require more than three wires, but deliver marginal benefits.

Active vocabulary

Nouns and noun phrases	
transmission substation	подстанция передачи
incoming electricity	входящая электроэнергия
transmission network	сеть передачи
to transport the energy	транспортировать энергию
network safety	безопасность сети
redundancy	избыточность
circuit breaker	автоматический выключатель
switch	переключатель
transformer	трансформатор
transmission system operator	оператор системы передачи
transmission efficiency	эффективность передачи
device	устройство
power input	входная мощность
step-up transformer	повышающий трансформатор

conversion equipment	оборудование для преобразования
polyphase induction motor	многофазный асинхронный двигатель
Verbs and verbal phrases	
to reroute power	перенаправить энергию

Questions:

1. What does a transmission substation do?
2. Which tasks do engineers have to design transmission networks?
3. What are these networks components?
4. Who is the transmission network usually administered on a regional basis?
5. How can transmission efficiency be hugely improved?
6. Explain Joule's Law.
7. Why are step-up transformers used?
8. What is a transmission grid?

TEXT 2.4.

The capital cost of electric power stations is so high, and **electric demand** is so variable, that it is often cheaper to import some portion of the needed power than to generate it locally. Because **nearby loads** are often correlated (hot weather in the Southwest portion of the US might cause many people to use air conditioners), electricity often comes from distant sources. Because of the economics of **load balancing**, wide area transmission grids now span across countries and even large portions of continents. The web of interconnections between power producers and consumers ensures that power can flow, even if a few links are inoperative.

The unvarying (or slowly varying over many hours) portion of the electric demand is known as the **base load** and is generally served best by large facilities (which are therefore efficient due to economies of scale) with low variable costs for fuel and operations. Such facilities might be nuclear or coal-fired power stations, or hydroelectric, while other renewable energy sources such as concentrated solar thermal and geothermal power have the potential to provide base load power. Renewable energy sources such as solar photovoltaics, wind, wave, and tidal are, due to their intermittency, **not considered "base load"** but can still add power to the grid. The **remaining power demand,** if any, is supplied by **peaking power plants,** which are typically smaller, faster-responding, and higher cost sources, such as combined cycle or combustion turbine plants fueled by natural gas.

Long-distance transmission of electricity (thousands of kilometers) is cheap and efficient, with costs of US $ 0.005–0.02/kWh (compared to annual averaged large producer costs of US $ 0.01–0.025/kWh, retail rates upwards of US $ 0.10/kWh, and multiples of retail for instantaneous suppliers at **unpredicted highest demand moments**). Thus distant suppliers can be cheaper than local sources (e.g., New York City buys a lot of electricity from Canada). Multiple local sources (even if more expensive and infrequently used) can make the transmission grid more fault tolerant to weather and other disasters that can disconnect distant suppliers.

Long distance transmission allows **remote renewable energy resources** to be used to displace fossil fuel consumption. Hydro and wind sources cannot be moved closer to populous cities, and solar costs are lowest in remote areas where local power needs are minimal. Connection costs alone can determine whether any particular renewable alternative is economically sensible. Costs can be prohibitive for transmission lines, but various proposals for massive infrastructure investment in high capacity, very long distance super grid transmission networks could be recovered with modest usage fees.

Active vocabulary

Nouns and noun phrases	
capital cost	капитальные расходы
electric demand	спрос на электроэнегрию
nearby load	приблизительная нагрузка
load balancing	изменение нагрузки
base load	базовая нагрузка
populous city	густонаселенный город
prohibitive	запретительный

Questions:

1. Why is electric demand so variable?
2. How do you understand “nearby loads”?
3. Where does electricity often come?
4. What does mean load balancing?
5. What does the web of interconnections between power producers and consumers ensure?
6. What is known as the base load?
7. What is the base load served best by?
8. Why are renewable energy sources not to be considered as "base load"?

9. How is supplied the remaining power demand?
10. Why is long-distance transmission of electricity better?
11. What does long distance transmission allow?
12. Translate the stressed word combinations and give their definitions in English.

UNIT 3 ELECTRICITY DISTRIBUTION

TEXT 3.1.

Electricity distribution is the final stage in the delivery of electricity to end users. A distribution system's network carries electricity from the transmission system and delivers it to consumers. Typically, the network would include medium-voltage (less than 50 kV) power lines, substations and pole-mounted transformers, low-voltage (less than 1 kV) distribution wiring and sometimes meters.

Modern distribution systems

Electric distribution substations transform power from transmission voltage to the lower voltage used for local distribution to homes and businesses. The modern distribution system begins as the primary circuit leaves the sub-station and ends as the secondary service enters the customer's meter socket. Distribution circuits serve many customers. The voltage used is appropriate for the shorter distance and varies from 2,300 to about 35,000 volts depending on utility standard practice, distance, and load to be served. Distribution circuits are fed from a transformer located in an electrical substation, where the voltage is reduced from the high values used for power transmission.

Conductors for distribution may be carried on overhead pole lines, or in densely-populated areas where they are buried underground. Urban and suburban distribution is done with three-phase systems to serve both residential, commercial, and industrial loads. Distribution in rural areas may be only single-phase if it is not economical to install three-phase power for relatively few and small customers.

Only large consumers are fed directly from distribution voltages; most utility customers are connected to a transformer, which reduces the distribution voltage to the relatively low voltage used by lighting and interior wiring systems. The transformer may be pole-mounted or set on the ground in a protective enclosure. In rural areas a pole-mount transformer may serve only one customer, but in more built-up areas multiple customers may be connected. In very dense city areas, a secondary network may be formed with many transformers feeding into a common bus at the utilization voltage. Each customer has an "electrical service" or "service

drop" connection and a meter for billing. (Some very small loads, such as yard lights, may be too small to meter and so are charged only a monthly rate.)

A ground connection to local earth is normally provided for the customer's system as well as for the equipment owned by the utility. The purpose of connecting the customer's system to ground is to limit the voltage that may develop if high voltage conductors fall on the lower-voltage conductors, or if a failure occurs within a distribution transformer. If all conductive objects are bonded to the same earth grounding system, the risk of electric shock is minimized. However, multiple connections between the utility ground and customer ground can lead to stray voltage problems; customer piping, swimming pools or other equipment may develop objectionable voltages. These problems may be difficult to resolve since they often originate from places other than the customer's premises.

Active vocabulary

Nouns and noun phrases	
power line	линия электропередачи
pole-mounted transformer	СТП трансформатор
distribution wiring	распределительная проводка
meter	метр, измерительный прибор
primary circuit	первый контур, цепь
customer's meter socket	розетка клиента
distribution circuit	распределительная цепь
overhead pole line	накладная полюсная линия
residential load	жилая нагрузка
commercial load	коммерческая нагрузка
industrial load	промышленная нагрузка
three-phase power	трехфазное питание
interior wiring systems	кабельные внутренние системы
protective enclosure	защитный корпус
pole-mount transformer	полюсный трансформатор
secondary network	вторичная сеть
utilization voltage	используемое напряжение
ground connection	заземление соединения
earth grounding system	система заземления
electric shock	электрический шок
customer's premise	помещение клиента

Verbs and verbal phrases to be fed	 питать, кормить

Questions:

Recalling.

1. What is electricity distribution?
2. Where does a distribution system's network carry electricity?
3. What does the network include?
4. What do electric distribution substations do?
5. How does the modern distribution system begin?
6. Who do distribution circuits serve?
7. How are distribution circuits are fed?
8. How may conductors for distribution be carried?
9. How is urban and suburban distribution done?
10. What are most utility customers connected to?
11. What kind of transformers are used?
12. What does each customer have?
13. What is the purpose of connecting the customer's system to ground?

Interpreting.

1. How much do you pay for electricity?
2. Do you think that electricity is expensibe?
3. How can you reduce electricity costs?

Extending.

1. What new methods are used to pay electricity bills?
2. How can you save energy?

Activity

Make a poster. SAVE ENERGY.

Each student writes a short story about implementation energy-saving technologies.

TEXT 3.2.

Smart Grids & ASM

Decentralised electricity from renewables is prompting a rethink about how best to run Europe's distribution networks. Indeed, traditionally, **distribution companies (DSOs)** designed their networks according to peak demand needs, not as connection points for generators like solar panels or windmills. In the past, predictable flows in the electricity network did not require extensive management

and monitoring tools. But the expansion of renewables across Europe has changed this - in some areas quasi overnight.

This fast change together with the fact that customers are moving to the centre of the new value chain has led to rethink the way DSOs should operate their networks. This takes place in the framework of energy industry liberalisation, decarbonisation of the economy as well as ground breaking ICT developments. DSOs seem themselves as key facilitators of this new power system: they will allow it to become more flexible, efficient and customer-centric.

Smart grids and Active Distribution System Management are the smart solutions that DSOs can provide to these new challenges, instead of simply 'burying copper in the ground'.

As outlined in the EURELECTRIC reports Ten Steps to Smart Grids, and The retail (r)evolution - power to the customer, smart grids can intelligently integrate behaviours and actions of all its users and can encourage consumers to actively manage their energy demand - for instance allowing them to shift their electricity consumption to times of lower prices.

Active Distribution System Management stands for system services and new types of network access at distribution level. Tools such as participation of decentralised generators in voltage and reactive power management, distribution network capacity management and congestion management, and information exchange between TSOs, DSOs and distributed energy resources would allow DSOs to optimise investments and ensure that infrastructure is only extended when it is more cost-efficient. such as: Another smart solution could be a the traffic light system to indicate different states of grid congestion as presented by EURELECTRIC.

Questions:

Recalling.

1. How do **distribution companies (DSOs)** design their networks?
2. Did electricity network require extensive management and monitoring tools in the past?
3. What does change the way DSOs should operate their networks?
4. How are new power systems?

TEXT 3.3.

Investments & Regulation

As mentioned in our report Power Distribution in Europe - Facts and Figures, European networks will require €600 billion of investment by 2020. Two thirds of this investment will take place in distribution grids. The DSO share of

overall network investments is estimated to grow to almost 75% by 2035, and to 80% by 2050.

DSO investments include building new capacity and refurbishing and replacing existing assets as they reach the end of their technical lifetime. Investments are also driven by a changing distribution system, with a greater role for new loads like electric vehicles, for distributed generation like rooftop solar panels, and for smart meters. As regulated companies, the DSO investment framework is determined by regulation at the national level.

Efficient national regulation that focuses on longer-term grid requirements and provides a fair rate of return should thus be encouraged. However, constraints on investments for DSOs seem to have increased since 2010 and regulatory risk is high on the agenda. Technological risk is also a major factor, especially as far as smart grid investments are concerned. EURELECTRIC is therefore working to ensure that the much needed investments in distribution networks can nevertheless take place, by removing investment hurdles for DSOs and ensuring that regulation is fit for purpose.

In addition, DSOs must be able to collect, in an adequate and timely manner, the necessary revenue to cover network costs and investments. This is done through network tariffs, determined by the regulatory authority.

Today, recovering network costs heavily depends on how much electricity is sold: in most European countries, network tariffs for households and small businesses are almost entirely based on energy volume (kWh). EURELECTRIC believes that network tariff structure should instead encourage customers to shift their peak hour consumption, by incentivising demand response and energy-efficient behaviour. Therefore, network tariffs should be progressively more capacity based and/or possibly peak-time differentiated.

Questions:

Recalling.

1. How much money do European networks require?
2. What do DSO investments include?
3. What does Efficient national regulation focuse?
4. What is a major factor?
5. What does recovering network costs heavily depend?

TEXT 3.4.

Smart Metering & Customers

Following European legislation, smart meters are increasingly being rolled out across Europe. As part of the physical grid infrastructure, the meters fall under

the grid operator's domain. In almost all EU member states the installation of such smart meters will thus be the responsibility of DSOs.

DSOs are now preparing to properly inform customers on questions re-lated to the smart meter installation. The rollout and related education and communication effort towards customers will encompass explaining what a smart meter is, how it works, why smart meters are needed, and where to go for impartial advice on smart meter functionalities and benefits. Clear information will be essential to activate consumers. For more information, see our report Communicating smart meters to customers - which role for DSOs?

Smart meters and smart grids will also make available a wealth of new customer data. As smart meters continue to be deployed throughout Europe, DSOs must therefore pay attention to ensuring effective data privacy and security for their customers.

As a regulated and therefore neutral entity, DSO can act as a neutral market facilitator collecting relevant customer data. DSOs could manage the data hub independently or together with ICT and telecommunications providers.

DSOs would facilitate the market by passing on the data to retailers, service providers and other market players via the data hubs in a non-discriminatory manner.

Customers remain the owners of their personal data and will have to give their approval before their data is shared with third parties. They will benefit from effective verification and validation of privacy, secure customer data management, neutral data handling, transparency and cost-efficiency.

TEXT 3.5.

Standardisation

Standards play a key role in the development and deployment of technology in society. They provide an indispensable basis for widespread market uptake of products and services. They also ensure customer convenience. In addition, agreed standards tend to encourage innovation, boost productivity and enhance economic efficiency by reducing or eliminating technical barriers that can create market distortions.

The European Commission has asked CENELEC, CEN and ETSI to develop standards in several areas related to the electricity system. Its three so-called standardisation mandates address smart meters (M/441), e-mobility (M/468) and smart grids (M/498).

EURELECTRIC DSOs work to support the on-going EU smart grid standardisation process by outlining standardisation priorities. Open and non-proprietary standards are indispensable for the smooth and cost-efficient roll-out of

smart electricity grids across Europe. Rapid adoption of such standards is important: DSOs are already facing challenges that require smart grid functionalities and services, for instance the proliferation of intermittent decentralised renewables in the distribution grid. For more information, have a look at EURELECTRIC and EDSO4SG report DSO priorities for smart grid standardisation.

EURELECTRIC is involved in the respective coordination committees that steer the standardisation process and is namely a cooperating partner of CENELEC, the European Committee for Electro-Technical Standardisation. EURELECTRIC working structure incorporates many experts who are active in several of CENELEC's technical committees.

UNIT 4 ENERGY CONSUMPTION

TEXT 4.1.

Consumption of electric energy is measured by W/ h (Watt x Hour) 1 W/h = 3600 joule = 859.8 calorie. One 100 watt light bulbs consume 876,000 W/·h (876 kW/·h) of energy in one year.

Electric/Electronics devices consume electric energy to generate desired output (i.e. light, heat, kinetic etc.), while its operation some part of energy are consumed in unintended output.

In 2008, world total of electricity production and consumption was 20261 TWh. This number corresponds to a "consumed" power of around 2.3 TW on average. The total energy needed for producing this power is roughly a factor 2 to 3 higher because the efficiency of power plants is roughly 30-50%. The generated power is thus in the order of 5 TW. This is approximately a third of the total energy consumption of 15 TW.

16816T Wh (83%) of electric energy was consumed by final users. The difference of 3464 TWh (17%) was consumed in the process of generating power and consumed as transmission loss.

At the world level, energy consumption was cut down by 1.5% during 2009, for the first time since World War II. Except in Asia and Middle East, consumptions were reduced in all the world regions. In OECD countries, accounting for 53% of the total, electricity demand scaled down by more than 4.5% in both Europe and North America while it shrank by above 7% in Japan. Electricity demand also dropped by more than 4.5% in CIS countries, driven by a large cut in Russian consumption. Conversely, in China and India (22% of the world's consumption), electricity consumption continued to rise at a strong pace (+6-7%) to meet energy needs related to high economic growth. In Middle East, growth rate was softened but remained high, just below 4%.

The countries which consume the most are top 20 populous countries and top 20 GDP countries and Saudi Arabia. 30 countries represent 77% of world population, 84% of world GDP, 83% of world electricity consumption.

Productivity per Electricity consumption (concept similar to Energy intensity) can be measured by dividing GDP amount by the electricity consumed. World average was $3.5 production/kWh.

Electricity consumption includes final consumption, in process consumption, and losses.

Active vocabulary

Nouns and noun phrases	
joule	джоуль
light bulb	лампочка
operation	работа
final user	конечный потребитель
transmission loss	потери при передаче
related to high economic growth	связанные с высокими темпами экономического роста
populous country	густонаселенная страна
Verbs and verbal phrases	
to be scaled down	подниматься с высоким темпом
to rise at a strong pace	удовлетворять потребности в энергии
to meet energy needs	быть сокращена
Adverbs	
roughly	грубо

Questions:

Recalling.

1. How is consumption of electric energy measured?
2. Why do electric/electronics devices consume electric energy?
3. How much was total of electricity production and consumption in 2008?
4. How much electricity was consumed by final users?
5. When was energy consumption was cut down by 1.5%?
6. How much e did electricity demand drop in CIS countries?
7. How is productivity per Electricity consumption measured?
8. What does electricity consumption include?

Interpreting. (

1. What is your opinion if electricity consumption increases or decreases in the nearest future?
2. Do the spheres of electricity consumption extend?

Expending.

1. What does electricity consumption depend on?
2. Which country consumes the most electricity?

Scanning. Search!

Scan the text and write out fact which refers to these figures:

876,000 W/·h; 20261 TWh; 16816T Wh; 3464 TWh; 1.5%; 53%; 7%; 22%; $3.5.

Activity.

A visit to power station.

Visit a power station and write a short report about its operation.

UNIT 5 ENVIROMENTAL CONCERNS

TEXT 5.1.

Most scientists agree that emissions of pollutants and greenhouse gases from fossil fuel-based electricity generation account for a significant portion of world greenhouse gas emissions; in the United States, electricity generation accounts for nearly 40% of emissions, the largest of any source. Transportation emissions are close behind, contributing about one-third of U.S. production of carbon dioxide.

In the United States, fossil fuel combustion for electric power generation is responsible for 65% of all emissions of sulfur dioxide, the main component of acid rain. Electricity generation is the fourth highest combined source of NOx, carbon monoxide, and particulate matter in the US.

In July 2011, the UK parliament tabled a motion that "levels of (carbon) emissions from nuclear power were approximately three times lower per kilowatt hour than those of solar, four times lower than clean coal and 36 times lower than conventional coal".

Though PV generation is positioned as environmentally friendly, fabrication of PV cells utilizes substantial amounts of water in addition to toxic chemicals such as phosphorus and arsenic. These are often overlooked when promoting PV. Because of strict environmental regulations in the United States, for example, PV fabrication is often performed in countries with lower standards, such as China.

Most large scale thermoelectric power stations consume considerable amounts of water for cooling purposes and boiler water make up - 1 L/kWh for once through (e.g. river cooling), and 1.7 L/kWh for cooling tower cooling. Water abstraction for cooling water accounts for about 40% of European total water abstraction, although most of this water is returned to its source, albeit slightly warmer. Different cooling systems have different consumption vs. abstraction characteristics. Cooling towers withdraw a small amount of water from the environment and evaporate most of it. Once-through systems withdraw a large amount but return it to the environment immediately, at a higher temperature.

Active vocabulary

Nouns and noun phrases	
pollutant	загрязнитель
greenhouse gases	парниковые газы
transportation emission	транспортные выбросы
carbon dioxide	углекислый газ
combustion	сжигание
sulfur dioxide	диоксид серы

acid rain	кислотный дождь
carbon monoxide	угарный газ
environmentally friendly	экологически благоприятный
PV cells	фотоэлементы
toxic chemicals	токсичные химикаты
phosphorus	фосфор
arsenic	мышьяк
albeit	хотя
abstraction characteristic	характеристика вобозабора
cooling tower	градирни
water abstraction	водозабор

Questions:

Recalling.

1. What accounts for a significant portion of world greenhouse gas emissions?
2. How much is proportion of emissions from electricity generation in the United States?
3. How much of sulfur dioxide emissions is electric power generation responsible for?
4. What place does electricity generation occupy as a source of carbon monoxide in the US?
5. Why is PV generation positioned as environmentally friendly?
6. Which countries is PV fabrication often performed?
7. How much water do most large scale thermoelectric power stations consume?

Scanning. Search!

Scan the text and write out fact which refers to these figures:

1 L/kWh

1.7 L/kWh

1.8 40% of

Activity.

1. **I'm an electricity consumer.**

Compose please a scheme of the delivery of electricity to you as a consumer.

UNIT 6 FUTURE OF ENERGY INDUSTRY

Text 6.1.

Energy today

Prosperity for everyone on Earth by 2050 will require a sustainable source of electricity equivalent to 3 to 5 times the commercial power currently produced. Because of the low average incomes in developing countries, however, this energy must be provided at one-tenth the present total cost per kilowatt-hour. Solar-power stations constructed on the moon from common lunar materials could provide the clean, safe, low-cost commercial electric energy needed on Earth.

Currently, commercial energy production on Earth raises concerns about pollution, safety, reliability of supply, and cost. These concerns grow as the world's nations begin to expand existing systems to power a more prosperous world. Such growth could exhaust coal, oil, and natural gas reserves in less than a century, while the production and burning of these fossil fuels pollute the biosphere. Expanding nuclear fission power would require breeder reactors, but there is intense political resistance to that idea because of concerns about proliferation, nuclear contamination of the environment, and cost. Thousands of large commercial fusion reactors are highly unlikely to be built by 2050. Terrestrial renewable systems (hydroelectric, geothermal, ocean thermal, waves, and tides) cannot dependably provide adequate power. Using wind power would require capturing one-third of the power of the low-level winds over all the continents.

Although energy coming directly to Earth from the sun is renewable, weather makes the supply variable. Very advanced technologies, such as 30 % efficient solar cells coupled with superconducting power transmission and storage, imply solar arrays that would occupy selected regions totaling 20 % of the area of the United States. Studies funded by the World Energy Council project that terrestrial solar energy will provide less than 15 % of the electric power needed for global prosperity by 2050.

Active vocabulary

Nouns and noun phrases	
waste product	отходы
mining coal	добыча угля
traffic hazards	аварии при транспортировке
occupational hazards	профессиональные риски
tax codes	налоговые кодексы
competitive	конкурентоспособный
social costs	социальные расходы

Questions:

Recalling.

1. What will prosperity for everyone require?
2. What could provide the clean, safe, low-cost commercial electric energy needed on Earth?
3. What concerns does commercial energy production on Earth raise?
4. What would expanding nuclear fission power require?
5. How many large commercial fusion reactors are highly unlikely to be built by 2050?
6. Can terrestrial renewable provide adequate power?
7. What makes the sun power supply variable?

Text 6.2.

Energy problems

Renewable energy sources, unlike fossil fuel, can be used without ever being used up. These are typically sources such as sun, wind, water and Earth's internal heat.

It is important to focus on the fact that the difference in cost between traditional fossil fuels and some of the cheapest: renewable energy sources is so relatively slight. Moreover, these economic costs do not include the negative social cost of fossil fuel use on the environment. Energy from a coalfired power plant may still be 20-50 percent cheaper than the energy produced by a windmill, but if the effects on environment and humans from coal pollution and waste products exceed the price difference then society ought to choose wind energy.

Recently, one European and two American large-scale projects have attempted to examine all costs associated with electricity production, all the way from the mortal risks of mining coal, the traffic hazards of transportation and occupational hazards of production including consequences of acid rain, particles, sulfur dioxide, nitrogen oxides and ozone on lakes, crops, buildings, children and old people and up to the consequences of tax codes and occupation plus a long, long list of similar considerations and costs. Altogether these studies find that the extra social cost of new coalfired power plants is around 0.16-0.59 cents per kWh. None of the three studies, however, quantifies the costs of carbon dioxide which probably means an additional 0.64 cents per kWh. Consequently renewable energy actually has to drop somewhat in price before it will be competitive, even including social costs. Nevertheless, it is estimated that the price of renewable energy will fall faster than the price for conventional energy. It should however also be added that there is still quite a bit of uncertainty about the predictions of such prices, because early predictions in hindsight have seemed rather optimistic.

In 1991 the Union of Concerned Scientists predicted that solar power today would drop below 10 cents per kWh, but unfortunately it has still only dropped to about 50 cents per kWh.

Thus, it is unclear whether it is necessary to support renewable energy with subsidies and tax exemptions. In Denmark this subsidy is as much as 5 cents per kWh for wind energy, and in the US, subsidy for wind power is estimated at about 1.5 cents per kWh. It would still be much more effective to tax energy such that its actual price would adequately reflect the social costs in production and emissions.

Active vocabulary

Nouns and noun phrases	
prosperity	процветание
sustainable source of electricity	устойчивый источник электроэнергии
low average income	низкий средний доход
developing countries	развивающиеся страны
commercial energy production	коммерческое производство энергии
reliability of supply	надежность поставок
prosperous world	процветающий мир
breeder reactor	реактор-размножитель
proliferation	распространение
nuclear contamination	ядерное заражение
fusion reactor	термоядерный реактор
advanced technologies	передовые технологии
Verbs	
to exhaust	исчерпать

Questions:

Recalling.

1. Which kind of energy is cheaper?
2. Why can’t we agree that coalfired energy is cheaper?
3. How many projects have been realized to examine all costs associated with electricity production?
4. How much do these studies evaluate the extra social cost of a new coalfired plant?
5. What is it necessary to do in order to make renewable energy competitive?
6. Does the renewable energy fall in price fast?
7. How is it possible to support the development of renewable energy?

GRAMMAR

1. SIMPLE TENSES

1.1. Present Simple - простое настоящее время

Время Present Simple обозначает действие в настоящем в широком смысле слова. Оно употребляется для обозначения обычных, регулярно повторяющихся или постоянных действий, например, когда мы говорим о чьих либо привычках, режиме дня, расписании и т. д., т. е. Present Simple обозначает действия, которые происходят в настоящее время, но не привязаны именно к моменту речи.

Английский глагол во временной форме Present Simple почти всегда совпадает со своей начальной, то есть указанной в словаре, формой без частицы to. Лишь в 3-ем лице единственного числа к ней нужно прибавить окончание -s: *I work – he works.* Если глагол оканчивается на -s, -ss, -sh, -ch, -x, -o, то к нему прибавляется окончание -es: *I wish – he wishes.* К глаголам на -y тоже прибавляется окончание -es, а -y заменяется на -i-: *I try – he tries.* Для того, чтобы построить вопросительное предложение, перед подлежащим нужно поставить вспомогательный глагол. Время Present Simple используется без него, поэтому в этом случае добавляется вспомогательный глагол do (или does в 3 л. ед. ч.): *Do you like rock? / Тебе нравится рок?*
Does he speak English? / Он говорит по-английски? В отрицательных предложениях тоже используется вспомогательный глагол *do/does*, но не перед подлежащим, а перед глаголом. После него прибавляется отрицательная частица not. *Do/does* и *not* часто сокращаются до *don't* и *doesn't* соответственно: *I do not like black coffee. / Я не люблю черный кофе.*
She doesn't smoke. / Она не курит.

Случаи употребления Present Simple

- Регулярные, повторяющиеся действия: *I often go to the park. / Я часто хожу в парк. They play tennis every weekend. / Каждые выходные они играют в теннис.*
- Действие в настоящем в широком смысле слова (не обязательно в момент речи): *Jim studies French./ Джим изучает французский. We live in Boston. / Мы живем в Бостоне.*
- Общеизвестные факты: *The Earth is round./ Земля – круглая. The Volga is the longest river in Europe. / Волга – самая длинная река в Европе.*
- Перечисление последовательности действий: *We analyse what our clients may need, develop a new product, produce a sample, improve it and sell it. / Мы анализируем, что может понадобиться нашим клиентам, разрабатываем новый продукт, изготавливаем образец, дорабатываем его и продаем.*

- Некоторые случаи указания на будущее время (если имеется в виду некое расписание или план действий, а также в придаточных предложениях времени и условия): *The airplane takes off at 2.30 p.m./ Самолет взлетает в 14:30.When you see a big green house, turn left. / Когда вы увидите большой зеленый дом, поверните налево.*
- Некоторые случаи указания на прошедшее время (в заголовках газет, при пересказе историй): *Airplane crashes in Pakistan. / В Пакистане разбился самолет. I met Lenny last week. He comes to me and says, "Hello, mister!"/ На прошлой неделе я встретил Ленни. Подходит ко мне и говорит: «Здорово, мистер!»*

1.2. Past Simple - простое прошедшее время

Время Past Simple используется для обозначения действия, которое произошло в определенное время в прошлом и время совершения которого уже истекло. Для уточнения момента совершения действия в прошлом при использовании времени Past Simple обычно используются такие слова, как *five days ago (пять дней назад), last year (в прошлом году), yesterday (вчера), in 1980 (в 1980 году)* и т.п. Для того, чтобы поставить английский глагол во время Past Simple, нужно использовать его «вторую форму». Для большинства глаголов она образуется прибавлением окончания *-ed: examine – examined, enjoy – enjoyed, close – closed.* Однако есть также достаточно большая группа неправильных английских глаголов, которые образуют форму прошедшего времени не по общим правилам, для них форму прошедшего времени нужно просто запомнить. *We saw your dog two blocks from here. / Мы видели вашу собаку в двух кварталах отсюда.* В вопросительном предложении перед подлежащим нужно использовать вспомогательный глагол do в прошедшем времени – did, а после подлежащего поставить основной, значимый глагол в начальной форме: *Did you wash your hands? / Ты помыл руки? Did they sign the contract? / Они подписали контракт?* В отрицательных предложениях перед глаголом нужно поставить вспомогательный глагол did и отрицательную частицу *not: We did not find our car. / Мы не нашли свою машину. I did not understand this question. / Я не понял этот вопрос.*

Случаи употребления Past Simple:

- Указание на простое действие в прошлом: *I saw Jeremy in the bank. / Я видел Джереми в банке.*
- Регулярные, повторяющиеся действия в прошлом: *The old man often visited me. / Старик часто меня навещал.* I noticed this charming shop girl each time I went to buy something. / Я замечал эту очаровательную продавщицу каждый раз, когда шел за покупками.

- Перечисление последовательности действий в прошлом: *I heard a strange sound, looked back, and saw a huge cat sitting on the table. / Я услышал странный звук, обернулся и увидел здоровенного кота, сидящего на столе.*

1.3. Future Simple - простое будущее время

Время Future Simple ссылается на действие, которое совершится в неопределенном или отдаленном будущем. Простое будущее время обычно используется с обстоятельствами: *tomorrow (завтра), next year (в следующем году), in five years (через пять лет), in 2035 (в 2035 году)* и т.п. Для того, чтобы поставить глагол во временную форму Future Simple, нужно использовать его начальную форму и вспомогательный глагол *shall* (для первого лица) или *will* (второе и третье лицо). В устной речи *shall* и *will* чаще всего сокращаются до формы 'll, которая может использоваться во всех лицах. В современном английском, особенно в устной речи, will стал использоваться и в первом лице: *I will go to Shanghai next summer./ Следующим летом я поеду в Шанхай.* В вопросительном предложении вспомогательные глаголы *shall* или *will* ставятся перед подлежащим. Значимый глагол остается после подлежащего в своей начальной форме: *Shall we go to the beach? / Мы пойдем на пляж? Will your boss agree with our conditions? / Ваш босс согласится с нашими условиями?* В отрицательных предложениях за вспомогательным глаголом следует отрицательная частица not. Вместе они могут быть сокращены до формы *shan't* (чаще в брит. английском) или *won't: I shall not (shan't) let you down./ Я вас не подведу. Fred will not (won't) agree to help us./ Фред не согласится нам помочь.*

Случаи употребления Future Simple:

- Указание на простое действие в будущем: *We'll return in 4 hours./ Мы вернемся через 4 часа. It will not be easy to convince him./ Его будет нелегко убедить.*
- Регулярные, повторяющиеся действия в будущем: *I promise I'll visit you every day./ Обещаю, что буду навещать тебя каждый день.*
- При перечислении последовательности действий в будущем: *I cannot wait for my vacation. I shall go to the river, swim and fish every day./ Не могу дождаться своего отпуска. Буду каждый день ходить к речке, купаться и ловить рыбу.*

2. CONTINUOUOS TENSES

2.1. Present Continuous - настоящее длительное время

Времена группы Continuous указывают на процесс, действие, длящееся в определенный момент в прошлом, настоящем или будущем. Время Present Continuous обычно указывает на процесс, длящийся непосредственно в

момент речи. На это могут указывать контекст или такие слова, как *now (сейчас), at the moment (в текущий момент)* и т.п.: *Sally is doing her homework at the moment./ Салли сейчас делает домашнее задание. Dad and me are fishing now. / Мы с папой сейчас рыбачим.* Для того, чтобы поставить глагол в форму времени Present Continuous, требуется вспомогательный глагол to be в настоящем времени и причастие настоящего времени (Participle I) смыслового глагола. To be в настоящем времени имеет три формы: *am* – 1 лицо, ед. ч. *(I am shaving.); is* – 3 лицо, ед. ч. *(He is reading.;) are* – 2 лицо ед. ч. и все формы мн. ч. *(They are sleeping..)* Причастие настоящего времени (Participle I) можно получить, прибавив к начальной форме значимого глагола окончание *-ing: jump – jumping, live – living.* В вопросительном предложении вспомогательный глагол выносится на место перед подлежащим, а значимый глагол остается после него: *Why are you laughing? / Почему ты смеешься? Are you using this dictionary? / Вы используете этот словарь?* В отрицательных предложениях за вспомогательным глаголом следует отрицательная частица not. Формы *is* и *are* при этом могут быть сокращены до *isn't* и *aren't* соответственно. *Radio is not (isn't) working. / Радио не работает.* Английские глаголы, связанные с восприятием *(notice, hear, see, feel ...),* эмоциями *(love, hate, like ...),* процессами умственной деятельности *(think, believe, understand ...),* владением *(have, possess ...)* не используются во временах группы Continuous, потому что они сами по себе обозначают процесс. Вместо них используется время Present Simple: *I hear you, don't shout./ Я слышу тебя, не кричи. I love pancakes. / Я люблю блинчики.*

Случаи употребления Present Continuous

- Указание на процесс, происходящий непосредственно в момент разговора: *The doctor is conducting an operation now./ Врач сейчас проводит операцию.*
- Описание характерных свойств человека, часто с негативной окраской: *Why are you always interrupting people?/ Почему ты вечно перебиваешь людей? He is always shouting at me./ Он всегда на меня орет.*
- Запланированное действие в будущем, часто с глаголами движения:*We are landing in Heathrow in 20 minutes. / Мы приземляемся в Хитроу через 20 минут.*

2.2.Past Continuous - прошедшее длительное время

Время Past Continuous указывает на процесс, длившийся в определенный момент или период в прошлом. В отличие от времени Past Simple, этот момент в прошлом должен быть назван прямо (например, *yesterday at 5 o'clock, when you called, when rain started)* или быть очевидным из контекста. *When you called I was taking shower. / Когда ты позвонил, я принимал душ.*

Charlie and me were already driving home when the engine suddenly stopped./ Мы с Чарли уже ехали домой, как вдруг заглох мотор. Для того, чтобы поставить глагол в форму Past Continuous, нужен вспомогательный глагол to be в прошедшем времени и причастие настоящего времени (Participle I) смыслового глагола. *To be* в прошедшем времени имеет две формы: *was* – 1 и 3 лицо ед. ч. *(I was smoking. He was eating.); were* – 2 лицо ед. ч. и все формы мн. ч. *(They were laughing.).* В вопросительном предложении вспомогательный глагол выносится на место перед подлежащим, а значимый глагол остается после него: *Were you sleeping when I called? You sounded drowsy./ Ты спал, когда я позвонил? Ты казался сонным.* В отрицательных предложениях за вспомогательным глаголом следует отрицательная частица not. Формы was и were при этом могут быть сокращены до *wasn't и weren't* соответственно. *In the morning our elevator was not (wasn't) working./ Утром не работал лифт.*

Случаи употребления Past Continuous

- Указание на процесс, происходивший в конкретный момент времени в прошлом: *I was sleeping when someone knocked at the door./ Когда я спал, кто-то постучал в дверь.*

2.3. Future Continuous - будущее длительное время

Время Future Continuous указывает на процесс, который будет длиться в определенный момент в будущем. В отличие от времени Future Simple, этот момент в будущем должен быть назван прямо (*tomorrow at 4 o'clock, when we meet)* или быть очевидным из контекста. *Tomorrow this time I shall be flying to New York./ Завтра в это же время я буду лететь в Нью-Йорк. Don't disturb me in the evening, I'll be preparing for exam./ Не мешайте мне вечером, я буду готовиться к экзамену.* Для того, чтобы поставить глагол в форму Future Continuous, нужен вспомогательный глагол to be в будущем времени и причастие настоящего времени (Participle I) смыслового глагола. To be в будущем времени имеет две формы: *shall be* – 1 лицо. *(I shall be studying. We shall be running.); will be* – 2 и 3 лицо. *(They will be packing presents.).* В вопросительном предложении shall / will выносится на место перед подлежащим, а to be и смысловой глагол остаются после него: *Why did you bring an album? Shall we be studying painting?/ Зачем Вы принесли альбом? Мы будем изучать живопись?* В отрицательных предложениях после *shall / will* ставится отрицательная частица not. Вместе они могут быть сокращены до формы *shan't* (чаще в брит. английском) или *won't*: At 6 I won't be sleeping yet./ В шесть я еще не буду спать.

Случаи употребления Future Continuous

- Указание на процесс, который будет происходить в определенный момент в будущем:*At 7 o'clock we'll be having barbecue, you are welcome to join./ В семь часов у нас будет барбекю, приглашаем зайти.*

3. PERFECT TENSES

3.1. Present Perfect - настоящее совершенное время

Время Present Perfect обозначает действие, которое завершилось к настоящему моменту или завершено в период настоящего времени. Хотя английские глаголы в Present Perfect обычно переводятся на русский язык в прошедшем времени, следует помнить, что в английском языке эти действия воспринимаются в настоящем времени, так как привязаны к настоящему результатом этого действия. *I have done my homework already./ Я уже сделал домашнее задание. We have no classes today, our teacher has fallen ill./ У нас сегодня не будет уроков, наш учитель заболел.* Время Present Perfect образуется при помощи вспомогательного глагола to have в настоящем времени и причастия прошедшего времени значимого глагола, то есть его «третьей формы». *To have* в настоящем времени имеет две формы: *has* – 3 лицо, ед. ч. *(He has played); have* – 1 и 2 лицо ед.ч. и все формы мн. ч. *(I have played).* Причастие второе, или причастие прошедшего времени (Participle II), можно получить, прибавив к начальной форме значимого глагола окончание *-ed: examine – examined, enjoy – enjoyed, close – closed.* Однако есть также достаточно большая группа неправильных английских глаголов, которые образуют форму прошедшего времени не по общим правилам. Для них форму причастия прошедшего времени нужно запомнить. В вопросительном предложении вспомогательный глагол выносится на место перед подлежащим, а значимый глагол остается после него: *Have you seen this film? / Ты смотрел этот фильм? Has she come yet? / Она еще не пришла?* В отрицательных предложениях за вспомогательным глаголом следует отрицательная частица not. Формы *have* и *has* при этом могут быть сокращены до haven't и hasn't соответственно: *I haven't seen him since then./ С тех пор я его так и не видел.*

Случаи употребления Present Perfect:

- Если говорящему важен сам факт произошедшего действия, а не его время или обстоятельства*: I have visited the Louvre 3 times./ Я посетил Лувр три раза.*
- Если время события имеет значение, то нужно использовать время Past Simple: *I visited the Louvre last year./ В посетил Лувр в прошлом году.*

- Если период, в который произошло действие, еще не закончился: *I have finished reading "Dracula" this week./ На этой неделе я закончил читать «Дракулу».* В противном случае используется время Past Simple: *I finished reading "Dracula" 2 weeks ago./ Я закончил читать «Дракулу» две недели назад.*
- Для обозначения действий, которые начались в прошлом и продолжаются в момент разговора: *I've studied Spanish since childhood./ Я учил испанский с детства. I haven't seen my hometown for 45 years./ Я не видел свой родной город 45 лет.*

3.2. Past Perfect - прошедшее совершенное время

Время Past Perfect обозначает действие, которое завершилось до некоего момента в прошлом: *I called Jim too late, he had already left./ Я позвонил Джиму слишком поздно, он уже ушел. We had lived in Paris for 12 years before we moved to America. / До переезда в Америку мы прожили в Париже 12 лет.* Время Past Perfect образуется при помощи вспомогательного глагола to have в прошедшем времени и причастия прошедшего времени значимого глагола, то есть его «третьей формы». *To have* в прошедшем времени имеет единственную форму *had.* В вопросительном предложении вспомогательный глагол выносится на место перед подлежащим, а значимый глагол остается после него: *Had you brushed your teeth before you went to bed?/ Ты почистил зубы, прежде чем пойти спать?* В отрицательных предложениях за вспомогательным глаголом следует отрицательная частица not. При этом они могут быть сокращены до формы hadn't. *How did you hope to pass the exam if you had not (hadn't) even opened the textbook?/ Как ты надеялся сдать экзамен, если ты до этого даже учебник не открыл?*

Случаи употребления Past Perfect:

- Действие, закончившееся до определенного момента в прошлом, на который может указывать точная дата или час, начало другого действия или контекст: *After the Sun had set, we saw thousands of fireflies./ После того, как зашло солнце, мы увидели тысячи светлячков.*
- Перечисление действий в прошлом, произошедших до времени повествования в целом: *I finally caught Lucky and looked around. The nasty dog had scratched the furniture, had torn the wallpapers and had eaten my lunch on the table./ Я наконец поймал Лаки и осмотрелся вокруг. Мерзкая собака исцарапала мебель, порвала обои и съела мой обед на столе.*

3.2. Future Perfect - будущее совершенное время

Время Future Perfect используется довольно редко, оно обозначает действие, которое закончится до определенного момента или начала другого

действия в будущем или будет продолжать длиться после него. *Next year we shall have been married for 30 years./ В следующем году мы будем женаты уже 30 лет.* Время Future Perfect образуется при помощи вспомогательного глагола to have в будущем времени и причастия прошедшего времени значимого глагола, то есть его «третьей формы». *To have* в будущем времени имеет две формы: *shall have* – 1 лицо. *(We shall have covered 30 km by sunset); will have* – 2 и 3 лицо. *(They will have covered 30 km by sunset).* В вопросительном предложении вспомогательный глагол выносится на место перед подлежащим, а значимый глагол остается после него: *Will have you read all these books by the exam time?/ Ты прочтешь все эти книги до начала экзаменов?* В отрицательных предложениях за вспомогательным глаголом следует отрицательная частица not. При этом они могут быть сокращены до формы *hadn't: I guess, I shall not have received your next letter before Christmas./ Думаю, я не получу твое следующее письмо раньше Рождества*.

Случаи употребления Future Perfect:

- Действие, которое начнется и закончится до определенного момента в будущем: *You will have spent much efforts before you can run a marathon. / Ты потратишь много усилий, прежде чем сможешь пробежать марафон.*

4. MODAL VERBS

Модальные глаголы в английском языке отличаются от остальных глаголов тем, что они не используются самостоятельно и не обозначают конкретного действия или состояния, они отражают его модальность, то есть отношение к нему говорящего. Вместе модальный глагол и инфинитив значащего глагола образуют составное модальное сказуемое (compound modal predicate): *I can play volleyball. / Я умею играть в волейбол.* О каком именно отношении идет речь? Например, говорящий может оценивать действие как возможное, необходимое, разрешаемое, просимое, запрещенное, приказываемое, маловероятное, очень вероятное и т. д.: *Я поеду в Лондон. Я могу поехать в Лондон. Я должен поехать в Лондон. Можно я поеду в Лондон?* В зависимости от такой оценки и структуры предложения нужно использовать один из следующих английских модальных глаголов. Модальные глаголы в английском языке*: Can / Could, May / Might, Must, Have to / Have got to, Be to, Need, Ought to, Should, Would Shall, Will, Dare, Used to.* Чаще всего используются первые три: *Can, May и Must.* Эти глаголы имеют самое общее значение и иногда могут заменять собой остальные модальные глаголы. Вопросительные предложения с модальными глаголами образуются без вспомогательного глагола *to do,* при этом модальный глагол выносится в начало предложения: *Shall I help you?/*

Мне помочь? Could you give me his address?/ Не дадите мне его адрес? Отрицательная форма модального глагола образуется постановкой после него частицы *not.*

4.1.Модальный глагол Can употребляется:

- Для отражения физической или умственной способности, умения что-то сделать: *I cannot run so fast!/ Я не могу бежать так быстро! Dennis could play piano since he was 13. / Денис умел играть на пианино с 13 лет. I cannot drive a car. / Я не умею водить машину.*
- Для обозначения общей возможности: *He can be anywhere right now./ Он сейчас может быть где угодно.*
- Теоретической возможности: *You can find any kind of information on the Internet./ В Интернете можно найти любую информацию.*
- Возможности что-то совершить согласно закону или правилам: *British Parliament can issue laws and form the budget./ Британский парламент может издавать законы и формировать бюджет.*
- Для того, чтобы попросить/дать разрешение: *Can I try on that coat?/ Можно я примерю то пальто? You can come in./ Заходите.* В таком же значении может использоваться модальный глагол May, который придает высказыванию более формальную окраску: *You may come in./ Вы можете войти.*
- Для запрещения чего-либо (в отрицательной форме cannot / can't): *You cannot walk on the grass. / Нельзя ходить по газону. One cannot smoke on gas station./ На заправке курить запрещено.*
- При просьбе: *Can I have a glass of water?/ Можно мне стакан воды? Can you wait for me in the hall?/ Не подождете меня в холле?*
- Для выражения сильного недоверия (в отрицательной форме cannot / can't): *He cannot be there! / Он не может там быть! He can't be so old./ Он не может быть так стар.*

5. VOICE

5.1. Активный залог (active voice)

Категория залога показывает, производит ли действие лицо (предмет), выраженное существительным или местоимением в функции подлежащего, или же оно само испытывает на себе чье-либо действие. В английском языке существует два вида залога: активный залог (действительный) и пассивный залог (страдательный). Активный залог (active voice) показывает, что лицо или предмет, выраженное подлежащим, само производит действие: *Sam baked a big cake./ Сэм испек большой пирог.* В примере выше лицо, выраженное подлежащим (Sam) самостоятельно производит действие (baked), т.е. является активным. Таким образом, можно сказать, что

предложение в целом употреблено в активном залоге. Другие примеры предложений в активном залоге: *Jeremy opened the present./ Джереми открыл подарок. Susan found her car keys./ Сьюзен нашла свои ключи от машины. James climbed the ladder./ Джеймс поднялся по лестнице. Kate has knitted this sweater herself./ Кейт сама связала этот свитер.*

5.2. Пассивный залог (passive voice)

Форма залога показывает, является ли подлежащее в предложении (лицо или предмет) производителем или объектом действия, выраженного сказуемым. Пассивный залог (passive voice) показывает, что лицо или предмет, выраженное подлежащим, испытывает действие на себе: *The big cake was baked by Sam./ Большой пирог был испечен Сэмом.* Пассивный залог употребляется, когда исполнитель действия очевиден или несуществен, или когда действие или его результат более интересны, чем исполнитель. Для того, чтобы получить форму глагола в пассивном залоге, необходим вспомогательный глагол *to be* в соответствующем времени, лице и числе и причастие прошедшего времени (Participle II) значимого глагола: *This building will be demolished next month./ Это здание будет снесено в следующем месяце. My dog has been stolen./ Мою собаку украли.* В отрицательных предложениях частица not ставится после вспомогательного глагола, а если их несколько, то после первого из них: *He has not been seen anywhere./ Его нигде не видели.* В вопросительных предложениях вспомогательный глагол (или первый из них) выносится на место перед подлежащим: *Was your wallet stolen?/ Ваш бумажник был украден?* Значение и употребление времен глагола в пассивном залоге такое же, как и времен глагола в активном залоге. В английском языке в пассивном залоге употребляются переходные глаголы, а также некоторые непереходные глаголы. Примеры предложений с переходными глаголами в пассивном залоге: *By the middle of the nineteenth century about sixty different elements had been discovered./ К середине XIX столетия было обнаружено около 60 различных элементов. The delegates will be met at the station./ Делегатов встретят на вокзале. While a current is flowing through a wire, the latter is being heated./ Когда ток проходит по проволоке, последняя нагревается.* Как видно из приведенных примеров, глагол в пассивном залоге в английском языке можно переводить на русский язык несколькими способами:

- Глаголом, оканчивающимся на -ся, -сь.
- Сочетанием глагола быть с краткой формой причастия пассивного залога (в русском языке в этом сочетании глагол быть в настоящем времени не употребляется).

- Глаголом в активном залоге в 3-м лице множественного числа в составе неопределенно-личного предложения.

Дополнение в предложении с глаголом-сказуемым в пассивном залоге употребляется с предлогом by или with. Это дополнение соответствует русскому дополнению в творительном падеже без предлога.

- Дополнение с предлогом by выражает действующее лицо или действующую силу: *The fish was caught by the seagull. / Рыба была поймана чайкой.*
- Дополнение с предлогом with выражает орудие действия: *Shafts are turned with cutters./ Валы обтачиваются резцами.*

6. CONDITIONAL

6.1. Условные придаточные предложения

Условные предложения могут выражать реальные, маловероятные (условные предложения I типа) и нереальные условия (условные предложения II типа).

Условные предложения I типа. Условие, содержащееся в условном придаточном предложении, рассматривается говорящим как реально предполагаемый факт, относящийся к настоящему, прошедшему или будущему временам. Сказуемые главного и придаточного предложений выражаются глаголами в формах изъявительного наклонения. *If the weather is nice, we go for a walk. / Если погода хорошая, мы ходим на прогулку. If the weather was nice, we went for a walk. / Если погода была хорошая, мы ходили на прогулку. If the weather is nice, we'll go for a walk. / Если погода будет хорошая, мы пойдём на прогулку.*

Условные предложения II типа Условие, содержащееся в условном придаточном предложении, рассматривается говорящим как маловероятное. Для выражения малой вероятности осуществления действия в настоящем или будущем временах сказуемое главного предложения употребляется в форме сослагательного наклонения should / would + Indefinite Infinitive без to, а сказуемое придаточного предложения - в форме сослагательного наклонения, аналогичной Past Indefinite или were для всех лиц от глагола *to be. If he were free, he would do it. / Если бы он был свободен, он бы это сделал. If we paid more attention to grammar, we should know the language better. / Если бы мы уделяли грамматике больше внимания, мы бы знали язык лучше.*

Условные предложения III типа Условие, содержащееся в условном придаточном предложении, рассматривается говорящим как неосуществимое, так как относится к прошлому времени. Сказуемое главного предложения употребляется в форме сослагательного наклонения

should / would + Perfect Infinitive, а сказуемое придаточного предложения в форме сослагательного наклонения, аналогичной Past Perfect. *I should not have been late yesterday, if my watch had been right. / Я бы не опоздал вчера, если бы мои часы шли правильно*.

Союзы условных придаточных предложений: *if - если; in case - в случае, если; suppose (that) - предположим, что; on condition (that) - при условии, что; provided (that) - при условии, что; unless - если … не; but for - если бы не.*

TESTS

ТЕСТ № 1 SIMPLE TENSES

The Present Simple Tense/ Глагол. Настоящее простое время

Выберите правильный вариант ответа Choose the correct variant:

1. My mother ____ a bad headache.

a. have got
b. am
c. has got

2. Where _____ the Johnsons (live)?

a. do
b. are
c. does

3. Margie and her sister ____ wonderful voices.

a. does
b. has got
c. have got

4. I (not/understand) ____ that man because I (not/know)____ English.

a. not understand, don't know
b. don't understand, not know
c. don't understand, don't know

5. ____ you ____ any time to help me? – Sorry, I ____

a. Do you have, don't
b. Have you got, am not
c. Do you have, have got

6. Everybody in our family (help) _____ Mummy about the house. Dad (walk) ____ the dog, I (water) ____ the flowers, and my brothers (clean) ____ the rooms.

a. help, walks, water, clean
b. helps, walks, water, clean
c. help, walks, water, cleans

7. ____ Jane Smith (speak) ____ English?

a. Is ... speak
b. Does ... speak

c. Do ... speak

8. The Browns ____ a nice house in the country.
a. has got
b. have got

9. ____ you (like) swimming?
a. Do you like
b. Does you like
c. Are you like

10.____ Dad ____ any brothers or sisters?
a. Have Dad got
b. Does Dad have
c. Does Dad has

11.____ your sister often (go) to the theatre?
a. Is ... go
b. Does ... go
c. Do ... go

12.We ____ a car, but we are going to buy it.
a. don't have
b. aren't have
c. hasn't

13.____ Bob (know) what I want?
a. Bob knows
b. Do Bob knows
c. Does Bob know

14.They can't go out because they ____ rain – coats and umbrellas.
a. have got
b. aren't have
c. don't have

15.Jack lives not far from us, but we (not/see) ____ him often.
a. not see
b. doesn't see

c. don’t see

16. Don’t give him cigarettes. He (not/smoke) ____.
a. isn’t smoke
b. doesn’t smoke
c. don’t smoke

17. Can you help me? I (not/know)____ the way to the market.
a. am not know
b. not know
c. don’t know

18. ____ Peter ____ any beer in the fridge?
a. Does Peter have
b. Do Peter has
c. Have Peter got

19. My daughter Mary (not/like)____ apples, but she likes oranges.
a. not likes
b. doesn’t likes
c. doesn’t like

20. What’s the matter? You (look) _____ very happy.
a. look
b. looks

Тест №2 SIMPLE TENSES

Прошедшее простое время/ The Past Indefinite (Simple) Tense

Выберите правильный вариант ответа. Choose the correct variant:

1. There isn’t a cloud in the sky, but it (be) cloudy in the morning.
a. is
b. was
c. were

2. Mrs. Clay usually finishes her work at half past three, but she (finish) it later yesterday afternoon.
a. finish
b. finishes
c. finished

3. Every day I help my Mom about the house, but last week I was very busy with my exam. So I (not/help) her much.

a. not helped
b. didn't helped
c. didn't help

4. Tom isn't playing tennis tomorrow afternoon, he (not/play) tennis yesterday.

a. doesn't play
b. didn't play
c. didn't played

5. We generally have lunch at 12.30, but yesterday we (have lunch) later.

a. had lunch
b. have lunched
c. had had lunch

6. Now my brother smokes a lot, but he (not/ smoke) before.

a. hadn't smoked
b. didn't smoke
c. not smoked

7. The Frasers live in four-room apartment, but last year they (live) in a small house in the country.

a. were living
b. did live
c. lived

8. I (get) to the market myself last time, but now I don't remember how to get there.

a. getted
b. goted
c. got

9. How you (cut) your finger?

a. How have you cut
b. How you cutted
c. How did you cut

10.Jack (try) to remember what he had done last April.
a. was tried
b. tried
c. tryed

11.Looking through the paper, the teacher (find) several mistakes.
a. finded
b. founded
c. found

12.He (meet) Mary and (fall) in love with her at first sight.
a. had met, falled
b. met, fell
c. meeted, fell

13.Helen (prefer) tea to coffee.
a. preferred
b. preffered
c. prefered

14.When you (write) to your parents last time?
a. When do you writed
b. When did you write
c. When did you wrote

15.Yesterday Mr. Watson (drink) too much at the party.
a. drunk
b. drinked
c. drank

16.Don't worry about your letter. I (send) it the day before yesterday.
a. sended
b. have sent
c. sent

17.When I was a child, I (always/be) late for school.
a. were always late
b. was always late
c. be always lated

18. My husband (work) in the bank for three years since 1990 to 1993.
a. was worked
b. had worked
c. worked

19. We (not/have) a holiday last year.
a. didn't have
b. haven't had
c. haven't had

20. When Jill (finish) school?
a. When did Jill finished
b. When was Jill finish
c. When did Jill finish

Тест №3 CONTINUOUS

Настоящее продолженное время/ The Present Continuous Tense

Выберите правильный вариант ответа. Choose the correct variant:

1. - Where are the children? It's quiet at home. - They (lie) on the carpet and (draw).
a. lie, are drawing
b. are lieing, drawing
c. are lying, drawing

2. - What you (do) now? - I (look for) my key. I can't open the door.
a. What do you do, I look for
b. What are you do, I looking for
c. What are you doing, I'm looking for
d. What you doing, I'm looking for

3. Listen! Somebody (sing) a lovely song.
a. sings
b. is singing
c. are singing

4. Why you (put on) the coat? It's sunny today.
a. are you putting on
b. do you put on
c. will you put on
d. are you puting on

5. Don’t make so much noise. I (try) to work.
a. tried
b. ’m triing
c. ’m trying

6. Why you (cry)? Is anything wrong?
a. do you cry
b. are you crying
c. have you crying

7. I (listen) to you attentively.
a. am listening
b. listen

8. What time Nick and Rosa (come) for dinner tonight?
a. is Nick and Rosa coming
b. Nick and Rosa are coming
c. do Nick and Rosa come
d. are Nick and Rosa coming

9. I’m sure you (make) the right choice.
a. will be made
b. are making
c. make

10. Take your umbrella. It (rain) cats and dogs.
a. rained
b. are raining
c. is raining

11. Why you (not/hurry)? I (wait) for you.
a. are you not hurry, am waiting
b. aren’t you hurrying, waiting
c. aren’t you hurrying, ’m waiting
d. don’t you hurry, am waiting

12. I don’t speak any foreign languages, but I (learn) English now.
a. am learning
b. learn

13. We (spend) next weekend at home.
a. spent
b. are spending

c. ’re spend

14.I (meet) Liz tonight. She (come) from Cork.
a. will meet, comes
b. am meeting, coming
c. am meeting, ’s coming

15.He (go) to speak to his parents.
a. went
b. is going
c. goes

16.At the moment we (fly) over the desert.
a. ’ve flying
b. flied
c. are flying

17.Have some hot tea. It (get) chilly.
a. getting
b. is geting
c. ’s getting

18.I (die) to see him.
a. am dying
b. ’ve died
c. am died
d. am diing

19.My Dad (work) overtime this week.
a. works
b. are working
c. is working

20.They (live) in a rented house these days.
a. were living
b. are living
c. live

Тест №4 PERFECT TENSES
The Past Simple Tense / The Past Perfect Tense
Выберите правильный вариант ответа. Choose the correct variant:

1. Poirot _____ her if Mrs. Ascher _____ any peculiar letters without a proper signature.

a. had asked, had received
b. asked, received
c. had asked, received
d. asked, had received

2. I thought that Mrs. Fowler _____ us everything.
a. told
b. had told
c. was told

3. But Poirot said that she _____ more than she _____ us.
a. knew
b. was knowing
c. had known

4. The letter _____ just before I _____ back.
a. came, arrived
b. had come, arrived
c. came, had arrived
d. had come, had arrived

5. Miss Higley said that Elizabeth _____ friendly in working hours, but the girls _____ much of her out of them.
a. was, didn’t see
b. had been, hadn’t seen
c. had been, didn’t see
d. was, hadn’t seen

6. She said that Betty _____ anything about her plans and she _____ her in the café that evening.
a. didn’t say, didn’t see
b. hadn’t said, didn’t see
c. didn’t say, hadn’t seen
d. hadn’t said, hadn’t seen

7. Hardly _____ she _____ these words when a beautiful young lady _____ in the room.
a. did ... say, appeared
b. had ... said, appeared
c. did ... say, had appeared
d. had ... said, had appeared

8. I _____ that once he _____ a well-known specialist in his field.
a. knew, had been

b. knew, was
c. had known, had been
d. had known, was

9. He _____ in the house he _____ for himself near the Devon coast.
a. lived, built
b. had lived, built
c. had lived, had built
d. lived, had built

10. Susan _____ her parents the news only after she and Mike _____ married.
a. had told, had got
b. had told, got
c. told, had got
d. told, got

11. The telephone on his table _____ and he _____ it up.
a. had rung, had picked
b. had rung, picked
c. rang, had picked
d. rang, picked

12. He _____ the bill and _____.
a. paid, left
b. had paid, left
c. had paid, had left
d. paid, had left

13. She _____ a stronger person now than she _____ a few months ago.
a. had been, was
b. was, had been

14. She _____ on her coat and _____ for a walk.
a. had put, went
b. put, went
c. put, had gone
d. had put, had gone

15. Hardly _____ raining when a rainbow _____ in the sky.
a. had it stopped, appeared
b. did it stop, appeared
c. had it stopped, had appeared
d. did it stop, had appeared

16.I was late because I _____ in a jam.
a. stick
b. had stick
c. had stuck

17.We went out after it _____ raining.
a. had been stopped
b. had stopped
c. stopped

18.I thanked him for what he _____ for me.
a. did
b. had done

19.The house he _____ was of a modern design.
a. was built
b. built
c. had built

20.My mother was worried because I _____ in touch with her for a long time.
a. haven't been
b. hadn't been
c. wasn't

Тест №5 Modal verbs / Модальные глаголы. Can и Could

Выберите правильный вариант Choose the correct variant

1. My wife _____ three languages.
a. cans speak
b. can speaks
c. can speak
d. cans speaks

2. I'm sorry, I _____ join you on Wednesday.
a. can`t
b. can`t to
c. don't can to
d. don't can

3. Can you _____ people's thoughts?
a. read
b. to read

4. Who _____ help me with my homework?
a. cans

b. can
c. cans to
d. can to

5. He _____ pass the exam.
a. didn’t can
b. couldn’t
c. couldn’t to

6. In my youth I _____ 5 miles without stopping.
a. could run
b. could to run
c. could ran

7. _____ lend me some money?
a. do you
b. can you
c. do you can

8. I _____ to go hiking with you.
a. shall be able
b. shall can

9. Wife _____ never forgive him.
a. couldn’t
b. could

10. Our child _____ read for now.
a. doesn’t can
b. cannots
c. can`t

11. Could Maugly _____ like people?
a. spoke
b. speak

12. Can you do this for me? – Yes, I _____.
a. can
b. do

13. Could he come in time? – No, he _____.
a. didn’t
b. couldn’t

14._____ cats swim?
a. do can
b. can

15.People _____ some things.
a. couldn’t forget
b. couldn’t forgot
c. couldn’t to forget

16.. Mary _____ English books without a dictionary.
a. can reads
b. cans read
c. can read

17.Where could I _____ my wallet?
a. put
b. putted

18.Weather in England _____ very quickly.
a. cans change
b. can to change
c. can changes
d. can change

19.We _____ to finish this work next week.
a. will can
b. will be able to

20.My parrot _____.
a. can’t speak
b. can’t to speak
c. can`ts speak

Тест № 6 Active/ Passive Voice. Действительный и страдательный залог
Выберите верный ответ

1. We ... by a loud noise during the night.
a. woke up
b. are woken up
c. were woken up
d. were waking up

2. A new supermarket is going to ... next year.
a. build
b. be built

c. be building
d. building

3. There's somebody walking behind us. I think ... .
a. we are following
b. we are being following
c. we are followed
d. we are being followed

4. 'Where ...?' 'In London'.
a. were you born
b. are you born
c. have you been born
d. did you born

5. There was a fight at the party, but nobody ... .
a. was hurt
b. were hurt
c. hurt

6. Jane ... to phone me last night, but she didn't.
a. supposed
b. is supposed
c. was supposed

7. Where ...? Which hairdresser did you go to?
a. did you cut your hair
b. have you cut your hair
c. did you have cut your hair
d. did you have your hair cut

8. ... during the storm.
a. They were collapsed the fence
b. The fence was collapsed
c. They collapsed the fence
d. The fence collapsed

9. The new computer system ... next month.
a. is being installed by people
b. is be installed
c. is being installed
d. is been installed

10. The children ... to the zoo.

a. were enjoyed taken
b. enjoyed being taken
c. were enjoyed taking
d. enjoyed taking

11.... chair the meeting.
a. John was decided to
b. There was decided that John should
c. It was decided that John should
d. John had been decided to

12.This car is not going ... in the race.
a. to drive
b. to be drive
c. to driven
d. to be driven

13.Will these clothes ... by Saturday?
a. make
b. made
c. be make
d. be made

14.The mice ... the cheese.
a. have eaten
b. have been eaten
c. has eaten
d. has been eaten

15.When a student I ... to the discos every Friday night.
a. used to go
b. are used to go
c. use to go
d. were used to go
16.Neither Jim nor Jack ... there.
a. was invited
b. was been invited
c. were invited
d. were been invited

17.Your food ... .
a. is still being prepared
b. has still been prepared
c. is being prepare

d. will prepare yet

18. Their engagement ... in the local paper.
a. was announced
b. has been announcing
c. is being announced
d. had announced

19. When ...?
a. has the letter posted
b. has the letter been posted
c. was the letter posted
d. did the letter post

20. After the volcanic eruption of 1957 the railway station ... .
a. destroyed completely
b. was completely destroyed
c. has been destroyed
d. has destroyed

Тест№7 Conditional Sentence Type I or II Conditional

Выберите правильный вариант

1. If you _____ the dishes, I _____ dinner tonight.
a. wash; will cook
b. washed; would cook

2. I am not hungry. I _____ something to eat if I were hungry.
a. will have
b. would have

3. If my dad _____ time next week, we _____ my room.
a. has; will paint
b. had; would paint

4. You _____ a lot about American history if you _____ the exhibition.
a. will learn; visit
b. would learn; visit

5. We _____ get there on time if we _____ the bus.
a. will not; do not catch
b. would not; did not catch

6. You _____. If you could drive, I _____ you my car.
a. can not drive; will lend
b. can not drive; would lend

7. If the weather is not too bad tomorrow, we _____ golf.
a. will play
b. would play

8. I have a lot to do today. If I didn't have to do so much, we _____.
a. can go out
b. could go out

9. If I _____ more time, I _____ to play the guitar.
a. have; will learn
b. had; would learn

10. If you _____ the car in the afternoon, I _____ shopping in the morning.
a. need; will go
b. needed; would go

11. If _____ a hat, I _____ like an old woman.
a. I wear; will look
b. I wore; would look

12. It _____ me if she _____ you.
a. surprise; does not help
b. would surprise; did not help

13. If we knew more about history, we _____ of the test.
a. will not be afraid
b. would not be afraid

14. I _____ jogging with Tom and Sue if they were here this week.
a. will go
b. would go

15. If I _____ you, I _____ what to do.
a. am; will not know
b. were; would not know

16. I _____ this bag if they have it in blue.
a. will buy

b. would buy

17. He _____ too fast. I _____ him better if he talked slower.
a. speaks; can understand
b. speaks; could understand

18. If she studied harder, she _____ better marks.
a. will get
b. would get

19. She _____ in cash if she had a credit card.
a. will not pay
b. would not pay

20. This letter is for Rose. – OK. _____ it to her.
a. I give
b. I will give

Appendix 1

ТАБЛИЦА ПРЕФИКСОВ ДЛЯ ОБРАЗОВАНИЯ ДОЛЬНЫХ И КРАТНЫХ ЕДИНИЦ

Английский язык			Русский язык		
Factor	Prefix	Symbol	Множитель	Префикс	Обозначение
10^{12}	tera	T	10^{12}	тера	Т
10^{9}	giga	G	10^{9}	гига	Г
10^{6}	mega	M	10^{6}	мега	М
10^{3}	kilo	k	10^{3}	кило	к
10^{2}	hecto	h	10^{2}	гекто	г
10^{1}	deca	da	10^{1}	дека	да
10^{-1}	deci	d	10^{-1}	деци	д
10^{-2}	centi	c	10^{-2}	санти	с
10^{-3}	milli	m	10^{-3}	милли	м
10^{-6}	micro	μ	10^{-6}	микро	мк
10^{-9}	nano	n	10^{-9}	нано	н
10^{-12}	pico	p	10^{-12}	пико	п
10^{-15}	femto	f	10^{-15}	фемто	ф
10^{-18}	atto	a	10^{-18}	атто	а

Appendix 2

МАТЕРИАЛ ДЛЯ ГРАМОТНОГО СОСТАВЛЕНИЯ СООБЩЕНИЯ О СЕБЕ И СВОЕЙ НАУЧНОЙ РАБОТЕ

1. Общая информация о себе	I come from Kazan, a city in the east part of the Republic of Tatarstan.	
	I'm a student At Kazan Power-Engineering University	
	I'm studying Physics and Math.	
	I can speak English quite well.	
	I'm enjoying my course a lot but it's very hard work.	Мне очень нравится мой курс но это очень тяжелая работа
	My course started five years ago and I'm in my fifth year.	
	After the course I'm going to work in Kazan but I don't know where yet.	
2. Общая информация о вузе	I'm at the Kazan power Engineering University	
	There are many faculties at our University	
	I'm at the faculty of…	
	I'm specializing in …	Я специализируюсь в области
	My faculty train specialists for power engineering branch of industry	Мой факультет занимается подготовкой специалистов в области энергетики
	I'm going to deal with … in my future research	Я собираюсь изучать … в моей будущей работе
	I'm going to start my research …	Я собираюсь начать мое исследование
	The dean of my faculty is	Декан моего факультета
	My University is a recognized center of training specialists in the field of power engineering	Мой университет является признанным центром по подготовке специалистов в области энергетики

3. Общая информация о теме научной работы:	I deal with an extremely interesting scientific problem such as…	Я имею дело с чрезвычайно интересной научной проблемой
	I put forward a highly vital idea such as…	Я выдвинул очень важную идею
	As a young scientist I advance a highly specific new hypothesis such as	Как ученый я предлагаю сугубо специальные новые гипотезы
	I consider highly vital new information	Я рассматриваю всю важную новую информацию
	I invent extremely sophisticated new device	Я изобрел чрезвычайно сложное новое устройство
	No scientist could suppose this estimation to be true but I believe that I …	Никакой ученый не может предположить степень верности своих оценок
3. Методы, используемые в работе	As a researcher I develop extremely complicated new methods	Как исследователь я разрабатываю чрезвычайно сложные новые методы
	The old methods of investigation are regarded as inadequate ones	Старые методы исследования не могут рассматриваться как адекватные
	The newly developed technique has certain advantages over the old ones.	Новые разработанные технические средства имеют определенные преимущества над старыми
	I'm going to obtain the information about …	Я намериваюсь получить информацию о
	I use ion-exchange chromatography techniques	Я использую технические средства основанные на ионном обмене
	We can't obtain true information by these means	Мы не можем добиться верной информации этими средствами

	We can’t gain knowledge about /…without serious researches.	Мы не можем получить знания о …без серьезных исследований
	We can prove the reliability of our data because we have use new methods of …	Мы можем доказать надежность наших данных потому что мы использовали новые методы
4. Содержание проводимой работы	I carry out simple and elegant experiments	Я провожу простые и изящные эксперименты
	I will verify the hypothesis which was put forward last year.	Я проверю гипотезу которая была выдвинута в прошлом году
	I hope to obtain the data on the energies released	Я надеясь получить данные об излучаемой энергии
	I’m going to support the theory which is put forward by our working team	Я собираюсь поддержать теорию которая была выдвинута нашей исследовательской командой
	We can’t view this problem in terms of this theory	Мы не можем рассматривать эту проблему с позиций этой теории
	We can’t obtain good agreement with such experiments we need new ones	Мы не можем получить подтверждения благодаря таким экспериментам - нам нужны новые
	We can’t develop a fruitful theory without reliable observations that’s why we examine new data	Мы не можем разрабатывать плодотворную теорию без надежных исследования вот почему мы изучаем новые данные

	It is no use undertaking this research without initiating preliminary studies of the observational data.	Нет необходимости предпринимать данное исследование без предварительного изучения данных, полученных опытным путем
	We regard the problem as the main one	Мы рассматриваем проблему как основную
	We analyze all the aspects of the problem	Мы изучаем все аспекты проблемы
	We consider the problem of … in all its complexity	Мы рассматриваем проблему во всей ее сложности
	It is necessary to suggest an alternative theory	Необходимо предложить новую теорию
	We will consider all the previous results	Мы рассматриваем предыдущие результаты
	There is a lot of information on the problem	Много информации имеется по этой проблеме
	I read the reviews in papers	Я прочитал обзоры статей
5. Цель проводимой научной работы	We will explain the mechanism of this process	Мы объясним механизм функционирования этого процесса
	We will treat all the side effects of …	Мы рассмотрим все побочные эффекты
	We will apply this theory to other systems	Мы применим эту теорию к другим системам
	We will demonstrate the validity of your findings	Мы покажем жизнеспособность наших открытий
	We will provide the evidence in the favour of this concept	Мы представим доказательства в пользу концепции
6. О ценности и	It is worth stimulating this work	Стоит стимулировать эту работу

значимости проводимой научной работы	One can’t help recognizing the importance of this study	Никто не может отказаться от признания важность этого исследования
7. О проделанной части работы	My having failed in understanding the core of the problem at the beginning was evident	Очевидно было, что мне не удалось понять суть этой проблемы в начале
	My having presented the problem in every detail helped me to grasp the idea	Мне помогало справиться с этой проблемой то, что я представил ее до малейших деталей
	My being able to cope with the problem seemed unrealistic at the beginning of my work	В начале моей работы мне казалось невероятным, что я смогу справиться с этой проблемой
	My having found the key to the solution of the problem seemed improbable	Казалось невероятным, что я найду ключ к решению этой проблемы
	My having succeeded in solving this problem was quite unexpected for our working team	Было неожиданно для нашей рабочей команды что я смогу найти решения к этой проблеме
	I will manage to complete my work in time	Мне удастся завершить работу вовремя
	I succeeded in formulating the concept	Мне удалось сформулировать концепцию
	The theory in question explain the gain in energy	Рассматриваемая теория объясняет выигрыш в энергии
7. Роль научного руководителя	My scientific adviser insists on developing a more constructive and fruitful theory	Мой научный руководитель настаивает на разработке более конструктивной и плодотворной теории

	My scientific adviser insists on investigating this problem	Мой научный руководитель настаивает на исследовании этой проблемы
	My scientific adviser insists on conducting a new series of experiments	Мой научный руководитель настаивает на проведении новой серии экспериментов
	My scientific adviser insists on applying this theory to other systems	Мой научный руководитель настаивает на применении этой теории к другим системам
	There are many outstanding scientists at my University and I'd like to name among them my scientific adviser …	Есть много выдающихся ученых в моем университете и я хотел бы назвать среди них моего научного руководителя
	We plan some new experiments and studies are being undertaking	Мы планируем новые эксперименты
	My scientific adviser presented convincing arguments in favour of his approach and we have common views on this problem	Мой научный руководитель представил убедительные аргументы в пользу своего подхода к данной проблеме
	My scientific adviser suggested some alternative interpretation of the phenomenon and we can develop some new approach.	Мой научный руководитель предложил альтернативное толкование этого феномена и мы можем разработать новый подход
8. Личный интерес к теме	The problem deals with my field of interest	Проблема относится к сфере моих интересов
	The subject is of great interest to my personality	Тема представляет большой интерес для меня

	I read much on this problem that's why I want to do research in the field of	Я много читал по этой проблеме и поэтому я хочу провести исследование в области
	I'd like to know as well if there is any discrepancies between the experimental results and the predictions of the theory	Я хотел бы узнать если какие-либо расхождения между экспериментально полученными результатами и теоретическими прогнозами
	It is of interest to see if there is any achievements in this field	Интересно увидеть есть какие-либо достижения в области
	I'm interested in my work	Я заинтересован в моей работе
	I will speak at the conferences and my results will be published in papers.	Я буду выступать на конференциях и результаты моей работы будут опубликованы в статьях

Appendix 3

Материал для грамотного реферирования

Аннотация специальной статьи или книги – это краткая характеристика оригинала, излагающая его содержание в виде перечня основных вопросов и иногда дающая критическую оценку. Объем 500 знаков.

Реферирование предполагает составление реферата.

Реферат – это конспективное изложение содержания статьи или книги, передающее ее основной смысл. Реферат содержит в обощенном виде все основные положения оригинала. Средний объем 2000 знаков.

Реферат составляется по схеме:

1. Автор, название работы (на иностранном языке), перевод названия.
2. Выходные данные
3. Краткое содержание работы.
4. Выводы или резюме составителя реферата.

Таблица № 1. Полезные выражения

Вводная часть	The text under consideration is entitled To start with The fact is The thing is that	Предлагаемый текст называется Чтобы начать Факт заключается в том, что Главный смысл в том, что
Начальная часть	The text begins with The text starts with The text opens with	Текст начинается Текст начинается Текст начинается
Основное содержание	The article deals with + сущ. Is is specially noted that + предложение. The text gives a valuable information about + сущ. It draws our attention to the fact that + предложение The text is devoted to The text is connected with The text studies The text describes The author touches upon	В статье говориться о Особо отмечается, что В тексте представлена ценная информация о Наше внимание привлечено к тому факту, что Текст посвящен Текст связан с В тексте изучается В тексте описывается Автор затрагивает Автор рассматривает Автор предполагает Автор вводит понятия …и

	The author considers The author supposes The author introduces the notions of…and defines them	определяет их.
Заключительная часть	The text is concluded by	Текст заканчивается…
Выражение несогласия /согласия позицией автора	I don't think I don't suppose I'm sure that It's likely, not very likely, unlikely, possible I totally disagree I have a firm believe that + предложение There is no reason to deny I'm in complete agreement	Я не думаю Я не полагаю Я уверен, что Вероятно, невозможно, возможно Я полностью не согласен У меня есть твердая уверенность, что Нет причин отрицать, что Я полностью согласен
Выражение своей позиции	In my opinion To my mind I think As far as I know I believe	По моему мнению Согласно моей точке зрения Я думаю Насколько я знаю Я полагаю
Наводящие вопросы	What do you think? What is your opinion? Do you think that…? Do you agree that…? Is it really so…?	Что Вы думаете? Каково ваше мнение? Думаете ли Вы, что? Согласны ли Вы, что? Верно ли это?

Таблица № 2. Полезные выражения

1. The title of the article.Название	Статья под заголовком Заголовок статьи, которую я прочитал это ... Как следует из названия В статье описывается	The article is headlined… The headline of the article I have read is… As the title implies the article describes
2. The author of the article, where and when the article was published. Выходные данные	Автор статьи ... Имя автора ... К сожалению имя автора не упоминается ... Статья написана Она была опубликована в ... (в Интернете). Это газета (научной) статья (опубликован 10 марта 2012/2010).	The author of the article is… The author's name is ... Unfortunately the author's name is not mentioned ... The article is written by… It was published in … (on the Internet). It is a newspaper (scientific) article (published on March 10, 2012 / in 2010).
3. The main idea of the article. Главная идея	Основная идея статьи заключается в ... Статья о ... Статья посвящена ... Статья затрагивает вопрос о Целью данной статьи является дать читателю некоторую информацию о .Цель статьи заключается в предоставлении читателю некоторые материалы	The main idea of the article is… The article is about… The article is devoted to… The article deals (is concerned) with… The article touches upon the issue of… The purpose of the article is to give the reader some information on… The aim of the article is to provide the reader with some material on…
4. The contents of the article. Some facts, names, figures. Содержание	...Автор начинает, говоря (читателя), что ...Автор (статьи) пишет (отчитывается, отмечает, подчеркивает, считает, замечает, считает, считает, анализ, указывает, говорит, описывает), что ... /	The author starts by telling (the reader) that… The author (of the article) writes (reports, states, stresses, thinks, notes, considers, believes, analyses, points out, says, describes) that… / draws reader's attention to...

	обращает внимание читателя на .. .Большое внимание уделяется ... Согласно статье ... Статья продолжает утверждать, что ... Она сообщает, (показывает подчеркивает), что ... В ней подробно говорилось о ... Из чего автор говорит, что это становится ясно, что ... Дело в том, что ...подчеркивается. В статье дается подробный анализ ... В заключение автор пишет, что ... / обращает внимание читателя на . Автор приходит к выводу, что ... Сделаны следующие выводы	Much attention is given to… According to the article… The article goes on to say that… It is reported (shown, stressed) that … It is spoken in detail about… From what the author says it becomes clear that… The fact that … is stressed. The article gives a detailed analysis of… In conclusion the author writes that… / draws reader's attention to... The author comes to the conclusion that… The following conclusions are drawn: …
5. Your opinion. мнение	Я нашел статью (а) интересной (важной, полезной), а /, потому что ...Я думаю, / На мой взгляд статья (а) интересная (важная, полезная), а /, потому что ... Я нашел статью слишком трудной для понимания/ довольно скучной, как /, потому что	I found the article (rather) interesting (important, useful) as / because… I think / In my opinion the article is (rather) interesting (important, useful) as / because… I found the article too hard to understand / rather boring as / because