Белорусский национальный технический университет

Иностранный язык (английский)

для специальности I ступени получения высшего образования 1-70 07 01 Строительство тепловых и атомных электростанций

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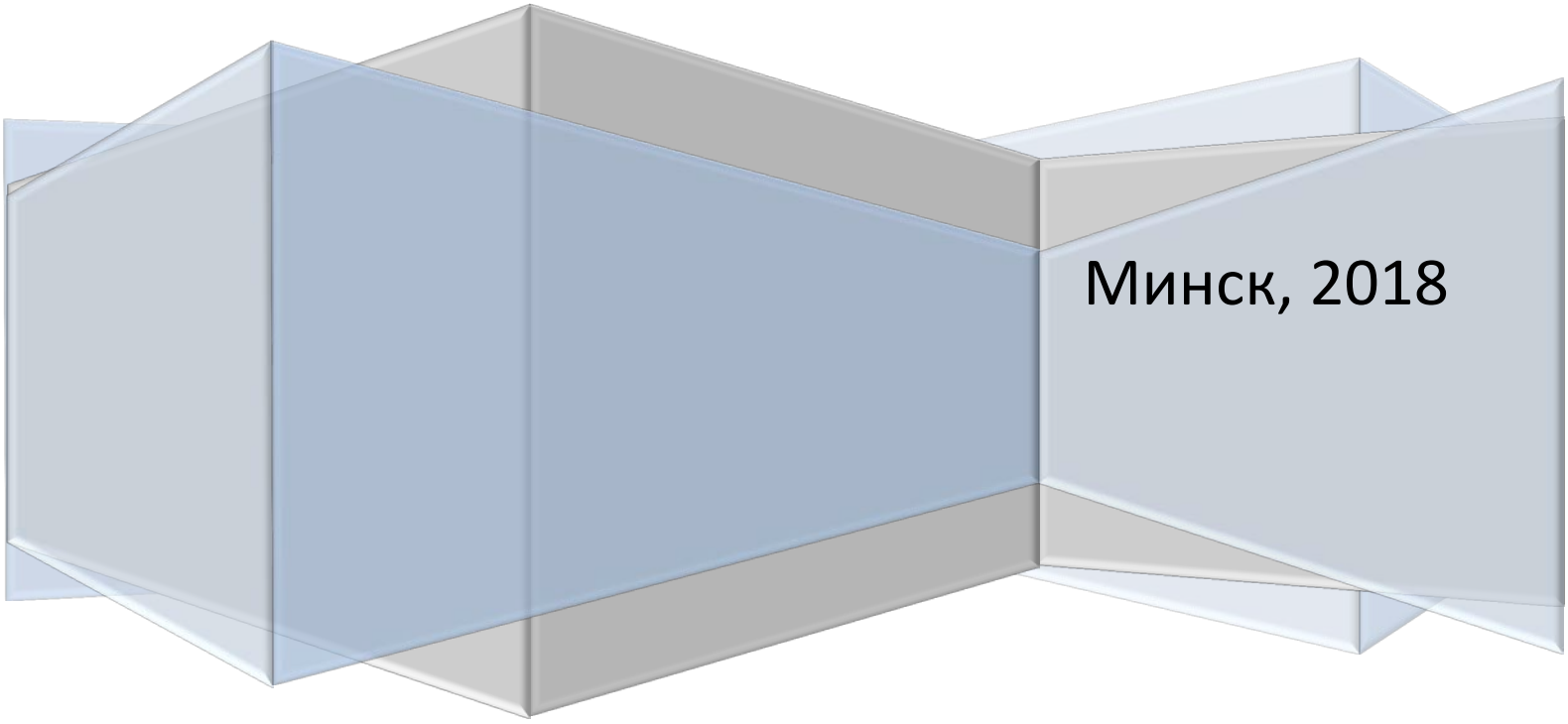

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ПОЯСНИТЕЛЬНАЯ ЗАПИСКА

Данный электронный учебно-методического комплекс (ЭУМК) предназначен для реализации образовательной программы по учебной дисциплине «Иностранный язык (английский)» для специальности 1-70 07 01 «Строительство тепловых и атомных электростанций» на I ступени обучения.

Целью ЭУМК является формирование иноязычной коммуникативной компетенции будущего специалиста, позволяющей использовать иностранный язык как средство профессионального и межличностного общения в области строительства тепловых и атомных электростанций. В процессе достижения главной цели решаются следующие задачи:

познавательные (знакомство с основными аспектами технической специальности посредством иностранного языка);

развивающие (совершенствование коммуникативных умений, формирование потребности к самостоятельной познавательной деятельности, систематизация знаний и умений);

воспитательные (осознание важности будущей специальности, формирование ценностного отношения к энергетическим ресурсам и необходимости их бережного использования, глубинное понимание принципов устойчивого развития);

практические, (овладение иноязычным общением в единстве всех его компетенций, функций и форм, что осуществляется посредством взаимосвязанного обучения всем видам речевой деятельности в рамках определенного программой предметно-тематического содержания, а также овладения технологиями языкового самообразования).

Оформление и использование ЭУМК по учебной дисциплине осуществляется в соответствии с требованиями СТП СМК БНТУ 6.3–02–2014.

Особенностью структурирования и подачи учебного материала является сама структура комплекса, которая позволяет эффективно реализовывать процесс обучения при проведении практических занятий, а также ориентирует обучающегося на использование иностранного языка в качестве инструмента профессиональной деятельности: для перевода и реферирования

профессионально-ориентированных и научных текстов, выступления с публичной речью, составления деловой документации.

Рекомендации по организации работы с ЭУМК. Данный электронно-методический комплекс предназначен как для аудиторных занятий, так и для самостоятельной работы студентов, обучающихся по специальности 1-70 07 01 «Строительство тепловых и атомных электростанций».

ПЕРЕЧЕНЬ МАТЕРИАЛОВ

Структура ЭУМК включает следующие разделы: теоретический, практический, контроля знаний и вспомогательный.

Теоретический раздел ЭУМК включает в себя учебно-методическое пособие «Практическая грамматика английского языка» Колосовой Т.В., Крюковой Л.А., которое позволяет студентам технического вуза повторить грамматические явления языка и рассмотреть их на примерах из технической литературы, что повышает мотивацию изучения иностранного языка для специальных целей. Чёткая структура предлагаемого пособия помогает студентам систематизировать знания и, в случае необходимости, воспользоваться им на разных этапах обучения при самостоятельной работе.

Практический раздел ЭУМК включает в себя дидактический материал, представляющий собой разработки с дополнительными заданиями как для работы на практических занятиях при непосредственном контроле преподавателя, так и для самостоятельной работы студентов. Разнообразный характер упражнений позволяет варьировать лексическую и грамматическую наполняемость занятия в соответствии с практическими задачами, а также дает возможность выбора для соответствия определенному уровню владения иностранным языком. Предполагается, что данные наработки лягут в основу учебного пособия по дисциплине для специальности. Кроме того, дополнительно используются такие учебники и учебные пособия, как: «The Harnessed Atom Nuclear energy and Electricity: Student’s Book», «The Harnessed Atom: Nuclear energy and Electricity: Teacher’s Book», «Nuclear English. Language Skills for a Globalizing Industry» (Серж Горлин), «Английския язык для энергетиков» (Е.В. Трухан, О.Н. Кобяк), «Nuclear Power Engineering» (Л.И. Спиридонова, Ю.С. Перевезенцева, О.С. Зорина), «English for Civil Engineering = Английский язык для строительных специальностей» (Т.П. Фомичёва, Т.В. Кайко), «Учебная деятельность студента в техническом вузе» (Е.Г. Богданович, О.Н. Барлюгова, Т.В. Колосова), а также словари: «English-Russian Dictionary for Nuclear Engineering = Англо-русский словарь с дефинициями к учебнику Сержа Горлина Nuclear English» (сост. С.В. Андрианова, А.А. Макарова) и электронный словарь «Термины атомной энергетики».

В **разделе контроля знаний** ЭУМК представлены образцы лексико-грамматических тестов тематического и итогового контроля, а также предметно-тематическое содержание зачёта и экзамена.

Во **вспомогательный раздел** включены учебная программа БНТУ по дисциплине «Иностранный язык (английский)», включающую учебно-методическую карту дисциплины, а также список рекомендуемой литературы.

ТЕОРЕТИЧЕСКИЙ РАЗДЕЛ

Теоретический раздел включает необходимый для изучения грамматический материал, который представлен в учебно-методическом пособии:

Колосова, Т. В. Практическая грамматика английского языка: учебно-методическое пособие для строительных специальностей БНТУ / Т.В. Колосова, Л.А. Крюкова. – Минск: БНТУ, 2005. – 107 с.
http://rep.bntu.by/handle/data/30611.

ПРАКТИЧЕСКИЙ РАЗДЕЛ

Практический раздел включает методические разработки и упражнения по разделам грамматики, практики устной и письменной речи и технического перевода.

РАБОЧИЕ МАТЕРИАЛЫ

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SECTION 1. CIVIL ENGINEERING: INTRODUCTION TO THE PROFESSION

Engineering is a fantastic base for any career.
Chris Liddell

UNIT 1. WHAT IS ENGINEERING

PRONUNCIATION PRACTICE

1. Read the following words paying attention to the pronunciation of the letter ‘g’. Mind the rule:

G before *e, i, y* is pronounced as [dʒ]

A. Engineering, energy, change, generate, garbage, geology, metallurgy, German, gentle, aging, algebra, origin, storage, college.
B. 1) Gregory got a regular grant. 2) Genetic engineering generates new agricultural crops and grains. 3) Graduate engineers need to be great in geometry and algebra. 4) George Stephenson* was a genius engineer. 5) One of the greatest challenges

today is to generate cleaner energy technology. 6) To take advantage of the career in engineering you'll need a deep knowledge of science and technology. 7) German language isn't as geographically spread as English. 8) The Three Gorges Dam in China is the largest power generating facility at present. 9) The introduction of energy safety programme is a clear message to future generations. 10) There is little danger to get a great amount of radiation while X-raying which is used for effective diagnosing and surgery.
*[ˈsti:vən.sən]

2. Group the words according to the pronunciation of the following sounds and read them aloud.

[ʃ]	[tʃ]	[ʤ]

Culture, station, nature, project, education, major, match, production, comprehension, intention, bridge, application, logical, construction, manufacture, object, job, profession, structure, journalist, capture, generator, future, just, invention, engine, radiation, temperature.

3. Practice pronunciation of the following sentence structures. Mind the intonation of tag questions.

The speaker is sure of the answer

He is an engˋineer,ˏisn't he?
She is an underˋgraduate,ˏisn't she?
Your ˈmajor isˋ physics,ˏ isn't it?
You have aˈbachelor's deˈgree in engˋineering,ˏ don't you?
You ˈwork in a làboratory,ˏ don't you?
Your ˈson finished ˈschool in 2ˋ017,ˏ didn't he?

The speaker is not sure of the answer

His ˈmajor is ˋphysics,ˋ isn't it?
Her ˈproject was sucˋcessful,ˋ wasn't it?
His ˈfather is anˋ architect,ˋ isn't he?
He has aˈmaster's deˈgree inˋ physics,ˋ doesn't he?
She ˈstudies at the uniˋversity,ˋ doesn't he?
Steve ˈHawking ˈgraduated fromˋ Oxford,ˋ didn't he?

GRAMMAR PRACTICE

4. The verb *'to be'* has irregular forms in the Present and Past Simple. Put the correct form of the verb *'to be'* in the following sentences.

1) We … students of the Power Plant Construction and Engineering Services Faculty.
2) I … good at mathematics, physics and chemistry at school.
3) Engineering … a science that deals with design, construction and operation of structures, machines, engines and other devices.
4) A civil engineer … someone who designs and supervises large construction projects, including roads, buildings, airports, tunnels, bridges, power stations and systems for water supply.

5) If you … a power plant engineer, you … responsible for construction, operation and maintenance of power plants.
6) The Belarusian National Technical University … a leading university in the field of higher engineering education in the Republic of Belarus.
7) The Belarusian National Technical University … founded in 1920 on the basis of the polytechnic college.
8) The applicants …. happy to enter this University.
9) There … several laboratories at the faculty.
10) Did you participate in mathematical Olympiads, when you … at school?

5. Identify the predicate of the sentence and underline it. NOTE that it is in the Present Simple tense form.

School teaches you. *From school you know what you want to be,* what you can be, who you are, where you are and all sorts of things like that. *School prepares you for life in certain ways*. In other ways it doesn't. The main problem with it is that *it provides an atmosphere unlike life* – a very closed-in, very protective atmosphere – whereas life is nothing like really. *I like school and I like it for a number of reasons*. Mostly because *I like to learn, and I use everything that I learn in my everyday life*. That's right, I have got a very unusual everyday life!

6. Make each *italicized* sentence of Exercise 1 negative. Use the auxiliary verbs of the Present Simple tense.

	DO+NOT (DON'T) +V 1 *I read→ I don't read*
3rd person singular (*he, she, it*)	**DOES+NOT (DOESN'T) +V1** *He reads→ He doesn't read*

7. Your school time is over. Now you are at University. Rewrite the text from Exercise 1 to describe your school past as in the model. Use the Past Simple tense form. Use negative forms if necessary.

MODEL: *School taught me…*

Positive form	**V1+*ed* – regular verb:** *work − worked* **V2 – irregular verb:** *teach – taught*
Negative form	**DID+NOT (DIDN'T) +V1** *I learnt→ I didn't learn*

8. Open the brackets and put the verb in the Present or Past Simple tense form.

1) Engineers (to change) the way our world (to work) in many different ways.
2) Alfred Hitchcock (to have) a degree in engineering.
3) Leonardo Da Vinci (to be) an engineering revolutionary in his time.
4) Electricity (to become) a subject of scientific interest in the late 17th century.
5) The greatest discovery with respect to power engineering (to come) from Michael Faraday who in 1831 (to discover) electromagnetic induction.
6) Effective management of electricity supply (to rely) mostly on local and regional engineering solutions.
7) In 2003 only 28 per cent of engineering students (to be) women. Now there (to be) a significant change of 36 per cent.

9. Ask tag questions to the sentences from Exercise 8. Mind the "Battery rule" for tags.

BATTERY RULE

Statement positive – Tag negative	
+	-

Statement negative – Tag positive	
-	+

MODEL**:**
This student ***lives*** on the University campus, ***doesn't*** he?
⇩ ⇩ ⇩ ⇩
Subject Predicate Auxiliar Personal pronoun that substitutes the

Students ***don't*** have much time for relaxation, ***do*** they?
⇩ ⇩ ⇩ ⇩
Subject Predicate Auxiliar Personal pronoun that substitutes the

Special case*:* the verb 'to be': He ***is*** a student, ***isn't*** he?

READING PRACTICE

Vocabulary for Study

consistent [kənˈsɪst(ə)nt] совместимый, сообразный, согласующийся
construction [kənˈstrʌkʃ(ə)n] строительство, конструкция, сооружение, здание, строение, постройка
engine [ˈendʒɪn] механизм, машина; механическое устройство; двигатель, мотор
engineering [ˌendʒɪˈnɪərɪŋ] техника; технология; разработка; конструирование; машиностроение; строительство; проектирование

biomechanical and medical engineering биомеханическая и медицинская инженерия (применение инженерных принципов в биологии и медицине)

chemical engineering химическая инженерия, химические технологии
civil engineering гражданское строительство; строительное искусство; строительная техника
computer engineering разработка электронно-вычислительной техники (ЭВМ); вычислительная техника
electrical engineering электротехника
environmental [ɪnˌvaɪ(ə)rənˈment(ə)l] **engineering** охрана окружающей среды, энвироника; техника моделирования эксплуатационных условий
genetic [dʒɪˈnetɪk] **engineering** генная инженерия
mechanical engineering машиностроение
military engineering военно-инженерное дело
mining [maɪnɪŋ] **and metallurgy** [mɪˈtælədʒi] **engineering** горное дело (техника) и металлургия
nuclear [ˈnju:klɪə] **engineering** разработка ядерной техники; ядерная техника

fixed structures стационарные сооружения (помещения, доменные печи и пр.)
immemorial [ˌɪmɪˊmɔ:rɪəl] незапамятный; древний
machine [məˈʃi:n] машина, установка, агрегат, механизм
maintenance [ˈmeɪntənəns] ремонт, уход, техническое обслуживание; содержание в исправности; эксплуатация
object предмет (физический), вещь
scientific [ˌsaɪənˊtɪfɪk] научный
to aim (at) целиться, направлять
to apply (to) сосредоточить (силы); приложить, направить (энергию и т. п.); посвятить (себя)
to build (built, built) строить, сооружать
to construct [kənˈstrʌkt] строить, сооружать; возводить; конструировать; создавать, сочинять, придумывать
to deal (with) [di:l] **(dealt (with), dealt (with)** [delt]**)** иметь дело (с), вести дело (с), работать
to develop развивать, совершенствовать; разрабатывать; обнаруживать, вскрывать (факты)
to encompass [ɪnˈkʌmpəs] охватывать, включать
to exploit [ɪksˈplɔɪt] эксплуатировать, разрабатывать, использовать в своих интересах
to make (made, made) делать, производить, создавать
to make an invention изобретать, делать изобретение
to exploit an invention использовать изобретение
to manufacture [ˌmænjuˈfæktʃə] производить, делать
to mean [mi:n] ***(meant, meant*** [ment]***)***, *v* подразумевать, иметь ввиду; значить, иметь значение
to power [ˈpauə] снабжать (питать) (электро)энергией, приводить в действие (движение)
to refer (to) [rɪˈfə:] отсылать (к), наводить справки, обращаться (за, к)

to relate (to) [rɪˈleɪt] относиться (к), иметь отношение (к)
tool [tu:l] инструмент, орудие труда, приспособление; средство

10. Read the international words and guess their meaning. Mind the stress.

basic [ˈbeɪsɪk]
biomechanical [ˌbaɪəʊmɪˈkænɪkəl]
civilization [ˌsɪvɪlaɪˈzeɪʃən]
chemical [ˈkemɪkəl]
communication [kəˌmju:nɪˈkeɪʃən]
construct [kənˈstrʌkt]
design [dɪˈzaɪn]
electrical [ɪˈlektrɪkəl]
energy [ˈenədʒɪ]
engineer [ˌendʒɪˈnɪə]
engineering [ˌendʒɪˈnɪərɪŋ]
fortification [ˌfɔ:tɪfɪˈkeɪʃən]
literally [ˈlɪt(ə)r(ə)lɪ]
machine [məˈʃi:n]
mechanical [mɪˈkænɪk(ə)l]
metallurgy [mɪˈtælədʒi]
military [ˈmɪlɪt(ə)rɪ]
modern [ˈmɔdən]
object [ˈɔbdʒɪkt]
operate [ˈɔpəreɪt]
principle [ˈprɪnsəpl]
problem [ˈprɔbləm]
process [ˈproʊsəs]
product [ˈprɔdʌkt]
structure [ˈstrʌktʃə]
talent ['tælənt]
technological [ˌteknəˈlɔdʒɪk(ə)l]

11. Read the proper names.

English [[ˈɪŋglɪʃ], the English language [ðiː ˈɪŋglɪʃ `læŋgwɪdʒ]
Latin [ˈlætɪn], the Latin language [ðə ˈlætɪn `læŋgwɪdʒ]

12. Read the words and underline the [e] sounds and circle the [k] sounds.

Manufacture, encompass, meant, construct, construction, structure, dealt, genetic, fortifications, object, civil, scientific, mechanical, chemical, computer, electrical, consistent, engine, engineering, biomechanical, medical, communications, develop.

13. Match the English and Russian equivalents.

1) machine	a) эксплуатировать
2) object	b) инструмент, орудие труда
3) to exploit	c) строительство, конструкция, сооружение, здание, строение, постройка
4) tool	d) предмет (физический), вещь
5) construction	e) ремонт, техническое обслуживание
6) to mean	f) подразумевать, иметь ввиду; значить, иметь значение
7) consistent	g) машина, установка, агрегат, механизм
8) engine	h) совместимый, сообразный, согласующийся
9) to encompass	i) научный
10) fixed structures	j) снабжать (электро)энергией, приводить в действие (движение)
11) to power	k) механизм, машина; механическое устройство; двигатель, мотор
12) maintenance	l) стационарные сооружения
13) scientific	m) охватывать, включать

14) to deal (with)	n) иметь дело (с), вести дело (с), работать

14. Answer the following question and read the text below to check your answer.

What is engineering?

Engineering

The English word *engineering* is of Latin origin: it originates from the word *engineer* which initially meant the one who could operate an engine. Later the word *engineer* referred to ‘a designer and constructor of military fortifications and weapons’. So the word *engineer* came from the word *engine* which in its turn originated from the Latin word *ingenium* with the meaning ‘natural talent; inborn capacity for inventions’ and also ‘skill’ or ‘cleverness’. In time the word *engine* came to be used for things that are products of human skills and cleverness – tools and machines, for example.

The concept of engineering has existed since time immemorial when humans made such fundamental inventions as the wheel, the axe, the boat, glass, magnetism and many others. Each of the inventions is consistent with the modern definition of engineering exploiting basic mechanical principles to develop useful tools and objects. So nowadays engineering is a large field which deals with problem-solving process for the good of humanity. It means that engineering is not only the art of designing, constructing, or using tools and machines but the profession of applying scientific principles to the design, construction and maintenance of tools and machines.

Originally there were only two fields of engineering: military engineering aimed at building military fortifications and communications and civil engineering aimed at building bridges, roads, dams, harbours, temples, aqueducts and other structures. All fields of engineering today evolved from civil engineering and the evolution of each field is dictated by societal needs for transport, energy, water, health, communication and security. For example, after the Industrial Revolution in the late 18th century mechanical engineering developed as a separate field in order to power manufacturing machines and engines. Mining and metallurgy engineering grew out of society's technological needs in the mid 19th century. A bit later electrical and chemical engineering came. Nuclear, computer, genetic, environmental, biomechanical and medical engineering are more modern branches.

Hence civil engineering is a broad field that encompasses planning, design, construction and maintenance of fixed structures as they relate to earth, water, or civilization and other processes.

LANGUAGE FOCUS

15. In the text there are a lot of words of the same stem that belong to different parts of speech. Fill in the chart with them according to the model.

Initial form	Noun	Verb	Adjective	Adverb
engine, *n*	*engineer,*	–	–	–

	engineering			
origin, *n*				
use, *n*				
design, *v*				
construct, *v*				
civil, *adj*				
mean, *v*				
evolve, *v*				
apply, *v*				
memory, *n*				

16. There are a lot of adjectives ending in *–al* in the text. Write them out and translate.

17. Write in the Past Simple tense forms and the Past Participles of the following verbs according to the model. Some are regular and some are irregular. Try to memorize the forms of the irregular verbs. Two verbs are missing! Write them in.

Infinitive	**Past Tense**	**Past Participle**
to aim	*aimed*	*aimed*
to apply		
to be	*was / were*	*been*
to come		
to deal with		
to develop		
???		
to encompass		
to evolve		
to exploit		
to exist		
to grow		
to invent		
???		
to manufacture		
to mean		
to operate		
to originate		
to power		
to refer to		
to relate to		
to use		

COMPREHENSION CHECK

18. Complete the following sentences according to the text.

1) The concept of engineering has existed ...
2) … the word *engine* meant ...
3) Engineering is not only the art of designing, … but the profession of …
4) All fields of engineering … engineering.
5) Military engineering aimed at … and communications.
6) Civil engineering aimed at … and other structures.
7) … as a separate field.
8) The evolution of each field of engineering ....
9) Mining and metallurgy engineering grew out of…

19. Substitute the words and word combinations in bold type with their synonyms from the text.

1) Biomechanical and medical engineering **combines** chemical, physical, biological, computational sciences and engineering principles and techniques **to put to use for** the problems of medicine.
2) The word engine **came from** Latin and **originally** meant 'natural talent'.
3) What does the word *engineering* **express**?
4) All **spheres** of engineering today **grew out of** from civil engineering.
5) The Industrial Revolution in the 18th century England **planned** fast changes in its economy by using **automated devices** in industry.
6) In the 19th century the **creation** of steam engine and steam turbine **gave impetus to** the Industrial Revolution.
7) The wheel is an ingenious **creation** made in **ancient** time.
8) The wheel is a **very important change in the way that people do things** in the manufacturing industry.
9). A **mechanical** uses special **instrument**.
10) Engineering is a large **sphere** which deals with **building** and **exploitation** of objects and machines.

20. Match the words and word-combinations in column A with the words and word-combinations in Column B to make up all possible word-combinations.

A	B
1) problem-solving process for	a) is dictated
2) societal needs for	b) the modern definition of engineering
3) to be consistent with	c) the design, construction and maintenance of tools and machines
4) to apply scientific principles to	d) originates from the word *engineer*
5) to grow out of	e) society's technological needs
6) to develop useful tools and objects	f) of fixed structures
7) maintenance	g) transport, energy, water, health,

	communication and security
8) the word *engineering*	h) tools and objects
9) the evolution of each field	i) the good of humanity

21. Mark the following statements as True (T), False (F) or No Evidence (NE). If the statement is false or has no evidence, give your reason for this.

1) The world is what it is today because of fundamental innovations.
2) Tools and machines are ingenious products of human skills and cleverness.
3) The English word *engine* came from the Greek language.
4) The wheel is a circular object that revolves on an axle fixed below a vehicle to enable it to move along or forming part of a machine.
5) Each of the inventions is consistent with the immemorial definition of engineering.
6) Genetic engineering is a broad field that encompasses planning, design, construction and maintenance of fixed structures, isn't it?
7) Modern civil engineering aims at building fixed structures too.
8) Ancient Romans developed the principles of building bridges, roads, dams, harbours, temples, aqueducts.

22. Work with your partner. Ask and answer tag questions based on the following statements.

MODEL: *Engineering is one of the most ancient occupations in history.* → *Engineering is one of the most ancient occupations in history, isn't it? – Yes, it is.*

1) Electrical and chemical engineering came after mining and metallurgy engineering.
2) The word *engineering* originated from the word *engine*.
3) At first the word *engine* meant the art of being clever.
4) Originally there was only one field of engineering: military engineering.
5) Nowadays engineering deals with problem-solving process for the good of humanity.
6) Nuclear, computer, genetic, environmental, biomechanical and medical engineering are more modern branches.
7) All of us are familiar with such fundamental inventions as glass and electricity.
8) Only environmental engineering is the profession of applying scientific principles to the design, construction and maintenance of tools and machines.

UNIT 2. MY CAREER AMBITIONS (PART 1)

PRONUNCIATION PRACTICE

1. Read the following words, paying attention to the pronunciation of the letter 'c'. Mind the rule:

C before *e, i, y* is pronounced as [s]

A. Capacity, civilization, civil, city, principle, produce, concentrate, service, facility, cybernetics, concept, advanced, certainly, science, recent, circuit, calcium, specify, cycle, vacancy, privacy, circumstance, center, circulate, cylinder, experience, enforce, procedure, space, price, resource.

B. 1) For our security we have to produce the energy we need from our own resources. 2) To start an advanced course of cybernetics you need to pass a credit on basic computer science. 3) An electronic circuit is composed of resistors, transistors, capacitors and inductors, connected by conductive wires or traces through which electric current can flow. 4) In recent years cyber piracy has increased across the whole Internet space. Under these circumstances we need to enforce privacy laws connected with digital information. 5) It's necessary to develop your capacities and acquire experience in your specialty in order to build up a successful career. 6) Civil engineers deal with production and maintenance of water and energy facilities in cities and other dwelling places. 7) The history of power engineering contains contributions from scientists across different disciplines in mathematics, physics, chemistry and medicine.

2. Group the words according to the pronunciation of the following sounds and read them aloud. Some words may have two variants of reading.

[k]	[ʃ]	[tʃ]

Special, character, choose, match, artificial, mechanism, bachelor, scholar, chain, machine, chemical, technology, chef, scheme, picture, change, starch, polytechnic, speciality, success, school, championship, architect, archaeology, schedule, machinery, ocean, initial, challenge, efficiency, English, Chicago, launch, catch.

3. Practice pronunciation of the following sentence structures. Mind the intonation of general questions and short answers.

A.
- Do you ˈlike engˌineering? - \Yes, I \do.
- Does he ˈspecialize inˌmath? - \Yes, he \does.
- Did you ˈfinishˌschool? - \Yes, I \did.
- Are you aˌstudent? - \Yes, I \am.
- Is your uniˈversityˌbig? - \Yes, it \is.
- Was the eˈxamˌdifficult? - \Yes, it \was.
- Were youˌhappy to ˈpass the eˈxam? - \Yes, I \was.
- Will youˈjoin theˌgroup? - \Yes, I \will
- Was the eˈxamˌdifficult? - \Yes, it \was.
- Were youˌhappy to ˈpass the eˈxam? - \Yes, I \was.
- Will youˈjoin theˌgroup? - \Yes, I \will.

B.
- Are you ́angry? - ̀No, I am̀not. I am̀worried.
- Was ˈKate ́present yesterday? - ̀No, shèwasn’t. She was̀absent.
- Do they ˈstud ́y French? - ̀No, theỳdon’t. They ˈstud ̀y English.
- Did your ˈparents advise on choosing ˈa caŕeer? - ̀No, theỳdidn’t. They supˈported me in mỳown dęcision.

GRAMMAR PRACTICE

4. Identify the predicate of the sentence and underline it. NOTE that it is in the Past Simple tense Form.

1) In the 1920s the Belarusian State Polytechnic Institute trained engineers for the main industries of the Soviet State. There were only 5 faculties in it. They were Mechanical Faculty, Civil Engineering Faculty, Cultural and Professional Faculty, Chemical and Technological Faculty, and Electrical Engineering Faculty.

2) She chose to become an engineer because she loved the smell of asphalt and concrete. And she had a success. She entered a technical University.

3) The revolutionary invention of the wheel gave rise to technologies from transportation to modern day machinery. Before the invention of the wheel people used slides and logs of timber to transport goods.

4) The usage of tools started 2.6 million years back in Ethiopia. The invention of machine tools advanced the industrial revolution.

5. Make each sentence of Exercise 1 negative.

6. Ask general questions to each sentence of Exercise 1 according to the model.

MODEL: *The use of tools **became** an important step in the evolution of humanity. – **Did** the use of tools **become** an important step in the evolution of humanity?*

*Thomas Savery **patented** the first practical steam engine in 1698. – **Did** Thomas Savery **patent** the first practical steam engine in 1698?*

*The student **was** in the University library an hour ago. – **Was** the student in the University library an hour ago?*

*There **were** students in the University library. **Were** there students in the University library?*

7. Ask tag questions to each sentence of Exercise 1.

8. Read and translate the following noun chains. If necessary, consult the dictionary.

NOTE that in English they often use two nouns together (Noun 1 + Noun 2) **to mean one idea.** Noun 1 **tells us** *what kind of* **thing** Noun 2 **is. If we have two and more than two nouns** (Noun 1 + Noun 2 + Noun 3 + …) **the last noun is the main**

one, whereas the previous nouns are like adjectives. We begin translation with the last noun:

MODEL: *Noun chain* = *Noun* (Noun 1) + *chain* (Noun 2) = *цепочка* (Noun 2) *существительных* (Noun 1).

1) **N's (*whose?*)+ N:** the engineer's table = the table of the engineer; the engineers' tables = the tables of the engineers; the world's population = the population of the world; the country's development = the development of the country; this student's textbook = the textbook of this student; these students' textbooks = the textbooks of these students; the company's success = the success of the company; humanity's inventions = the inventions of humanity;
2) **N + N:** a power engineer, a food engineer, a steam engine, hand tools, machine tools, power tools, a metro station, wind speed, ocean currents, a mail box, a labour market, a table tennis, a window table, a table lamp, an apple tree, sugar cane, cane sugar, water density.

READING PRACTICE

Vocabulary for Study

civil engineer инженер-строитель
equipment [ɪˈkwɪpmənt] **and machinery** [məˈʃiːnərɪ] оборудование; машины и механизмы
expectation [ˌekspekˈteɪʃən] ожидание
field trip производственная практика
intended [ɪnˈtendɪd] предполагаемый, будущий, планируемый
irrigation project [ˌɪrɪˌgeɪʃ(ə)n ˈprɔdʒɪkt // -ekt] оросительная система; проект оросительной системы
major [ˈmeɪʤə] профилирующая дисциплина, основная специальность, первая специальность
power engineering энергетика
power engineer инженер-энергетик, энергетик
specialty *(Am.)* [ˈspeʃəlti] **(or speciality *(Br.)*** [ˌspeʃɪˈælətɪ]**)** специальность, специализация; подробности, детали, частности
to apply [əˈplaɪ] применять, использовать, употреблять;
to aspire [əˈspaɪə] мечтать стать, жаждать. претендовать
to be dignified [ˈdɪgnɪfaɪd] обладающий чувством собственного достоинства, благородный, возвышенный, достойный; заслуживающий внимания
to be fascinated (with) [ˈfæsɪneɪtɪd] быть неравнодушным к ч.-л.; быть очарованным ч.-л.
to combine [kəmˈbaɪn] соединять, объединять; сочетать; смешивать; комбинировать
to distribute [dɪsˈtrɪbju(:)t] 1) распределять, раздавать; разносить; 2) распределять (*часто по поверхности*); (равномерно) разбрасывать; 3) рассредоточивать

environmental health laboratory лаборатория медико-экологических исследований
e.g. = for example [fər ɪgˈzɑːmpl] (of Latin origin, abbreviation for ***e****xempli* ***g****ratia*) например
to extend [ɪkˈstend] протягивать, вытягивать, простирать; расширять; удлинять; растягивать, увеличивать
to fulfil [fulˈfɪl] выполнять; исполнять, осуществлять
to graduate (from) [ˈgrædjueɪt] оканчивать (высшее учебное заведение)
industrial services производственно-технические услуги / помощь
to interact [ˌɪntərˈækt] взаимодействовать; находиться во взаимодействии, действовать, влиять друг на друга
to match [mætʃ] соответствовать
to offer предлагать
to push [puʃ] подталкивали; *зд.* заставляли
to set (set, set) устанавливать; придавать значение
to treat [tri:t] лечить ,обрабатывать, подвергать воздействию (*чего-л.*)
transportation [ˌtrænspɔːˈteɪʃən] перевозки, транспортное обеспечение
unique [juːˈniːk] единственный в своем роде; уникальный
wastewater facilities система отвода, сбора и очистки сточных вод
water distribution facilities [ˈwɔːtə dɪstrɪˈbjuːʃ(ə)n fə` sɪlɪtɪz] гидротехника, водораспределительные сооружения
water treatment facilities [ˈwɔːtə ˈtriːtm(ə)nt fə`sɪlɪtɪz] водоочистные сооружения

9. Read the international words and guess their meaning. Mind the stress.

major [ˈmeɪʤə]	technical [ˈteknɪkəl]	construction [kənˈstrʌkʃən]
idea [aɪˈdɪə]	specialty [ˈspeʃəlti]	University [ˌjuːnɪˈvəːsɪtɪ]
area [ˈɛəriə]	speciality [ˌspeʃɪˈælətɪ]	Engineering [ˌenʤɪˈnɪərɪŋ]
real [rɪəl]	favorite [ˈfeɪvrət]	education [ˌedjuːˈkeɪʃən]
dam [dæm]	project [ˈprɔdʒekt]	discipline [ˈdɪsɪplɪn]
combine [kəmˈbaɪn]	physics [ˈfɪzɪks]	mathematics [ˌmæθɪˈmætɪks]
program [ˈprəugræm]	standard [ˈstændəd]	laboratory [ləˈbɔrət(ə)rɪ]
tunnel [ˈtʌn(ə)l]	airport [ˈeəpɔːt]	interest [ˈɪntrɪst]

10.Read the proper names.

Fairleigh Dickinson University [ˈfɛəlɪ ˈdɪkɪnsən ˌjuːnɪ`vəːsɪtɪ]

11. Match the words with the same vowel sound.

engineer	bridge
profession	specialty
fulfill	friend
refrigeration	project
maths	petrochemical

12. Match the English and Russian equivalents.

1) irrigation project	a) устанавливать
2) water distribution facilities	b) водоочистные сооружения
3) environmental health laboratory	c) оросительная система
4) equipment and machinery	d) система отвода, сбора и очистки сточных вод
5) water treatment facilities	e) производственно-техническая помощь
6) industrial services	f) выполнять;
7) to be dignified	g) машины и механизмы
8) to set	h) производственная практика
9) to fulfil	i) обладающий чувством собственного достоинства
10) e.g. = for example	j) лаборатория медико-экологических исследований
11) field trip	k) например

13. Answer the following question and read the text below to check your answer.

Why did they decide to become engineers?

Why Are We Engineers?

My friend and I are not engineers yet but we are aspiring to become highly qualified specialists after we graduate because we have been dreaming about our future professions since childhood.

My intended major is civil engineering, the area of engineering disciplines, extending across many technical specialties, specialties that are not independent but interact with each other. Since school, mathematics and physics were my favorite subjects so I love the idea of applying them to real life problems.

I chose civil engineering because I was always fascinated with civil projects. I think one of my greatest influences was my father. He is a civil engineer and I could learn many things about this field from him.

The construction always kept my interest. Buildings, bridges, tunnels, highways, dams, airports, irrigation projects, water treatment and water distribution facilities, wastewater facilities – I liked constructions of every kind. There is something different and dignified about each of these projects, that someday they were someone's idea. I chose to apply to Fairleigh Dickinson University because of its academic excellence and unique opportunities. FDU offers the best study program combined with laboratory work, which is important because I will be able to apply what I learned in class. The research and projects opportunities, and certainly a field trip to a construction site will give me rich experience by the time I graduate.

Fairleigh Dickinson fulfills all my university education expectations and I am sure that I will receive more than I want. I am confident I will match the high standards set by the University.

My friend's intended major is power engineering, the field that offers a lot of positions and jobs anywhere, from petrochemical plants to hotels and hospitals. Power engineers operate and maintain the equipment and machinery (e.g. boilers, steam and gas turbines, gas and diesel engines, pumps) that provide power, heat, refrigeration and other industrial services.

My friend decided to deal with engineering for many reasons but the main one was his family. His father and grandfather are civil engineers and both work for the department of transportation, the mother is a chemical engineer at the environmental health laboratory. From his early childhood they all pushed him to think about how and why different things work. Moreover he was always interested in such mysterious things as energy and electricity, their nature and importance for people. He really thinks that power engineering is the perfect choice for him.

(based on https://essayforum.com/undergraduate/liked-constructions-kind-civil-engineering-16664/)

LANGUAGE FOCUS

14. Derive nouns ending in *-ion/-tion* from the following verbs.

MODEL: *to dictate – dictat**ion***

To combine, to distribute, to extend, to expect, to graduate, to construct, to fascinate, to demonstrate, to construct, to irrigate, to specialize, to apply, to educate, to aspire.

15. Write in the past simple tense forms and the past participles of the following verbs according to the model. Some are regular and some are irregular. Try to memorize the forms of the irregular verbs.

There are two extra verbs in the chart! Circle them.

Infinitive	**Past Tense**	**Past Participle**
to aim		
to apply	*applied*	*applied*
to aspire		
to be		
to become	*became*	*become*
to choose		
to combine		
to come		
to deal with		
to decide		
to dream		
to extend		
to fascinate		

to fulfill		
to give		
to graduate		
to intend		
to interact		
to learn		
to like		
to love		
to maintain		
to match		
to offer		
to operate		
to provide		
to push		
to receive		
to set		
to think		
to want		
to work		

16. Look back at the text and copy out 13 word-combinations beginning with a regular verb like in the model.

MODEL: *love the idea*

17. Define a part-of-speech meaning of the words in bold type and translate them according to the context.

1) My friend decided to deal with engineering for many reasons but the main **one** was his family.
a) numeral b) noun c) adverb
2) His father and grandfather are civil engineers and **both** work for the department of transportation
a) conjunction b) noun c) pronoun
3) I chose to apply to Fairleigh Dickinson University because of **its** academic excellence and unique opportunities.
a) negative pronoun b) personal pronoun c) possessive pronoun

COMPREHENSION CHECK

18. Complete the following sentences according to the text.

1) … my father.
2) … – I liked constructions of every kind.
3)… the area of engineering disciplines.

4) … someday they were someone's idea.
5) Civil Engineering extends …
6) I love the idea of applying mathematics and physics to ...
7) I decided to apply to…
8) A field … by the time I graduate.
9) My friend's mother is…

19. Substitute the words and word combinations in bold type with their synonyms from the text.

1) I **realized** my ambition, I entered the University.
2) I am sure the University demands will **correspond** to his character.
3) My sister successfully **completed her education at** University.
4) They will **use** new technology to almost every industrial process.
5) My **primary field of study** is Civil Engineering.
6) You must **cooperate** more with your groupmates.
7) We have plans **to make** our house *bigger*.
8) The **planned** effect was reached.
9) **Besides** I'm interested in one more specialty.

20. Match the words and word-combinations in column A with the words and word-combinations in Column B to make up all possible word-combinations.

A	B
1) was fascinated with	a) my interest
2) standards	b) engineering disciplines
3) interact with	c) civil projects
4) kept	d) a university
5) match	e) set by your university
6) apply to	f) each other
7) a field trip to	g) applying them to real life problems
8) the area of	h) the high standards
9) the idea of	i) a construction site
10) fulfill	j) in energy and electricity
11) was always interested	k) my university education expectations

21. Mark the following statements as True (T), False (F) or No Evidence (NE). If the statement is false or has no evidence, give your reason for this.

1) I chose civil engineering because I was always fascinated with agriculture.
2) The main reason for my friend to be a power engineer was the influence of his girl-friend.
3) I think one of my greatest influences was my father.
4) FDU offers the worst study program.
5) I could learn many things about civil projects from my father.

6) My intended minor is civil engineering.
7) Civil engineering is the area of engineering disciplines extending across many social specialties.
8) The construction always kept my friend's interest.
9) We went on a field trip to a construction site.

22. Answer the following questions.

1) The narrator's intended major is Civil Engineering, isn't it?
2) His favorite subjects were chemistry and physics, weren't they?
3) Is the narrator sure that he will receive less at University than he wants?
4) What constructions did he like?
5) Was the narrator always fascinated with military projects?
6) Did the narrator's friend choose to apply to Fairleigh Dickinson University?
7) Are the friends aspiring that academic activities will give them rich experience by the time they graduate?
8) Is he confident that he will match the high standards set by Fairleigh Dickinson University?
9) Does power engineering offer many positions and jobs anywhere, from petrochemical plants to hotels and hospitals?

UNIT 3. MY CAREER AMBITIONS (PART 2)

PRONUNCIATION PRACTICE

1. Read the following words. Mind the rule: *qu* is pronounced as [kw].
A. Quality, quantity, quickly, quietly, equal, qualified, qualification, requirement, liquid, square, question, quotation, quota, equipment, equivalent, acquire, aqueduct, frequency, earthquake.
B. 1) Mr. Quinsy won't get this aqueduct project because he is not qualified enough. 2) Be quiet and stop quarreling! 3) I like the quotation of Queen Elizabeth II about engineering. 4) There are certain requirements for the equipment used at power stations. 5) A square meter is equivalent to 10 000 square centimeters. 6) After graduation you will acquire the qualification of a civil engineer. 7) We need to work out special requirements for the construction of a plant considering the frequency of earthquakes in this area.

2. Group the words according to the pronunciation of the following sounds and read them aloud. Some words may have two variants of reading.

[i:]	[ɪə]	[aɪ]

Field, science, career, society, experience, degree, applied, engineer, specified, release, mean, quiet, memorial, client, supplies, read, leader, teacher, historian,

qualified, tutorial, real, industrial, each, believe, identified, diesel, piece, year, died, here, variety, material.

3. Practice pronunciation of the following sentence structures. Mind the intonation of alternative questions.

1) Do you study at University or at school? – At University.
2) Are you from Belarus or from the USA? – From Belarus.
3) Will you have a degree in engineering or in physics? – Neither. I need to finish post-graduate courses to get a degree.
4) Are you good at mathematics or languages? – I'm good at both.
5) Would you like tea, coffee, mineral water or juice? – Juice, please.
6) Do you attend lectures, tutorials, workshops or laboratory classes? – All of them.
7) Will you become a civil engineer, an architect, a power plant operator, or a businessman? – I don't know yet.

GRAMMAR PRACTICE

4. Identify the predicate of the sentence and underline it. NOTE that it is in the Future Simple Tense Form.

1) Engineers of tomorrow, like engineers of yesterday and today, will possess *strong analytical skills*.
2) Yesterday, today and forever engineering will be synonymous *with ingenuity* – a skill in planning, combining, and adapting. *Using science and practical ingenuity*, engineers will identify problems and find solutions.
3) Creativity (invention, innovation) will forever remain an indispensable quality *for engineering*.
4) As always good engineering will require *good communication skills* such as active listening, speaking and writing.
5) With the growing interdependence between technology and economic and social foundations of modern society, there will be an *increasing* number of opportunities for engineers to exercise their potential as leaders, not only in business but also in the nonprofit and government sectors.

5. Make each sentence of Exercise 1 negative.

WILL + NOT = WON'T or WILL NOT

6. Ask alternative questions to each sentence from Exercise 1, making the alternative to *the italicized* word combinations.

MODEL: **General question + Alternative *OR* + General question**
He will become an *engineer.* → *Will he become an engineer OR will he become a teacher? // Will he become an engineer OR a teacher?*

7. Ask tag questions to each sentence from Exercise 1.

8. Read and translate the following noun chains. If necessary, consult the dictionary.

1) **N + N + N:** a power plant definition, a state power system, a microwave oven producer, London Underground stations, the New York city subway, electricity generation principles, a table tennis table, university education expectations, the football match result, the World Swimming Championship, the computer engineer's table, the computer engineers' tables;
2) **N + N + N +N + more Ns:** a New York city subway map, the Power Plant Construction Seminar, the City Transport and Environment Conference, the head office online database, University transfer credit policy, University Guide League Table, Paris Fashion Week summer collection.
3) **(Adj. + N) + N:** a first-year student, real life problems, a thirty-page booklet, a handsome bank manager, one-way ticket, a five-rouble banknote, a three-component noun chain, an English language teacher, a washing machine history, next generation innovations, an international music festival, a five-minute walk;
4) ***Miscellaneous:*** 10 most exciting art exhibition centers, a United Kingdom music television programme, the official Architecture Week festival website, the online dictionary Street Style information, the company's online banking service, new power station qualified personnel, the world's top universities, heavy construction equipment industry sector, building material and equipment sector, the International Power Plant Construction Conference.

9. Write the comparative and superlative forms of the following *adjectives*.

NOTE that *one* syllable adjectives and *two* syllable adjectives ending in *-y, -ow, -le, -er(-re*) form the comparative and superlative degrees by adding the suffixes *–er* and *–est* correspondingly. The other *two* syllable adjectives and adjectives of three and more syllables take *more/most* to form degrees of comparison.

MODEL A: *Long – longer – longest*
Good – better – best

Low, cheap, high, smart, close, large, new, small, far, hard, warm, cold, cool, hot, strong, fast, dry, quick, wide, big, bad, many, little, short, sharp, deep, light, bright, bad.

MODEL B: *Pretty – prettier – prettiest*
Reasonable – more reasonable – most reasonable

Busy, happy, tiny, steady, little, simple, useful, narrow, clever, severe, gentle, tender, yellow, friendly, icy, peaceful, pleasant, careful, available, reliable, adaptable, fashionable, important, essential, versatile, numerous, exact, efficient, complicated.

10. Write the comparative and superlative forms of the following *adverbs*.

NOTE that only *one* syllable adverbs form the comparative and superlative degrees with the help of the suffixes *–er* and *–est* correspondingly. Adverbs of two and more syllables take *more/most* to form degrees of comparison.

MODEL A: *Fast – faster – fastest*
Much – more – most

Hard, late, well, deep (*about* place), high(*about* place), near, short, far, sharp, plain, clear, straight, soon, loud.

MODEL B: *Heavily – more heavily, most heavily*
Badly – worse – worst

Slowly, deeply (*about* feelings), exactly, little, brightly, happily, easily, busily, steadily, simply, truly, powerfully, usefully, carefully, peacefully, conveniently, efficiently, comfortably, carelessly, quietly, clearly, sharply, essentially, dangerously, well.

11. Write comparatives with the help of the adverbs *much, a lot, far (= a lot); a bit, a little, slightly* according to the model *Adverb + a Comparative*. Translate them.

MODEL A:	*much / fast*	*much + faster = much faster ‘намного / гораздо быстрее’*
	a little / clear	*a little + clearer = a little clearer ‘немного яснее / прозрачнее’*
MODEL B:	*much / badly*	*much + worse = much worse ‘намного / гораздохуже*
	a little / usefully	*a little + more usefully = a little more usefully‘немного полезнее’*

A lot / fair, far / hard, a bit / late, much / well, a lot / good, a little / deep, much / bad, a bit / high, slightly / near, a little / little, a lot / many, much / much, a lot / comfortably, a little / carelessly, much / quietly, a little /well, a bit / clearly, slightly / expensive, a lot / dangerously.

READING PRACTICE

Vocabulary for Study

academic staff [ˌækəˈdemɪk `stɑ:f] преподавательский состав, штат
approachable [əˈprəutʃəbl]доступный
assignment [əˈsaɪnmənt] задание
as well as так же как, а также; заодно и
attendance [əˈtendəns] посещаемость, посещение
bachelor ['bætʃ(ə)lə] бакалавр
Bachelor of Engineering (BEng) степень бакалавра в области технических наук, бакалавр технических наук
Bachelor of Science (BS) степень бакалавра в области естественных наук, бакалавр естественных наук
career options [kəˈrɪə `ɔpʃənz] возможности карьерного (профессионального) роста
challenge[ˈtʃælɪndʒ] проблема, вызов, задача
complementary [ˌkɔmplɪˈmentərɪ] дополнительный, добавочный
compulsory [kəmˈpʌlsərɪ] обязательный
compulsory courses (subjects) обязательные дисциплины (предметы)
degree [dɪˈgri:] степень (по), диплом (по)
to earn a degree [tə ˈə:n ə dɪ`gri:] получить степень
depending on в зависимости от
different [ˈdɪfrənt] различный, другой
to be different from/to smth/smb отличаться отчего-л./кого-л.
diverse [daɪˈvə:s] разнообразный
elective [ɪˈlektɪv] предмет/дисциплина по выбору, факультатив
etc / etc. [ɪtˈsetrə] (of Latin origin, abbreviation for *et cetera*) и так далее (и т.д.), и тому подобное (и т.п.), и прочее
far [fɑ:] намного
Hydraulic Engineering [haɪˈdrɔ:lɪk ˌendʒɪ`nɪərɪŋ] гидротехника, гидротехническое строительство
i.e. = that is (to say); in other words (of Latin origin, abbreviation for *id est*) то есть, другими словами
lecturer преподаватель
may *(modal verb)* мочь что-л. (с)делать (выражает разрешение): **may do smth**
might [maɪt] *(modal verb)* быть в праве что-л. (с)делать: **might do smth**
minor [ˈmaɪnə] вторая специальность
must [mʌst] *(modal verb)* (обязательно) должен что-л. (с)делать: **must do smth**
range [reɪndʒ] ряд, диапазон, круг, сфера, ареал, цепь
responsible [rɪsˈpɔnsəbl] ответственный
to be responsible for smth/smb быть ответственным за кого-л./что-л.
Structural Engineering проектирование и расчёт зданий и сооружений
to assess[əˈses] оценивать
to be always there всегда рядом
to be up to smb зависеть от кого-либо, быть чьим-либо решением/делом
to shape [ʃeɪp] формировать, *зд.* составлять
to study at University учиться в университете; **to go to school** учиться в школе

tutor [ˋtju:tə] консультант; куратор; преподаватель-ассистент; репетитор
tutorial [tju:ˈtɔ:rɪəl] (a class for students) семинар; консультация; практическое занятие
workshop [ˈwə:kʃɔp] (an event for a group of people sharing the same scientific, research, etc. interest) семинар; симпозиум; секционное заседание

12. Read the international words and guess their meaning. Mind the stress.

academic [ˌækəˈdemɪk]
career [kəˈrɪə]
classes [klɑ:sɪz]
combination [ˌkɒmbɪˈneɪʃən]
contact [ˈkɔntækt]
container [kənˈteɪnə]
course [kɔ:s]
double [dʌbl]
exams [ɪgˈzæmz]
examinations [ɪgˌzæmɪˈneɪʃənz]
focus [ˈfəukəs]
group [gru:p]
hydraulic [haɪˈdrɔ:lɪk]
lab [læb]
laboratory [ləˈbɔrətərɪ]
lecture [ˈlektʃə]
lecturer [ˈlektʃərə]
major [ˈmeɪdʒə]
minor [ˈmaɪnə]
option [ˈɔpʃən]
range reɪndʒ]
results [rɪˈzʌlts]
student [ˈstju:d(ə)nt]
structure [ˈstrʌktʃə]

13. Circle the word with a different sound.

1)	take	shape	range	may	major	have
2)	staff	far	war	class	are	branch
3)	bachelor	contact	case	object	architect	career
4)	some	civil	centre	lecture	science	students

14. Match the English and Russian equivalents.

1) to be responsible for	a) дисциплина по выбору, факультатив
2) workshop	b) доступный
3) to study at University	c) семинар; симпозиум
4)career options	d)семинар (вид занятия)
5) elective	e) быть ответственным за
6) It is up to you	f) (обязательно) должен что-л. (с)делать
7) to go to school	g) возможности карьерного роста
8) tutorial	h) отличаться от
9) compulsory courses	i) Ваше (личное) дело/Ваши проблемы
10) to be different from/to	j) учиться в школе
11) approachable	k) учиться в университете
12) must	l) обязательные дисциплины
13) to be always there	m) всегда рядом

15. Answer the question and read the text below to check your answer.

Are the educational requirements for freshmen students the same in all the countries?

University Is Different to School

Studying at University, you'll be more responsible for your learning and spend fewer contact hours with academic staff than with your school teachers. You'll also have far more independence and meet a more diverse range of students.

Your degree will have some compulsory courses, but you may also choose electives in the selected field of study to help shape your major. For example, if your friend and you want to become civil engineers in Australia (as well as a great number of other countries), you must get a four-year Bachelor of Science (BS), or Bachelor of Engineering (BEng) degree in civil engineering. But you might choose more Power Plant Engineering subjects while your friend might focus on Hydraulic Engineering.

Besides engineering students choose from a great variety of minors, i.e. complementary courses under the categories of technical and complementary studies, which can give you more career options from a single degree. So you might minor in Structural Engineering whereas your friend's minor might be Environmental Engineering. You will graduate with a Bachelor of Science in Power Plant and Structural Engineering and your friend will have a Bachelor of Science in Hydraulic and Environmental Engineering.

Some universities also offer double degrees, which means you can graduate with two qualifications in less time.

Depending on your degree, you'll attend a combination of lectures, tutorials, workshops or laboratory classes. Each course is assessed differently. Some have assignments only, while others contain assignments and exams. Our approachable lecturers and tutors are always there to help you, but won't be looking over your shoulder as much as your school teachers. You'll study more independently through your own reading, research, online work and writing. Some courses may also require you to take part in group activities. Attendance and participation are up to you and only you will be responsible for your results.

As the civil engineering profession is vital to the growth of the country and to the well-being of its citizens, who knows maybe in the future you'll earn an advanced degree and become the next leader in solving tomorrow's challenges through research and innovation.

(based on https://www.griffith.edu.au/life-at-griffith/university-life)

NOTE that in the expressions ***at school, at college, at University*** we do not use ***the/a*** when we speak about the general idea of these places – about the idea of 'studies', and what they are used for – they are used for studies. Besides in these examples the idea of 'studies' is expressed with the preposition ***at***. But when we speak about buildings, we use ***the/a.***

E.g., *We go to school every day (to study). Excuse me, where is the school, please? (a separate building).*

LANGUAGE FOCUS

16. In the text there are a lot of words of the same stem that belong to different parts of speech. Fill in the chart with them according to the model.

Initial form	Noun	Verb/Form of the Verb	Adjective	Adverb
attend, v	*attendance*	*attend*	–	–
depend, *v*				
differ, *v*				
engine, *n*				
few, *a*				
little, *a*				
many, *a*				
much, *a*				
respond, *v*				
study, *v*				
tutor, *n*				
work, *v*				

17. Write in the Past Simple tense forms and the Past Participles of the following verbs according to the model. Some are regular and some are irregular. Try to memorize the forms of the irregular verbs.

Infinitive	Past Tense	Past Participle
to assess	*assessed*	*assessed*
to attend		
to be		
to become		
to choose		
to choose		
to contain		
to earn		
to focus on		
to get		
to give		
to graduate		
to have		
to help		
to look over		
to mean		
to meet		
to offer		
to require		
to shape		
to study		
to take		
to want		

18. Look back at the text and write out 19 word-combinations beginning with an irregular verb as in the model.

MODEL: *is Different to School*

19. Define a part-of-speech meaning of the words in bold type and translate them according to the context.

1) You'll also have **far more** independence and meet a more diverse range of students.
a) adjective, adjective b) adverb, adjective c) adverb, adverb

2) … which means you can graduate with two qualifications in **less** time.
a) adjective b) adverb c) verb

3) **Some** courses may also require you to take part in group activities.
a) adjective b) adverb c) verb

COMPREHENSION CHECK

20. Complete the following sentences according to the text.

1) You can graduate from some universities with two… .
2) … you'll attend a combination of lectures, tutorials, workshops or laboratory classes.
3) Attendance and participation are… .
4) Our … are always there to help you.
5) At University you'll also have far more….
6) … you'll be more responsible for your learning.
7) University is… .
8) Your friend … Hydraulic Engineering.
9) You might minor in … minor might be Environmental Engineering.
10) At University you'll spend … .

21. Substitute the words and word combinations in bold type with their synonyms from the text.

1) Did you take any **additional courses** to shape your major?
2) **Teaching staff** are professional personnel directly involved in teaching students, including classroom teachers, special education teachers and other teachers who work with students as a whole class, in small groups, or in one-to-one teaching and who are always there to help them.

3) The primary assignment of **highly qualified teachers and researchers with the titles of professor, associate professor, and assistant professor** is instruction and research.
4) **Faculty members** also include personnel with other titles, e.g. dean, director, associate dean, assistant dean, chair or head of department.
5) Students are responsible for using the provided resources to meet the requirements of their **primary and secondary fields of study**.
6) Academic and teaching staff **are allowed to** take immediate disciplinary actions against students who are engaged in non-class activities in class such as using a cell phone, working on **a task** for another course, sleeping, and reading non-class materials.
7) Is a history or engineering **degree** a suitable qualification?
8) In US universities there are Career Services that offer computer-based programs designed to help students identify their skills, interests and values to form a foundation for their **set of compulsory courses** exploration.
9) There are several ways that a student can take in order to **get** a degree in architecture.
10) To teach how to solve industrial problems involving economic and social aspects of a country's development is a **demanding task** facing engineering education.
11) Some subjects are **optional**, so a student may **concentrate** only **on** his major.
12) What **subjects** do you **learn**? –My curriculum **includes** exact sciences and languages.

23. Match the words and word-combinations in column A with the words and word-combinations in Column B to make up all possible word-combinations.

A	B
1) to be more responsible	a) electives
2) choose	b) of Science degree in civil engineering
3) studying at	c) degrees
4) to get a four-year bachelor	d) diverse range of students
5) to graduate	e) shape your major
6) will meet a more	f) for your learning
7) to offer double	g) of minors
8) the selected field of study to help	h) University
9) might focus	i) with two qualifications
10) a great variety	j) might be Environmental Engineering
11) your friend's minor	k) in Structural Engineering
12) approachable lecturers	l) on Hydraulic Engineering
13) might minor	m) and tutors

24. Mark the following statements as True (T), False (F) or No Evidence (NE). If the statement is false or has no evidence, give your reason for this.

1) Students are not responsible for their University studies.

2) School teachers are always there to help you at University.
3) You'll study more independently through your own reading, research, online work and writing.
4) Attendance and participation aren't up to you.
5) Our approachable lecturers and tutors will be looking over your shoulder as much as your school teachers.
6) Minors are compulsory courses under the categories of technical and complementary studies.
7) Major is a student's primary field of study.
8) Minor is a student's optional field of study.
9) All first-year students can swim well.
10) Some US universities offer double degrees.

25. Answer the questions.

1) Must foreign students get a four-year or five-year Bachelor of Engineering (BEng) degree in civil engineering?
2) Do all students spend fewer contact hours with academic staff or with their school teachers?
3) Will you graduate with a Bachelor of Science in Power Plant Engineering or in Power Engineering?
4) Are attendance and participation up to you or to your teaching and academic staff?
5) Does a combination of lectures, tutorials, workshops and laboratory classes depending on student's degree or on his/her teacher's one?
6) Do student's career options depend on minors or do they depend on electives?
7) Are students responsible for their results or are their teachers?
8) Is each course of studies assessed differently or is class attendance?
9) Which is easier: studying at University or going to school?
10) Which do students want from University: academic or professional success?
11) Which is more important for students: attendance of all the lessons or skipping the most boring ones?

SECTION 2. BASIC NOTIONS OF POWER ENGINEERING

You are energy, and energy cannot be created or destroyed. Energy just changes form.
Rhonda Byrne

UNIT 1. WHAT IS ENERGY

PRONUNCIATION PRACTICE

1. Read the words. Mind the rule: *ph* is pronounced as [f].

A. Phone, alpha, graph, phase, phenomenon, phosphates, tomography, photography, geography, philosophy, physics, atmosphere, emphasize, phantom, pharmacy, physiotherapist.

B. 1) Philip studies philosophy and physics. 2) In Rutherford's experiment he was firing alpha particles and these alphas were colliding with the nitrogen. 3) The invention of nuclear power gave rise to advanced industrial radiography and tomography techniques. 4) The graph illustrates phases of this physical process. 5) Photography is the practice of creating durable images by recording light or other electromagnetic radiation. 6) Long before the first photographs were made, ancient Chinese philosopher Mo Di discovered and developed optic principles and pinhole camera. 7) A telephone converts sound into electronic signals 8) Lightning is a natural phenomenon of a sudden electrostatic discharge that occurs in atmosphere.

2. Group the nouns according to the pronunciation of the plural noun ending –s/-es.

[s]	[z]	[ɪz]

Changes, plants, engines, facilities, machines, supplies, products, tools, objects, methods, particles, notions, powers, fuels, atoms, reactions, pieces, phases, plants, requirements, offices, frequencies, principles, factories, theories.

3. A. Practice pronunciation of the following sentence structures. Mind the Falling intonation of Special questions.

ˈWhat is ˋenergy?
ˈWhat is electˋricity?
ˈWhat is a ˈpower ˋplant?
ˈWhat is an ˋatom?
ˈWhat is an ˋisotope?
ˈWhat is radiˋation?
ˈWhat is ˋfission?

ˈHow is ˈenergy conˋverted?
ˈHow is electricity proˋduced?
ˈHow does a ˈpower ˙plant ˋwork?
ˈWho disˈcovered an ˋatom?
ˈWhen was ˈnuclear ˙energy disˋcovered?
ˈWhy is radiˈation ˋdangerous?
ˈWhere does ˈfission ˙takè place?

B. Try to answer these questions.

GRAMMAR PRACTICE

5. Identify the following nouns as Countable or Uncountable.

6.

Energy, change, temperature, clothes, laundry, liquid, time, activity, heat, light, home, machine, fuel, truck, game, video, state, motion, speed, particle, wave, ray, product, plant, biomass, rain, storm, pressure, coal, source, gasoline, food, supply resources, people, sugar, matter

5. Form a plural form of countable nouns from Exercise 4.

6. Group the uncountable nouns from Exercise 4 under the headings: a) Names of substances, b) Natural phenomena, c) Abstract nouns, d) Collective nouns. Which of the uncountable nouns are used only in plural?

7. Translate the sentences paying attention to the nouns *in italics*. Comment on the change in the grammatical form and meaning of these nouns.

A. 1) The *work* of an engineer requires much responsibility.
   2) The scientific *works* of Albert Einstein have changed our understanding of energy.
B. 1) The energy in moving *water* turns a watermill or turbine to produce hydropower.
   2) You could at least offer us a *water*.
C. 1) We should understand that most *businesses* require a stable provision of electricity.
   2) This company entered the nuclear energy *business* more than 50 years ago.
D. 1) Will you give me a *light*?
   2) Burning of wood gives *light* and heat.
E. 1) European Committee should extend its *powers* to provide energy security.
   2) The *power* of atom should be used only to advance human progress.
F. 1) *Mechanics* is one of the subjects I study at the university
   2) The *mechanics* of this process are quite complex.
G. 1) Fermentation is the conversion of *sugars* to alcohol.
   2) Do you still take four *sugars* in your tea?
   3) Too much *sugar* is harmful for health.
H. 1) They are having picnic in the *woods*.
   2) The lake was surrounded with a *wood*.
   3) Without access to modern energy services people rely on traditional fuels, such as *wood*.
I. 1) Even military *forces* could not stop fighting between the two opposition groups.
   2) Because of the increased mass, more *force* is needed to accelerate the object.
   3) Globalization may become *a force* for good or for evil.
J. 1) Alpha particles are not very penetrating and deposit all their *energies* along their short paths.
   2) Gamma rays are waves of *energy* without mass of electric charge.

8. Identify a part of speech of the word in bold type.

1) We need energy to **fuel** our cars.
2) I didn't **power** my phone last night.
3) Cool air **flows** to replace the heated air. This **flow** is called wind.

4) The **supplies** of coal, oil and natural gas are limited.
5) When the roller coaster **speeds** down the track, potential energy is **changed** into kinetic energy.
6) We need **change** in energy industry to solve environmental issues.
7) A **release** of heat means that you apply effort and work hard.
8) We have no natural sources of fossil **fuels.**
9) This **plant manufactures** refined oil products.

READING PRACTICE

Vocabulary for Study

biodiesel [ˌbaɪəʊˈdɪz(ə)l] биодизельное топливо
biomass [ˈbaɪəʊˌmæs] биотопливо
coal [kəul] уголь
conservation [ˌkɔnsəˈveɪʃ(ə)n] сохранение
conserve [kənˈsə:v] сохранять
conversion [kənˈvə:ʃən] преобразование, обращение
convert [kənˈvə:t] преобразовывать, превращать
evaporate [ɪˈvæpəˌreɪt] испарять, испаряться
fuel [fju:əl] топливо
fossil [ˈfɔsəl;-ɪl**] fuel** ископаемое топливо
liquid [ˈlɪkwɪd**] fuel** жидкое топливо
garbage [ˈgɑ:bɪdʒ] мусор
harness [ˈhɑ:nɪs] обуздывать, покорять, укрощать; использовать (энергию)
hydropower [ˈhaɪdrəuˌpauə] гидроэнергия
kinetic [kɪˈnetɪk; kaɪ-] **energy** кинетическая энергия
landfill свалка, место захоронении мусорных отходов
layer [leɪə] слой
manure [məˈnjuə] навоз, органическое удобрение
motion [ˈməʊʃən] движение
natural gas [ˈnætʃ(ə)rəl `gæs] природный газ
non-renewable невозобновляемый
oil [ɔɪl] нефть
photosynthesis [ˌfəutəuˈsinθəsis] фотосинтез
potential [pəˈtenʃəl] **energy** потенциальная энергия
pressure [ˈpreʃə] давление
radiant [ˈreɪdɪənt] **energy** солнечная энергия
release [rɪˈli:s] высвобождать, выпускать
renewable sources [rɪˈnju:əbl `sɔ:siz] возобновляемые источники
starch [stɑ:tʃ] крахмал
stored [stɔ:d] **energy** сохраненная энергия
sugars [ˈʃugəz] сахара
surface [ˈsə:fɪs] поверхность
switchgrass [ˈswɪtʃˌgrɑ:s] сухая травяная масса
the law of conservation of energy закон сохранения энергии

the upper atmosphere [ˈætməsˌfɪə] верхний слой атмосферы
water cycle [ˈsaɪkəl] круговорот воды
water vapour [ˈveɪpə] испарения

9. A. Read the international words and guess their meaning.

isotope [ˈaɪsəˌtəup]	alcohol [ˈælkəˌhɔl]	atmosphere [ˈætməsˌfɪə]
ion [ˈaɪən]	methane [ˈmiːθeɪn]	gravity [ˈgrævɪtɪ]
neutron [ˈnjuːtrɔn]	ethanol [ˈeθəˌnɔl;ˈiːθə-]	temperature [ˈtemprɪtʃə]
electron [ɪˈlektrɔn]	biodiesel [ˈbaɪəʊˌdiːzəl]	photosynthesis [fəutəuˈsinθɪsɪs]
gasoline [ˈgæsəˌliːn]	biomass [ˈbaɪəuˌmæs]	thermal [ˈθəːməl]
natural gas [ˈnætʃ(ə)rəl `gæs]	convert [kənˈvəːt]	geothermal [ˌdʒiːəuˈθəːməl]
	potential [pəˈtenʃəl]	turbine [ˈtəːbin; -baɪn]

B. Try to answer the following questions:
Which words denote particles?
Which words refer to some type of fuel?

10. Read the words and underline the vowels that are pronounced as in the alphabet (= 1st syllable type), e.g., *a* [ei].

Basic, radiant, kinetic, motion, evaporate, biomass, uranium, methane, process, photosynthesis, primary, nature, fuel, stove, replace, create, produce, using, continuous, layer.

11. Answer the following question and read the text below to check your answer.

What types of energy do you know?

Energy

The law of conservation of energy says that energy can change from one form into another, but it cannot be created or destroyed. In fact, when we say that we use energy, we really mean that we convert and harness it to do the work we need to do.

We can divide energy into two basic states: potential energy and kinetic energy. Potential energy is stored energy that is waiting to be used. Kinetic energy is energy of motion. Potential energy must be changed into kinetic energy before we can use it.

Much of the Earth’s energy comes from the Sun in the form of radiant energy. Plants convert this energy to chemical energy by a process called photosynthesis. This chemical energy is stored in the form of sugars and starches, which provide energy for the plant as well as people and animals that eat the plant. Biomass is the name for materials from plants and animals that have chemical energy stored in them. A biomass fuel we all know is wood for fireplaces and wood stoves. Other examples are crops such as corn and switchgrass, manure, garbage, and methane gas from

landfills. By burning biomass, we release its stored chemical energy as thermal and radiant energy. We also can convert it to liquid fuel, such as ethanol and biodiesel.

Radiant energy from the Sun's rays makes some parts of the Earth warmer than others. Air surrounding these warmer surfaces is heated, which causes it to rise. Cooler air then flows in to replace the heated air that has risen. We call this flow of air wind.

Radiant energy from the Sun also causes water to evaporate. The water vapor rises into the upper atmosphere where it forms clouds and rain. This is called the water cycle. When it rains, the water flows down rivers. The energy in moving water can turn a watermill or turbine to make hydropower.

About 300 million years ago, countless plants and animals died and were slowly buried beneath layers and layers of dirt and sand. Heat and pressure from these layers concentrated the chemical energy stored in them, slowly changing them to the fossil fuels, oil, coal, and natural gas.

Primary energy is energy found in nature before we convert it to do work. There are also secondary energy sources that are produced by using primary energy. We can further divide the primary and secondary energy sources we use into renewable and non-renewable sources. Renewable sources can be continuously replaced. Day after day the Sun shines, the wind blows, plants grow, and rivers flow. Non-renewable sources cannot be replaced. The supplies of coal, oil, natural gas, and uranium are limited. When we use up these resources, they will be gone. People today are looking for ways to save energy by carefully using our energy resources and by trying to convert energy as efficiently as possible.

(based on *The Harnessed Atom*: https://www.energy.gov/ne/downloads/harnessed-atom-student-edition)

LANGUAGE FOCUS

12. Pick up all nouns from the text and group them as Countable or Uncountable.

13. Find derivatives for the following words from the text. Identify the way of derivation: Affixation (adding suffixes or prefixes) or Compounding (combining two stems).

conserve –	grass –	power –	second –
move –	land –	count –	continue –
photo –	place –	lay –	new –
mass –	vapour –	press –	care –
fire –	water –	nature –	efficient –

14. A. Find in the text sentences with the following verb-forms. Try to identify the grammatical form of each verb as in the model.

MODEL: *are written* → ***the grammatical form is the Present Simple Passive***

1) is stored 2) is heated 3) are produced 4) are limited 5) will be gone

B. Make these sentences negative and interrogative, i.e. ask general and tag questions as in the model.

MODEL: *Energy is **found** everywhere.*
*Energy **isn't found** everywhere.*
*Is energy **found** everywhere?*
*Energy **is found** everywhere, **isn't it**?*

15. According to the model turn the following active constructions into passive ones by putting the noun *energy* as subject.

MODEL: *We use **energy** in industry. – **Energy** is used in industry.*

1) We cannot destroy energy but we can store it.
2) We harness energy to do work.
3) We divide energy into two states: potential energy and kinetic energy.
4) We change potential energy into kinetic energy before we can use it.
5) We lose some of energy each time we convert it from one form to another.
6) Plants convert nuclear energy to electrical energy.
7) Burning wood releases stored chemical energy in the form of heat and light.
8) We find primary energy in nature.
9) We use the energy in moving water to make hydropower.
10) People save energy by carefully using energy resources.

16. Open the brackets, using a verb in the Active or Passive Voice. Identify a form of energy for each case.

1) Objects (to move) by applying a force.
2) Chemical bonds of a material (to change).
3) The atom center (to split) apart.
4) Electrons (to move) through a conductor.
5) Waves (to emit) by the Sun.
6) The Moon (to pull) tidal waters.
7) The temperature (to increase) by heating.
8) Energy (to convert) in hundreds of ways.
9) The tremendous energy in storms and winds (to cause) by the Sun's radiant energy.

COMPREHENSION CHECK

17. Complete the following sentences as in the text.

1) The law of conservation of energy says…
2) Kinetic energy is…

3) … in the form of radiant energy.
4) Plants convert radiant energy to…
5) Biomass is the name for…
6) Examples of biomass are …
7) We can convert biomass to…
8) … makes some parts of the Earth warmer than others.
9) Radiant energy from the Sun…
10)… are limited.

18. Find in the text synonyms to the following words and word combinations.

1) give off, let off
2) change, turn into
3) conserve, save
4) accumulate, gather
5) numerous
6) make, create
7) substitute
8) reduced

19. Substitute the words and word combinations with their opposites from the text, changing negative sentences into positive ones.

1) Energy of motion isn't called **static** energy.
2) Potential energy doesn't **stay the same**.
3) The Earth's energy doesn't **go to** the Sun.
4) Chemical energy in plants isn't **released** in the form of sugars and starches.
5) Radiant energy from the Sun's rays doesn't make parts of the Earth **cooler**.
6) Heated air doesn't **move lower**.
7) Clouds aren't formed in **lower** atmosphere.
8) Solar energy doesn't cause water to **condense**.
9) Many years ago plants and animals died weren't buried **over** some layers of dirt and sand.
10) **Secondary** energy isn't found in nature.
11) The supplies of coal, oil, natural gas, and uranium aren't **boundless**.
12) We shouldn't convert energy **inadequately**.

20. Mark the following statements as True (T), False (F) or No Evidence (NE). If the statement is false or has no evidence, give your reason for this.

1) We take energy from nature.
2) Potential energy is converted to kinetic energy and vice versa.
3) Wood is the source of thermal energy.
4) Garbage and landfills are used to harness energy.
5) Radiant energy warms the Earth's surface.
6) Heated air is heavier than cooler air.
7) Primary sources of energy include fossil fuels, oil, coal and natural gas.
8) The supplies of non-renewable sources is limited.
9) Drop the slices of popatoes into the oil and fry until golden brown.

21. Work with your partner. Ask and answer special questions about the following notions.

MODEL: *What is energy? How can you define energy?*

Potential energy	Photosynthesis	Water cycle	Primary sources
Kinetic energy	Biomass	Air wind	Non-renewable resources

UNIT 2. DISOVERING PARTICLES

PRONUNCIATION PRACTICE

1. A. Pronounce the following names of chemical elements correctly.

aluminium	[æləˈmınıəm]	argon	[ˈɑːgɔn]
helium	[ˈhiːlıəm]	boron	[ˈbɔːrɔn
lithium	[ˈliθıəm]	carbon	[ˈkɑːbən]
beryllium	[bəˈrılıəm]	iron	[ˈaıən]
sodium	[ˈsəudıəm]	krypton	[ˈkrıptɔn]
potassium	[pəˈtæsıəm]	radon	[ˈreıdɔn]
calcium	[ˈkælsıəm]		
technetium	[tekˈniːʃıəm]	hydrogen	[ˈhaıdrıdʒən]
palladium	[pəˈleıdıəm]	nitrogen	[ˈnaıtrədʒən]
radium	[ˈreıdıəm]	oxygen	[ˈɔksıdʒən]
thorium	[ˈθɔːrıəm]		
uranium	[juˈreınıəm]	fluorine	[ˈfluəriːn]
plutonium	[pluːˈtəunıəm]	chlorine	[ˈklɔːriːn]
curium	[ˈkjuərıəm]	iodine	[ˈaıədiːn];
berkelium	[ˈbəːklıəm]		
americium	[ˌæməˈrısıəm]	phosphorus	[ˈfɔsfərəs]
polonium	[pəˈləunıəm]	lead	[led]
vanadium	[vəˈneıdıəm]	bismuth	[ˈbızməθ]

B. Which elements are radioactive?

2. Name the elements of the following chemical symbols and formulas. Practise them in the structures *This is* or *These are* according to the intonation marks.

MODEL:
a) ***Ca*** *– This is ˩calcium. Is this ˧calcium? This ˩isn't ˧sodium, this is ˩calcium. This is ˩calcium, ˩isn't it?*

b) ***H_2O*** *– These are ˩hydrogen and ˩oxygen. ˩Are these ˩hydrogen and ˊoxygen? These ˩aren't ˩helium and ˩oxygen, these are ˩hydrogen and ˩oxygen. These are ˩hydrogen and ˩oxygen, ˩aren't these?*

1) He, Li, Be, C, O, F, Ne, Na, Al, S, Cl, V, Kr, Rh, Pd, Tm, Bk.
2) $AgNO_3$, $AuCl_3$, CH_4 (methane), CaC_2, F_2Fe (iron fluoride), F_4U, Fe_2O_3, NaCl, PbO, $RaCl_2$.

GRAMMAR PRACTICE

3. A. Some nouns in English have irregular plural forms. Give the plural form of the following nouns. If necessary, consult the dictionary.

1) nucleus; 2) phenomenon; 3) spectrum; 4) diagnosis; 5) synthesis.

B. Are these nouns borrowed or are they native English? What language are they borrowed? To answer these questions, you may consult the Oxford Advanced Learner's Dictionary: https://www.oxfordlearnersdictionaries.com.

4. Match the name of the discovery with the name of the inventor, using the Possessive Case form.

MODEL: *Law of Partial Pressures –* ***Dalton's*** *Law of Partial Pressures.*

Maxwell, Mendeleev, Kelvin, Curie, Tesla, Fermi, Einstein, Rutherford, Chadwick

1) periodic table; 2) theory of electromagnetism; 3) discovery of radium; 4) discovery of neutron; 5) theory on existence of atomic nucleus; 6) theory of relativity; 7) laws of thermodynamics; 8) alternating current electrical system; 9) nuclear reactor.

5. Change the sentences into the Passive Voice.

MODEL: *Alessandro Volta invented the first battery. – The first battery …*
The first battery was invented by Alessandro Volta.

1) Democritus called the smallest piece of matter 'an atom' – The smallest piece of matter …
2) John Dalton explained atomic behavior based on weight measurements. – Atomic behavior…
3) Mendeleyev developed the periodic table of elements. – The periodic table of elements…
4) W. Roentgen discovered an x-ray. – An x-ray…
5) M. Curie studied radioactive "uranium rays". – Radioactive "uranium rays"…

6) Einstein proposed a theory about relation between energy and matter. – Relation theory…
7) Scientists released energy from the nucleus by splitting atoms. – Energy from the nucleus…
8) Otto Hahn and his group measured the half-life of uranium for the first time. – The half-life of uranium…
10) J. Thomson proved the existence of electrons and isotope. – The existence…
11) Thomas Edison built the very first practical power station in 1882 – The very first practical power station …

READING PRACTICE

Vocabulary for Study

a bar of gold слиток золота
a millionth of a second миллионная доля секунды
a speck of dust пылинка
bond [bɔnd**]** узел, связь
bundle [ˈbʌndl**]** связка, пучок
chemical reaction [ˈkemɪkəl rɪ`ækʃən] химическая реакция
dense плотный
electric charge [ɪˈlektrɪk `tʃa:dʒ] электрический заряд
enormous [ɪˈnɔ:məs] огромный
fission [fɪʃn] деление, расщепление
fission products продукты расщепления
matter [ˈmætə] материя
nuclear energy [ˈnju:klɪə] ядерная энергия
particle [ˈpɑ:tɪkl] частица
property [ˈprɔpətɪ] свойство
rubber band [ˈrʌbə `bænd] резиновая лента / полоска; резиновая нить; эластичная связь
to bind [baɪnd**] (bound, bound** [baʊnd]**)** связывать
to break down (broke down, broken down) разрывать(ся), ломать(ся)
to determine [dɪˈtə:mɪn)] определять, устанавливать
to lead [li:d] **(led, led** [led]**)** руководить, возглавлять
to occur [əˈkə:] иметь место, встречаться, наблюдаться
to release [rɪˈli:s] выпускать, выделять, высвобождать
to split apart делиться, расщепляться
to stretch растягивать(ся)
to strike [straɪk] **(struck, struck** [strʌk]**)** ударять
to vary [ˈvɛəɾɪ] варьировать(ся), различаться, меняться
vs. / v. [ˈvə:səs] (of Latin origin, abbreviation for *versus*) против; в отличие от, с равнении с, по отношению к
weight [weɪt] вес, масса

6. Read the international words that denote different particles.

atom [ˈætəm]	electron [ɪˈlektrɔn]	isotope [ˈaɪsəˌtəup]
element [ˈelɪmənt]	proton [ˈprəutɔn]	photon [ˈfəutɔn]
molecule[ˈmɔlɪˌkju:l]	neutron [ˈnju:trɔn]	nucleon [ˈnju:klɪˌɔn]

7. Read the proper names.

Enrico Fermi [enˈrɪkəu `fə:mɪ], University of Chicago [ju:nɪˈvə:sɪtɪ əv ʃɪ`kɑ:gəu]

8. Make sure you know the difference between the following words.

part *vs.* particle	charge *vs*. change
matter *vs*. substance	stretch *vs*. break (shoot)
center *vs.* nucleus	compound *vs.* combination
bundle *vs.* bond	table cloth *vs.* table salt

9. Match the English and Russian equivalents.

1) property	a) электрический заряд
2) electric charge	b) свойство
3) harness energy	c) расщеплять
4) strong force	d) расщепление
5) fission	e) добывать энергию
6) split apart	f) сильное взаимодействие
7) release energy	g) высвобождать энергию

10. Answer the following question and read the text below to check your answer.

What are the parts of atom?

Atoms, Molecules and Other Particles

To understand nuclear energy, it is important to first understand **atoms**, which are the building blocks of matter. An atom is the smallest part of any element that has all the properties of that element. Atoms are so small that it takes millions of them to make a speck of dust.

Today, we know that at least 92 different kinds of atoms occur in nature. Combining atoms of different elements – or atoms of the same element – forms **molecules**. For example, a bar of pure gold contains only atoms of one element. On the other hand, a molecule of table salt has one atom of the element sodium and one atom of the element chlorine. A molecule of water had two atoms of hydrogen and one atom of oxygen. The kind of molecule depends on which atoms combine. This combining is called **a chemical reaction**.

There are three basic particles in most atoms – protons, neutrons, and electrons. **Protons** carry a positive electrical charge (+). **Neutrons** have no electrical charge. Protons and neutrons together make a dense bundle at the center of an atom. This

bundle is called the nucleus. **Electrons** have a negative electrical charge (-) and move around the nucleus.

The nucleus in every atom of an element always has the same number of protons. For example, oxygen always has eight protons. However, the number of neutrons may vary. The different numbers of neutrons determine **isotopes** of the element.

Some of isotopes are like rubber bands that are stretched too far. We call these elements **unstable** isotopes. They break and change instantly to a different energy level. Scientists observe that the elements do this to become more **stable**. When a stretched rubber band breaks, you can't see its energy, but you can see the effect on the rubber band, which shoots across the room. Sometimes similar things happen when unstable isotopes break down and new bonds are formed. Energy is released. And although all atoms are extremely small, the energy holding together their centers is the strongest force known in nature. It is called the **strong force**. When the strong force is broken and new bond is formed, the energy that I released is vast.

When scientists began to understand the forces that bind atoms together, they wondered if a machine could be built to harness this energy. A team of scientists led by Enrico Fermi built a machine to harness the energy within atoms in 1942 at the University of Chicago. The machine, a reactor, caused uranium atoms to split in a process called **fission**. Fission releases energy from the nucleus of the atoms. When a neutron strikes the nucleus of uranium-235, the nucleus becomes more unstable, vibrates, and then splits apart. All this takes about a millionth of a second. We end up with two lighter-weight atoms of new elements, which are called fission products. Two or three neutrons are released. And an enormous amount of kinetic energy is released, mainly as heat.

(based on *The Harnessed Atom*: https://www.energy.gov/ne/downloads/harnessed-atom-student-edition)

LANGUAGE FOCUS

11. Choose the appropriate word form, paying attention to the difference in form and meaning.

1) ***small – smaller – the smallest***
a) An atom is _____ part of any element.
b) Atoms are invisible because they are so _____.
c)Atoms are _____ than molecules.
2) ***little – less – at least***
a) _____ 92 different kinds of atoms occur in nature.
b) The weight of fission products is _____ than the weight of uranium-235.
c) Before Curie's discovery scientists knew _____ about radiation.
4) ***strong – stronger – strongest***
a) The energy holding together their centers is _____ force known in nature.
b) It is called the _____ force.
c) It is _____ than thermal energy.
5) ***million – millions – millionth***

a) It takes _____ of atoms to make a speck of dust.
b) It takes about a _____ of a second to split the nucleus.
c) For _____ of years heat and pressure concentrated the chemical energy stored in plants and animals buried beneath layers of soil.
6) ***one – the one – first***
a) At _____ you should know what is an atom to understand nuclear energy.
b) On _____ hand a molecule may contain only atoms of _____ element. On the other hand, it may have atoms of different elements.
c) Among all scientists who studied fission Otto Hahn is _____ who is called the father of nuclear chemistry.

12. Complete of-phrases for uncountable nouns. Find the combinations from the text for Part A and make your own combinations for Part B.

A. 1) _____ of salt
2) _____ of dust
3) _____ of pure gold
4) _____ of water
5) _____ of matter

B. 6) a grain of _____
7) a molecule of _____
8) a wave of _____
9) a piece of _____
10) a type of _____

COMPREHENSION CHECK

13. Complete the sentences with the words in bold from the text.

1) The smallest piece that is still salt is called ….
2) In … atoms do not change. Instead, they combine with or separate from other atoms.
3) We use the number of … in an atom to identify it. For instance, carbon has 6, iron 26, gold 79, lead 82, uranium 92, and so on.
4) A second isotope of uranium, which contains three additional …, is uranium-238 or U-238 (92 + 146 = 238).
5) Some proton-neutron combinations are more … than others. Those that are … do not change.
6) The … of an element have the same chemical properties, but they may differ in their nuclear properties
7) If the positively charged … and the negatively charged … are equal in number, they balance each other. As a result, the atom has no electrical charge.
8) When … is broken and a new bond is formed, the energy that is released is vast.
9) In a chain reaction a neutron causes an atom of U-235 to undergo …., or split.
10)… are the basic building blocks of everything in the universe.

14. Find in the text words with the opposite meaning.

positive –	similar –	combining –
stable –	break apart –	weak force –
stay the same –	hold together –	heavy weight –

15. Substitute the words and word combinations in bold type with their synonyms from the text.

1) The radiation being fired at the copper **is knocking** some of the electrons from the atoms, and this had the effect of making the atoms **give off a burst of** energy, an X-ray.
2) The invention makes it possible to **obtain** more **energy** at the transmission output than is applied to its input.
3) The strong force is what **binds** the quarks together to form the nucleus at the heart of the atom.
4) The energy derived from **splitting** uranium and plutonium atoms was originally used for the ultimate weapon, the atomic bomb.
5) This substance is made from **similar** molecules.
6) **Various** chemical combinations **are found** in **the wild**.
7) Some particles are **negatively charged,** while other particles **take** a positive electrical charge or **stay neutral**.
8) The fission process **is finished with** atoms of new elements that **weigh less**.

16. Mark the following statements as True (T) or False (F). If the statement is false, give your reason for this.

1) Molecules are the smallest units of matter.
2) Neutrons have no electrical charge.
3) Atoms combine to form isotopes.
4) The energy that holds the nucleus of an atom is stronger than geothermal energy.
5) Atoms are indivisible.
6) The nucleus of each atom of a specific element contains the same number of neutrons but the number of protons may vary.
7) Isotopes of an element are identified by adding the number of protons and neutrons together and writing the sum next to the chemical symbol for the element.
8) When uranium is bombarded with neutrons and splits apart, the resulting elements are lighter in mass.

17. Answer the questions.

1) What are the building blocks of matter?
2) What is the source of nuclear energy?
3) Is an atom the smallest particle?
4) What are molecules made of?
5) Is the nucleus made of protons, neutrons or electrons?

6) The nucleus of an atom has the same number of electrons, doesn't it?
7) How are unstable isotopes formed?
8) Where does the strong force occur?
9) Who built the first nuclear reactor?
10) Could you describe fission?

UNIT 3. ELECTRICITY BASICS

PRONUNCIATION PRACTICE

1. Read the following words observing the pronunciation of the sound [ə:]. NOTE that it's a 3rd syllable type (*vowel+r*).

A. Work, worker, serve, service, bury, convert, observe, turn, term, burn, versatile, surplus, turbine, world, first, thermal, firm, surface, certain, dirt, earth, Thursday.
B. 1) Surplus electricity from solar would be used to turn turbines at night. 2) Marie Curie was the first person who received the Nobel Prize twice. 3) 16 terawatts of energy hits the Earth's surface every 88 minutes. 4) The breakdown of energy sources currently used in buildings is about one third biomass, one third electricity and heat, and one third fossil fuels. 5) Research works of the potential for geothermal, ocean thermal energy conversion are continuing. 6) Conversion is turning one form of energy into another one.

2. Group the following words according to the sounds. Mark similar syllables and formulate the reading rules.

[ɔ]	[ʌ]

Come, called, all, done, small, almost, falling, something, always, one, other, halt, above, company, money, sometimes, alternate, discovery.

3. Practise the structures with *There is / There are.* Correct the statements if there is a mistake.

1) There are ˈtwo types of ˈenergy.
2) There are ˈspecial reˈquirement for ˈpower plant conˈstruction.
3) There is a ˈvital need in ˈcivil engiˈneers in our ˈcountry.
4) There is an ˈatom power ˈplant in BelaˈrusS.
5) There is ˈno need to ˈharness atom ˈenergy.
6) There is ˈno radiˈation in atmoˈsphere.
7) There are ˈseveral ˈparticles in a moˈlecule.

GRAMMAR PRACTICE

4. Fill in the gaps with either the indefinite article (a/an) or with no article (−). NOTE that the indefinite article (a/an) is used with countable nouns and no article (−) is used with uncountable nouns or nouns in the plural form.

1) It’s difficult to imagine __ life without __ electricity.
2) __ atom is composed of __ protons, __ neutrons and __ electrons.
3) __lead, __ water and __concrete can stop __ radiation from gamma waves.
4) In __ chain reaction __ neutron causes __ atom of U-235 to undergo __ fission.
5) At __ power plant __heat is converted to __ mechanical energy that is then converted __ electricity.
6) __nuclear science is used in __industry, __medicine, __agriculture to provide __ energy, save __ lives and increase __ productivity.
7) __matter exists in __ four states – __ solid, __liquid, __gas and __ plasma.
8) __current is __electricity in __motion. When __current flows through __ conductor it creates __heat because of __resistance.
9) __coal, __petroleum and __nuclear power are __secondary sources.
10) __kilogram of __coal or __liter of __oil contains about __30 megajoules of energy.

5. Fill in the gaps with articles. Use ‘the’ if the noun is specified by the context or refers to a unique object and ‘a/an’ if the noun is not defined by the context or refers to any member of the class.

1) Power plants are built to meet our demands for electricity. However, __ demand for electricity changes from year to year.
2) We are very familiar with __ electricity that flows through wires. __ light in your bedroom turn on when you flip __ switch.
3) __ energy that is needed to produce __ electricity for our homes comes from secondary sources.
4) __simple circuit may include two components: __battery and __lamp. __ circuit allows current to flow from __battery to __lamp, through __lamp, then back to __battery.
5) __ volt is __ measure of electric pressure.
6) __ distance between __ Earth and __ Sun constantly changes as __ Earth revolves around __ Sun.
7) Everything in __ universe is made of atoms − __star, __tree, __animal and __human body.
8) Two of __ tiny particles that make up atoms − protons and electrons − are __ bearers of electric charge. __protons have __positive charge and __electrons have __ negative charge.
9) Customers pay for __electricity they use.
10) There's __ basic law of physics called __ conservation of energy that explains how you can get energy.

6. Match the English prepositions of place with their Russian equivalents.

in	на
at	под
on	над
over	через
under	вдоль, по
through	около
against	вокруг
along	из, от
above	в
toward (to)	у
from	внутри
inside	снаружи
outside	
around	
near	

7. Choose the correct preposition.

1) Plug *in/on* your TV and electrical energy flows *into/along* it *over/through* a cable. The cable runs all the way *from/outside* your TV – underground or *in/through* the air – *to/inside* the power plant.
2) An electric motor is essentially just a tight coil of copper wire wrapped *on/around* an iron core that's free to rotate at high speed *inside/above* a powerful, permanent magnet.
3) If you move an electric wire *in/inside* a magnetic field, you make electricity flow *toward/through* the wire – in effect, you generate electricity.
4) Edison opened a temporary power plant *along/near* Fleet Street *in/at* London in January 1882.
5) When a switch is *off/on* the electrical circuit completes and current flows *from/against* the negative end of the power source, *in/through* the conductors *to/around* the load, and finally *to/at* the positive end.

READING PRACTICE

Vocabulary for Study

adaptable [əˈdæptəbəl] адаптируемый, гибкий
appliance [əˈplaɪəns] прибор, электроприбор
blade [bleɪd] лопасть
coil [kɔɪl] катушка, обмотка
copper wire [ˌkɔpə `waɪə] медная проволока, медный провод
flow [fləʊ] движение; поток
generation [ˈdʒenəˌreɪʃn] производство
lightning ['laɪtnɪŋ] молния
long distance длинная дистанция

magnetic field магнитное поле
network сеть, система
pipe [paɪp] труба
power grid электросеть
shaft [ʃɑ:ft] вал; ось
steam [sti:m] пар
substation подстанция
switch выключатель
to be accustomed (to smth) [əˈkʌstəmd] привыкнуть (к чему-л.)
to come to a halt [hɔ:lt] остановить(ся)
to direct направлять
to distribute [dɪstrɪˈbju:t] распределять
distribution [dɪstrɪˈbju:ʃən] распределение
to generate [ˈdʒenəˌreɪt] генерировать, получать, производить
to pump накачивать, перекачивать
to run (ran, run) управлять
to spin (span, spun) вращать(ся)
to take smth for granted принимать как должное
to transmit [trænzˈmɪt; træns-] передавать
transmission [trænzˈmɪʃən; træns-] передача
utility [ju:ˈtɪlɪtɪ] электро- или энергоснабжающее предприятие / организация; электроэнергетическая служба
versatile [ˈvə:səˌtaɪl] универсальный, многопрофильный
voltage current [ˈvəultɪdʒ] ток напряжения
windmill ветряная мельница

8. Find the rhyming pairs and read them aloud. Some pairs are missing, so make up your own rhymes.

A. ready, wire, coil, steam, correct, source, through, facility, mile, kinetic, transmission

B. hire, team, steady, true, horse, utility, magnetic, attract, generator, versatile, allergy

9. Match English and Russian equivalents

1) производить электричество	a) generate electricity
2) поставлять электричество	b) provide with electricity
3) обеспечивать электричеством	c) electrical charge
4) электросеть	d) (electric) current
5) линии электропередач	e) electrical appliance
6) электростанция	f) electric flow
7) электроподстанция	g) power grid
8) электроприбор	h) power station
9) электрический заряд	i) high voltage

10) ток	j) electrical substation
11) высокое напряжение	k) deliver electricity
12) подача электричества	l) transmission lines

10. Answer the following question and read the text below to check your answer.

How does electricity get to our homes?

Electricity Basics

You just flip a switch or plug in an appliance, and electricity there. But how did it get there? Many steps go into providing us with electricity.

Of all the forms of energy, electricity is the one we rely on most in our day-to-day lives. In fact, we are so accustomed to using electrical energy that we tend to take it for granted – until service stops and everything comes to a halt.

Electricity is the most versatile and adaptable form of energy. We use it at home, at school, and at work to run numerous machines and to heat and light buildings.

To scientists, electricity is the flow of tiny particles called electrons that have an electrical charge. Sometimes you see it in the sky as lightning or experience it as static electricity when your hair is attracted to a comb or when there is a crackling sound as you take off your sweater.

To produce a steady flow of electricity, we use a generator. A generator is a coil of copper wire that spins inside a magnetic field. This produces a flow of electrons through the coil of wire.

Electricity is generally produced at a power plant by converting one of the primary sources of energy into electricity. The sources used to make electricity are fossil fuels (coal, oil, or natural gas), uranium, or falling water. Solar power, wind, biomass, and geothermal sources are also used.

Most power plants are similar in several important ways. They generate electricity by heating water to produce steam. The steam is then directed against the blades of a turbine, making it spin much like the way air makes a windmill’s blades spin. As steam flows over the blades of a turbine, kinetic energy turns the shaft. The turbine turns the generator and produces electricity.

One way to think about how electricity is distributed is to imagine water being pumped through pipes. The water flows from high pressure at the pump down the pipes toward the lower pressure at your home. With electricity, this “pressure” difference is called voltage.

The electricity produced in the generator is sent out over wires to homes, schools, hospitals, farms, offices, and factories.

Companies that develop, own and operate power plants as well as sell electricity are called utilities. State and local governments regulate utilities. When governments regulate, they make sure that the utility provides good services at prices that are fair to customers and the utility and that our electricity supply is steady. In return, the utility is allowed to be the only one in its area.

To get electricity to everyone who needs it, utilities send large amounts of electrical power over long distances. This is done through a network of transmission lines called the power grid. At the power plant the voltage from the generator is increased to transmit it more efficiently. The high voltage current is then sent through the power grid to a substation where it is transformed to lower voltages for distribution to homes, schools, industries. So, there are three main steps in getting electricity:

• Generation – using a source of energy to produce electricity

• Transmission – using high voltage lines from the power plant to distribute electricity to areas that may be far from the power plant

• Distribution – using lower voltage lines, substations, and transformers to deliver electricity to local customers.

LANGUAGE FOCUS

11. Look back at the text again and find cases of using articles with the following nouns. Comment them on.

1) form; 2) flow; 3) electricity; 4) power plant; 5) source; 6) steam; 7) turbine; 8) generator.

12. Find 3 grammar mistakes in each sentence and correct them.

1) For scientists electricity is a flow of tiny particles called electrons that has an electrical charge.
2) A generator is a coil of a copper wire that spins upside the magnetic field.
3) The sources are used to make electricity are the fossil fuels, uranium, or a falling water.
4) Electricity that produced in the generator is send out over wires to homes, schools, hospitals, and factories.
5) As steam flows the blades of a turbine, a kinetic energy turns into the shaft.
6) To get electricity for everyone who needs, utilities send a large amounts of electrical power over long distances.
7) The high voltage current is sent over the power grid to a substation where it transforms to low voltages.
8) Of all forms of energy, electricity is one we rely in our daily lives.

13. Insert prepositions in the following word combinations.

1) take it __ granted
2) bring __ a halt
3) plug __ a device
4) rely __ electrical energy
5) be accustomed __ electrical light
6) use electricity __ home and __ work
9) spin __ a magnetic field
10) direct __ the blades __ a turbine
11) flow __ the wire
12) pump water __ pipes
13) flow __ high ___ lower pressure
14) send __ electricity __ the wires

7) produced __ a power plant
8) a lightning __ the sky
15) send __ long distances
16) send __ the power grid __ substations

14. Match the words and word-combinations in column A with the words and word-combinations in Column B to make up all possible word-combinations.

A	B
1) a flow of	a) systems
2) transmission	b) voltage lines
3) distribution	c) flows
4) to make	d) using electrical energy
5) to generate	e) a switch
6) to produce	f) granted
7) steam	g) tiny particles
8) water	h) in
9) to be accustomed to	i) electrons
10) to take for	j) in one aspect of the industry
11) to be involved	k) in the generator
12) lower	l) lines
13) flip	m) electricity

15. Paraphrase the following words and word-combinations by using your active vocabulary.

Bring to a halt, continuous, to believe that something is true, once, very small, to transform, to operate machines, many, to connect a piece of electrical equipment to an electricity supply, electrify, click.

COMPREHENSION CHECK

16. Complete the following sentences according to the text.

1) … is one of all the forms of energy that we rely on most in our everyday live.
2) Electricity is the flow of tiny particles called …
3) Most power plants generate electricity...
4) Electricity is the most versatile and adaptable form of energy that we use…
5) We see an electrical charge…
6) The steam is then directed against the blades of a turbine, making it…
7) … is to imagine water being pumped through pipes.
8) At the power plant the voltage from the generator is increased…
9) … is then sent through the power grid to …
10) Electricity is the only reliable form of energy that we take…

17. Substitute the words and word combinations in bold type with their synonyms from the text.

1) We **are so used to** using electrical energy that we **think it is true and normal**.
2) Electricity is **generated** at a power plant by **transforming** one of the primary sources of energy into electricity.
3) The steam **is passed** to the turbine generators to produce electricity.
4) Electricity is a reliable part of our **daily** life.
5) The three steps in getting electricity involve **the acts of producing, delivering, and sending out** electricity.
6) The shaft **turns** thanks to kinetic energy.
7) Electrical energy is a **universal and flexible** (versatile and adaptable) form of energy, but it is difficult to store.
8) Most power plants **operate according to common principles**.

18. Mark the following statements as True (T), False (F) or No Evidence (NE). If the statement is false or has no evidence, give your reason for this.

1) Electricity is used everywhere.
2) Electricity is adaptable and environmentally friendly.
3) Electricity is used to heat and light buildings.
4) Electricity is generated from atoms.
5) Electricity is produced from primary sources of energy.
6) All power plants generate electricity by heating water.
7) Potential energy is converted to kinetic energy in a turbine,
8) Electricity supply includes generation, distribution and transmission.
9) The word *utility* is used to describe the measument of usefulness that a consumer obtains from any good.

19. Answer the following questions.

1) Will you recall the situations when we take electricity for granted?
2) What do we call electrons?
3) Can you give any examples of an electrical charge? What are they?
4) What is a generator designed for?
5) What do we call a generator?
6) How is electricity produced?
7) What do we call voltage?
8) Where is electricity produced?
9) What energy sources do we use to make electricity?
10) Are there three or four steps of sending out electricity? What are they?
11) What is a power grid?

SECTION 3. THE CONSTRUCTION OF THERMAL AND NUCLEAR POWER PLANTS

Our nation's power plant fleet must include a mix of

solar, wind, hydro, natural gas and nuclear plants.
Lynn Good

UNIT 1. THE BIGGEST POWER PLANTS

PRONUNCIATION PRACTICE

1. Practise the following words and sentences observing the correct pronunciation of the sound [w].

A. We, web, wet, were, way, wild, want, what, somewhat, where, watt, kilowatt, megawatt, wind, wood, water, waste, wave, wire, why, which, wheel, work, network, workout, world, worldwide, worse, worth, wonder, award, switch, twelve, twenty, twice, twist, between, power.
B. 1) This week the weather has been worse. 2) William was working on Wednesday. 3) Why was the queen weary? 4) I wonder how to win an award on power engineering. 5) The weight of a wind turbine per kilowatt of installed power has been halved nowadays. 6) The working materials are on our workshop website. 7) Classical wire telephone network is widely replaced by wireless network of data transmitting. 8) Major releases will be to waste water or solid waste.

2. Practise the following words and word combinations observing the difference in pronunciation of the sounds [f], [v] and [w].

A.

west – vest	award – afford
wet – vet	power – hover
wire – fire	watt – volt
wind [ai] – find	wonder – founder
wheel – feel	await – available
wood – food	weather – vessel
worse – verse	workout – vertical

B. However, five wheels, heavy waves, every week, half way, we've won, twelve watt, a piece of wood, a drop of water, convert power, voltage value of twenty Volt, ways to preserve environment.

3. Read the following sentences and mark pauses with a vertical line '|' to separate the main clause from the subordinate one.

MODEL: *I wonder | how energy supply would change in future.*

1) I wonder why you want to become an engineer. 2) What are you going to do when you graduate? 3) Engineers must act on predictions of what people will need in the future. 4) When a conversion process wastes a lot of energy it is called inefficient 5) Water supply is what we need for a cooling system. 4) When scientists began to

understand the forces that bind atoms together they wondered if they could harness this energy. 6) The power plant is a location in which the energy conversions take place. 7) Much depends on where you plan to build a power plant. 8) When there is a problem at a power plant anywhere in the world experts study what happened to find ways to make plants safer.

GRAMMAR PRACTICE

4. Identify and underline adjectives in the following sentences. Say what part of speech they modify.

1) Vertical shaft windmills with rectangular blades were located in the 13th century China. They were commonly used for irrigation. 2) Electric power systems are comprised of components that produce electrical energy and transmit this energy to consumers. As the North Carolina State University scientists declare, a modern electric power system has mainly six main components: (1) power plants which generate electric power, (2) transformers which raise or lower the voltages as needed, (3) transmission lines to carry power, (4) substations at which the voltage is stepped down for carrying power over the distribution lines, (5) distribution lines, and (6) distribution transformers which lower the voltage to the level needed for the consumer equipment. 3) All electricity produced in a power plant is *alternating current* (AC). The type of electric current found in your home is *direct current* (DC). 4) Power plants can be divided into two categories: conventional and non-conventional power plants.

5. Identify and underline adverbs in the following sentences. Say what part of speech they modify.

1) The production and transmission of electricity is relatively efficient and inexpensive, although unlike other forms of energy, electricity is not easily stored, and thus, must be produced based on the demand. 2) A 3 phase alternating current (AC) generator is commonly known as the alternator. 3) The turbine is mechanically coupled with alternator in a way that its rotor will rotate with the rotation of turbine blades. 4) There are basically 2 types of transformers: step-up transformers and step-down transformers. Depending on the use of the transformers, both are extremely important for different circuits. 5) Conserving energy is an obvious answer, but how can we do this effectively and economically? 6) This article is about efficient energy use and environmentally friendly energy resources. 7) Fossil fuels are non-renewable and that is why they are becoming too expensive or too environmentally damaging to retrieve (=to get). 8) After the Chernobyl nuclear disaster in 1986, public confidence in nuclear power was badly shaken.

6. Open the brackets using either the comparative or the superlative form of an adjective / adverb.

1) Step-up transformers convert alternating current (AC) voltage to a *(larger, largest*) AC voltage value. Step-down transformers convert AC voltage to a *(smaller, smallest)* AC voltage value. 2) In comparison to thermal power plants, hydroelectric plants are *(more ecologically friendly, most ecologically friendly)* as they are free from fuel combustion. 3) Higher voltages can be transmitted *(more efficiently, most efficiently)* over long distances than lower voltages. 4) A thermal power station is the *(more conventional method, most conventional method)* of generating electric power with reasonably high efficiency. 5) Candles, gas lights, oil lamps, fires and electric lighting are widely known forms of artificial lighting. Do you know which of them is the *(more common, most common)*? 6) Unplugging charges for our phones and music layers means wasting (less, least) energy or energy conservation. 7) Which way of energy production affects our environment *(worse, worst)* of all: cutting trees or drilling for oil or mining coal and uranium or damming rivers for hydropower?

READING PRACTICE

Vocabulary for Study

accidents [ˈæksɪdənts] аварии, неполадки
average [ˈævərɪdʒ] средний
array [əˈreɪ] батарея; модуль; панель
billion [ˈbɪlɪən] миллиард, 10^9, биллион, несметное количество

Британцы и американцы используют эти слова по-разному: 1 billion (USA) = a thousand millions тысяча миллионов, 1 billion (GB) = a million millions миллион миллионов, 1 trillion (USA) = a million millions миллион миллионов, 1 trillion (GB) = a billion millions миллиард миллионов. Таким образом, британский вариант означает большее количество в каждом случае. Однако, американские варианты начинают доминировать.

capacity [kəˈpæsətɪ] производительность; грузоподъёмность; вместимость; мощность; способность (*материала*); электрическая ёмкость; подача (*напр. насоса*); расход, пропускная способность
capacity factor коэффициент использования мощности

Отношение реально выработанной на атомной станции энергии за определенный период времени к той энергии, которая могла бы быть выработана при работе атомной станции на проектной мощности в течение всего этого периода времени.

chart [tʃɑːt], *n* диаграмма; схема; чертёж; таблица; график; карта; *v* наносить на карту; чертить диаграмму, схему, чертёж или карту
combined-cycle natural gas plant газовая часть парогазовой установки
entire [ɪnˈtaɪə] полный, целый, весь, полный; цельный, из одного куска
have to do smth *(modal verb)* вынужден / приходится что-л. делать; должен
installed capacity установленная мощность/емкость
irrigation орошение, ирригация, промывание, спринцевание
kWhs = kilowatt-hours [ˈkɪləwɔt `auəz]
kWhs per year киловатт-часов в год, киловатт-часов ежегодно

MW = megawatts
24 hours a day 24 часа в сутки, круглосуточно, круглые сутки
nameplate [ˈneɪmpleɪt] паспортная табличка; табличка номинальных данных (оборудования); табличка с основными характеристиками (оборудования); пластинка с надписью, шильдик (прибора); фирменный штемпель; именная печатка
Nameplate Installed Capacity установленная мощность/емкость по паспорту; паспортная мощность/емкость
outages [ˈaʊtɪdʒɪz] **for refueling and maintenance** (запланированное) отключение электричества для технического обслуживания
photovoltaic installations фотоэлектрические установки, сооружения
since, *adv* (*в начале предложения*) так как, поскольку
Three Gorges Dam [ˈθri: ˈgɔ:dʒɪz `dæm] ГЭС «Три ущелья»
to assist fish оказать помощь в целях увеличения производства рыбы
to define [dɪˈfaɪn] давать определение, устанавливать
to divide by [dɪˈvaɪd] делить на, **to multiply by** [ˈmʌltɪplaɪ] умножать на, **to equal** [ˈi:kwəl] = **to be equal to** равняться, быть равным
to estimate [ˈestɪmeɪt] подсчитывать, оценивать
to ramp down постепенно спускать воду
to run работать, производить электроэнергию
to surpass [səˈpɑ:s] превосходить, превышать
to top быть во главе; стоять на первом месте, быть первым; превосходить
utility-scale, *n* шкала полезности; значительное количество; в промышленных масштабах; *adj*. крупномасштабный
wind farm ветропарк, ветряная электростанция, ветровая электростанция, ветроэлектростанция, парк ветротурбин, поле ветротурбин

7. Read the international words and guess their meaning. Mind the stress.

hydroelectric [ˌhaɪdrəʊɪˈlektrɪk]	dam [dæm]	ramp [ræmp]
installation [ɪnstəˈleɪʃən]	scale [skeɪl]	assist [əˈsɪst]
combine [kəmˈbaɪn]	cycle [ˈsaɪkl]	photo [ˈfəʊtəʊ]
kilowatt [ˈkɪləʊwɔt]	natural [ˈnætʃərəl]	gas [gæs]
megawatts [ˈmegəwɔt]	border [ˈbɔ:də]	factor [ˈfæktə]

8. Read the numerals. NOTE that it's easy to confuse *15* and *50*, *19* and *90* when you hear them. The stress patterns in them are usually like this:

↓ _ in the numerals ending in -*ty*: 60 [ˈsɪkstɪ]**;**
_ ↓ in the numerals ending in -*teen*: 16 [ˌsɪks`ti:n**].**

A. 13, 14, 15, 16, 17, 18, 19.
B. 20, 30, 40, 50, 60, 70, 80, 90.
C. 13 – 30, 14 – 40, 15 –50, 16 – 60, 17 – 70, 18 – 80, 19 – 90.

9. Read the numerals. Say where they represent a number and where they represent a year (date).

A. 103; 1,030; 10,300; 103,000; 1,030,000; 10,300,000; 103,000,000; 1,030,000,000; 10,300,000,000; 103,000,000,000.
B. 225; 2,250; 22,500; 225,000; 2,250,000; 22,500,000; 225,000,000; 2,250,000,000; 22,500,000,000; 225,000,000,000.
C. 2016; 2019; 1998; 1893; 1000; 2000; 2004; 2150; 3000; 1772; 1616; 1660; 1880.

10. Read the proper names.
Itaipu [ɪtaɪˈpu], Brazil [brəˈzɪl], Paraguay [ˈpærəgwaɪ], China [ˈtʃaɪnə].

11. Match the English and Russian equivalents.

1) utility-scale	a) паспортная мощность
2) outages for refueling and maintenance	b) коэффициент использования мощности
3) accidents	c) таблица
4) capacity factor	d) фотоэлектрические установки
5) kWhs per year	e) шкала полезности
6) Nameplate Installed Capacity	f) отключение электричества для технического обслуживания
7) chart	g) киловатт-часов в год
8) photovoltaic installations	h) аварии, неполадки
9) to surpass	i) стоять на первом месте
10) to define	j) превосходить, превышать
11) to top	k) давать определение

12. Answer the following question and read the text below to check your answer.

What types of power plants do you remember?

The Biggest Power Plants in the World – Hydro and Nuclear

The Itaipu Hydroelectric Plant, located on the border between Brazil and Paraguay, produces 103 billion kWhs a year, more than any power plant in the world, even surpassing the Three Gorges Dam in China.

There have been some cool articles on the biggest power plants in the world, and China always tops the chart with its 22,500 MW Three Gorges Dam Hydroelectric Plant. In 2007 the Three Gorges was the world's biggest dam, biggest power plant and biggest consumer of dirt, stone, concrete and steel.

But that isn’t actually true since it depends on how you define the word *big*.

The usual, but somewhat incorrect, measure of what’s *biggest* is the so-called Nameplate Installed Capacity, which is the maximum power a plant could produce at any moment when everything is running perfectly.

But the real measure of *big* is what the power plant actually produces. The difference between these two measures is what's known as the capacity factor. The capacity factor is equal to what the plant, a solar array or a wind farm produces in kWhs per year divided by what it could produce if it ran at capacity, 24 hours a day, every day for the entire year.

A year has 8,766 hours, and we like to use kWhs for production since that's what shows up in everyone's electric bill at the end of the month.

No power plant runs all the time. Sometimes the hydroelectric dam has to ramp down to use the water to assist fish, irrigation or navigation and not to use it to produce electricity. Often the sun isn't shining or the wind isn't blowing. There are outages for refueling and maintenance, and accidents.

The U.S. Energy Information Administration estimates that utility-scale solar photovoltaic installations in America had an average capacity factor of 27% in 2016, with utility-scale wind farms at 35%, hydroelectric at 38%, coal plants at 55%, combined-cycle natural gas plants at 56% and nuclear plants at 92%.

(to be continued)

(by James Conca: *https://www.forbes.com/sites/infiniti/2017/09/01/mind-over-matter-engaging-your-biggest-muscle-your-brain-in-workouts/#47c5aaeb5449)*

LANGUAGE FOCUS

13. Fill in the chart with the proper derivatives from the text.

Produce, watt, irrigate, navigate, differ, install, actual, correct, one, photo, nature, electricity, usually, perfect, what, thing, consume.

Noun	Pronoun	Adjective	Adverb

14. Define a part-of-speech meaning of the words in bold type and translate them according to the context.

1) But that isn't actually true **since** it depends on how you define *big*.
a) conjunction b) preposition c) adverb

2) The difference between these two measures is what's known **as** the capacity factor.
a) conjunction b) preposition c) adverb

3) The Itaipu Hydroelectric Plant … produces 103 billion kWhs a year, more than **any** power plant in the world …
a) pronoun b) adverb c) verb

15. Paraphrase the following words and word-combinations by using your active vocabulary.

Large, as, whole, really, some, a few, among, per, the same, true, always, in case, named as, the most.

16. Insert prepositions.

1) An average amount is calculated … adding some amounts together and then dividing … the number of amounts. 2) When a power plant is described as a «1000 MW» plant, what does that mean? – It means that the capacity … the power plant is 1000 MW. When it is running … full capacity, its output (выходная мощность) is 1000 MW. 3) Nine multiplied … two is equal … eighteen. 4) Twelve divided six equals … two. 5) The program's success depends … the amount … financial support … local governments. Yet we can hardly rely … them. 6) In this journal you can find very interesting articles … power plant construction. 7) The United Kingdom is one … the best locations for wind power … the world, and is considered to be the best … Europe. 8) Our hotel has high ceilings, spacious rooms, and constant power outages … maintenance. 9) The project development process applies to the development … any privately-financed, utility-scale power plant.

COMPREHENSION CHECK

17. Complete the following sentences according to the text.

1) The Itaipu Hydroelectric Plant is located …
2) The real measure of *big* is …
3) China … the Three Gorges Dam Hydroelectric Plant.
4) Nameplate Installed Capacity is the maximum power … is running perfectly.
5) The capacity factor is equal to … for the entire year.
6) … had an average capacity factor of 27% in …
7) No power plant runs all the time, there are outages …

18. Substitute the words and word combinations in bold type with their synonyms from the text.

1) Radio stations reported brief **periods when a power supply or other service is not available**.
2) The company aimed to double its electricity-generating **amount**.

3) The Government had **total** control of the power plant project.
4) «Green Power» is electricity that **relies on** renewable environmentally friendly sources of energy.
5) The Lukolm natural gas power plant **is at the highest place in** the list of power plants in Belarus.
6) The total manufacturing capacity of the Lukolm natural gas power plant is estimated at 2,640 MW **for each** year.
7) **The maximum rated output of a generator, or other electric power production equipment under specific conditions designated by the manufacturer** is commonly expressed in megawatts (MW) and indicated on a **flat, usually rectangular piece of metal, wood, or plastic on which the name of a person or company is printed**.
8) **As** an electric utility must regularly meet the needs of customers, it must predict their needs for electricity in the future.
9) Most power **stations generate** electricity by heating water to produce steam.
10) As the Energy Committee **considers**, our resources **are decreasing in volume**.
11) The utility **is situated** near the river as it needs hydraulic **power** and **the amount of space** for effective maintenance.

19. Match the words and word-combinations in column A with the words and word-combinations in Column B to make up all possible word-combinations.

A	B
1) articles on	a) refueling and maintenance, and accidents
2) equal to what	b) how you define *big*
3) outages for	c) per year
4) it depends on	d) factor of 27%
5) it ran every day	e) the biggest power plants
6) divided by	f) for the entire year
7) an average capacity	g) the plant, a solar array or a wind farm produces
8) everything	h) what it could produce
9) produces in kWhs	i) is running perfectly

20. Mark the following statements as True (T), False (F) or No Evidence (NE). If the statement is false or has no evidence, give your reason for this.

1) The real measure of *big* is what the power plant actually produces.
2) Power plants run all the time.
3) The biggest power plants in the world are hydro and nuclear.
4) The Itaipu Hydroelectric Plant produces 103 billion kWhs a year less than any power plant in the world.

5) The capacity factor is equal to what s power installation produces in kWhs per year divided by what it could produce if it ran at capacity every day for the entire year.
6) Wild sunflowers are coarse, hairy, leafy, fast-growing annual plants that grow to an average height of between one and two metres.
7) The meaning of the word *big* applied to a power plant doesn't depend on the definition given in the dictionary.
8) While the sun isn't shining or the wind isn't blowing, a power plant isn't running.
9) The Itaipu Hydroelectric Plant is located in Canada.

21. Answer the questions.

1) What types of power plants are mentioned in the text?
2) What is the capacity factor of each of them?
3) Where is the Itaipu Hydroelectric Plant located?
4) Where is Three Gorges Dam located?
5) What do we call the Nameplate Installed Capacity?
6) Why does the hydroelectric dam have to ramp down
7) What is the meaning of the word *big* given in the English-English dictionary?
8) What is the meaning of the word *big* according to the text?
9) Is there any information concerning the biggest power plant in the world in the text?

UNIT 2. TOP-LIST POWER PLANTS

PRONUNCIATION PRACTICE

1. Read the following words, paying attention to the pronunciation of the sound [a:].

A. Are, car, far, farm, fast, half, start, hard, sharp, mark, market, carbon, part, apart, impart, particle, department, park, guard, garbage, art, architect, large, enlarge, charge, harness.
B. 1) Are you going to take part in a car race? 2) A large pile of garbage was left on the parking lot. 3) In the past month, Israel allowed the transfer of about half of Gaza's power plants' industrial fuel needs. 4) The country intends to participate in the carbon market. 5) The largest wind farm is in China. 6) The department of Energy has programmes to impart new technologies to power plant construction.

2. Read the following pairs and compare the pronunciation of [a:] with other vowel sounds. NOTE that the words are different in their meaning.

[a:] – [æ]	[a:] – [ʌ]
part – pat	part – pump
plant – planned	bar – but
half – have	carbon – couple

art – ate dark – duck
march – much

3. Practice pronunciation of the following sentence structures. Mind the intonation of enumeration.

1) Elec'tricity is 'used in our /homes, | /schools, | /hospitals, | /farms, | /offices and \factories.
2) The 'sources of 'energy are /coal, | 'natural /gas, | /oil, | u/ranium | and 'falling \water.
3) 'Energy ·sources can be re/newable and ·non-re\newable.
4) 'Each power 'plant tech'nology has ad/vantages and disad\vantages.
5) Power 'plants are di'vided into ·two \categories: | con/ventional and ·non-con\ventional.
6) Con'ventional ·power 'plants are /fossil fuel ·power ·plants, | hydroe/lectric ·power ·plants | and \nuclear |power |plants.
7) 'Non-con·ventional ·power 'plants are /wind ·power ·plants, | /solar ·power ·plants, | geo/thermal ·power ·plants | and bio\mass |power |plants.
8) 'Large 'nuclear ·power 'plants are lo'cated in /China, | Ja/pan, | 'South Ko/rea, | /France, | U/kraine and \Canada.

GRAMMAR PRACTICE

4. Identify and underline compound adjectives or adverbs made up of an *Adverb + Participle II*, an *Adverb + Adverb*, or an *Adverb + Adjective* combinations in the following sentences.

1) Power stations may be located a long way from densely populated areas. They are usually quite large. 2) The electricity cost in our country seems rather reasonable. 3) Belarus can become completely energy independent by the year 2050. 4) The photovoltaic power capacity in Belarus remained relatively unchanged for the last 5 years. 5) Deregulation very often leads to removing barriers to competition. 6) New smart grid systems help utilities meet the demand for electricity very efficiently[1]. 7) New smart grid systems help utilities operate efficiently and effectively[2] enough. 8) The first fully formed theory of the electromagnetic force was rich in results that made no sense mathematically. 9) The fuel for nuclear power stations is relatively cheap, but the power stations themselves are expensive to build.

5. Write comparatives with the help of the adverbs *much, a lot, far (= a lot); a bit, a little, slightly* according to the model *Adverb + a Comparative*. Translate them.

MODEL A: | *a bit / high* | *a bit + higher = a bit higher 'немного выше'*

[1] efficiently (=in a quick and organized way) 'оперативно';
[2] effectively (=with the results we want) 'результативно'.

Much / well, much / bad, slightly / near, a little / little, a lot / many, much / much, slightly / short, a bit / narrow, a lot / clever, a little / severe, a lot / sharp, much / gentle, a bit / far, a lot / plain, slightly / soon, a bit / loud, far /happy, a lot / good, a little / deep.

MODEL B:	*much / well*	*much + better = much better ‘намного / гораздо лучше*

A lot / essential, far / versatile, much / numerous, far / exact, a little / efficient, slightly / complicated, a bit / slowly, far / deeply, a lot / exactly, much / little, a little / brightly, much / happily, a bit / easily, a lot / busily, a bit / steadily, slightly / simply, much / truly, a lot / carefully, far / conveniently, much / efficiently.

6. Read and translate the comparatives.

1) Hydro-electric plants are of much lower capacity if compared to their thermal or nuclear counterparts. 2) A 3-phase induction motor was far simpler in construction. 3) In the UK onshore wind[3] has the advantage of being one of the most affordable renewable energy sources. Generating electricity from onshore wind turbines typically costs around half the cost of offshore wind[4] and a quarter of the costs of solar photovoltaic panels. It is also slightly cheaper, on average, than nuclear power. Onshore wind generation is still slightly more expensive than fossil fuels. 4) Farms would benefit a lot more from installing wind turbines. 5) There are a few polluting aspects of harnessing geothermal energy (read a bit more about them in the disadvantages section). 6) Other techniques are being developed and the next few years will probably bring a lot more discoveries. 7) The costs for constructing a nuclear power plant escalated rapidly during the last two decades, at a much higher rate than inflation. 8) The utility companies and the government are showing a lot greater awareness toward increasing nuclear power generating capacity. 9) Solar cells are devices that convert light energy directly into electrical energy. You may have seen small solar cells in calculators. Larger arrays of solar cells are used to power road signs in remote areas, and much larger arrays are used to power satellites in the orbit around the Earth.

7. Identify the pronouns *that (those), this (these)* and *it* used instead of a noun (nouns) already mentioned and translate them.

1) Generation, transmission and distribution of Alternating Current (AC) power were much easier than those of Direct Current (DC) power. 2) Also the running cost of a hydroelectric plant is much cheaper than that of a thermal plant as there is no need of fuel to be burnt. 3) If a mass of a planet is much greater than that of the other, the

[3] onshore wind ‘береговой ветер’; onshore wind farm ‘наземные (береговые) ветряные турбины (установки, электростанции)’;
[4] offshore wind ‘морской ветер’; offshore wind farm ‘морские ветряные турбины (установки)’

center of mass is very close to its own center and its movement is barely noticeable. 4) The numerous changes in regulations that are imposed on the power plant owner, designer, construction-manager, and contractors during the construction phase are much more expensive to put into effect during the construction phase than they would have been during that of design. 5) Voltage and current are two basic parameters of an electric circuit. But these are not sufficient to express the work an electric circuit element. 6) There are two basic types of equipment you might need abroad in terms of electricity. These are a plug adapter and a converter or transformer. 7) Some emissions are created by the manufacture, transportation and installation of wind turbines, but these are considered fairly low. 8) Radiation is energy moving through space in the form of waves and particles. It is part of natural world and has been since the beginning of our planet. It can be described as non-ionizing (low energy) or ionizing (high energy). Some important forms of ionizing radiation are alpha and beta particles, gamma rays, and x-rays.

READING PRACTICE

Vocabulary for Study

annual [ˈænjuəl] ежегодный; годовой
carbon footprint «углеродный след»: количество углерода (углекислого газа), выбрасываемого в атмосферу при производстве какой-либо продукции; выбросы парниковых газов в атмосферу; (негативные) экологические последствия какой-либо деятельности
market set-up требования рынка
natural feature природный объект, памятник природы
physiographic ˌ[fɪzɪəˈgræfɪk] **feature** физико-географическая структура, особенности рельефа
the rest of the world остальные страны мира
to come online запускать, вводить в действие / эксплуатацию
to curtail [kəˈteɪl] отключать, сокращать, уменьшать, прекращать подачу
to keep doing something продолжать что-л. делать
to split (split, split) разделяться; делиться на части
to spread (spread, spread) простираться, распространяться
to triple ['trɪp(ə)l] утраивать, увеличивать втрое
transmission bottleneck ограничения в сети электроснабжения (напр. отпуска тепла или электроэнергии)
undue [ʌnˈdjuː] больший, чем необходимо; чрезмерный
whopping [ˈwɒpɪŋ] колоссальный; необычайный; непревзойденный; огромный; чудовищный

8. Read the international words and guess their meaning. Mind the stress.

contact [ˈkɔntækt]	global ['gləʊb(ə)l]	perspective [pə'spektɪv]
dam [ˈdæm]	hydroelectric [ˈhaɪdrəuɪ`lektrɪk]	production [prəˈdʌkʃən]
electricity [ɪlekˈtrɪsɪtɪ]	kilometer [ˈkɪləuˌmiːtə]	problem [ˈprɔbləm]

generate [ˈdʒenəreɪt] kilowatt ['kɪləwɔt] solar ['səulə]

9. Circle the word with a different sound.

1)	only	capacity	electricity	hydroplant	already	quickly
2)	by	city	country	efficiently	actually	every
3)	plant	generate	station	nuclear	making	wind
4)	building	tripling	big	split	install	China

10. Read the proper names.

Xiluodo [ˈsɪlɔ:dɔ:], Hanul [ˈhaɪ(ə)nəl; ˈhʌnəl], South Korea [ˌsaʊθ kə`ri:ə], Bruce [bru:s], Canada [ˈkænədə], Hanbit [ˈhʌnbɪt], Guri [ˈgurɪ], Venezuela [ˌvenɪ'zweɪlə; [ˌvenəˈzwi:lə], Surgut [ˈsə:gət], Palo Verde [ˈpɑ:lə `və:deɪ], Japan [dʒəˈpæn], Xiangjiaba [ˈzænˌdʒɑ:ˌbɑ:], Kashiwazaki-Kariwa [ˈkʌʃɪwɑ:ˈzʌkɪ kə`rɪwə], Fukushima [ˌfu:ku:ˈʃi:mə], Kurnool [kəˈnu:l], India [ˈɪndɪə], Gansu [ˌgɑ:nˈsu:], Baihetan [ˌbaɪˌhə:ˈtɑ:n], Jinsha [ˌdzɪnˈʃɑ:], Los Angeles [ˌlɔs `ændʒɪli:z], San Diego [ˌsæn dɪ`egəʊ], San Francisco [ˌsæn fr(ə)n`sɪskəʊ].

11. Match the English and Russian equivalents.

1) carbon footprint	a) запускать, вводить в действие
2) physiographic feature	b) требования рынка
3) transmission bottleneck	c) отключать, сокращать
4) to come online	d) простираться, распространяться
5) to triple	e) «углеродный след»
6) to curtail	f) ограничения в сети электроснабжения
7) market set-up	g) особенности рельефа
8) to spread	h) разделяться; делиться на части
9) to split	i) увеличивать втрое

12. Answer the following question and read the text below to check your answer.

What factors make up the notion of the biggest power plant?

The Biggest Power Plants in the World – Hydro and Nuclear

Last year, the Three Gorges Dam generated about 93 billion kWhs each year, instead of the 193 billion kWhs that it could have generated if it had operated continuously, giving it a capacity factor of only 48%.

But Brazil's Itaipu Dam, with a much smaller Nameplate Capacity of 14,000 MW, had a whopping capacity factor of 84% and generated 103 billion kWhs last year, making it the biggest power plant in the world. The Three Gorges was in the second place.

From this perspective of electricity production, the biggest power plants in the world, and their annual electricity production, are:

- Itaipu Hydroelectric Station (Brazil/Paraguay) 103,000,000,000 kWhs
- Three Gorges Hydroelectric Plant (China) 93,500,000,000 kWhs
- Xiluodo Hydroelectric Station (China) 52,200,000,000 kWhs
- Hanul Nuclear Generating Station (South Korea) 48,160,000,000 kWhs
- Bruce Nuclear Generating Station (Canada) 47,630,000,000 kWhs
- Hanbit Nuclear Generating Station (South Korea) 47,620,000,000 kWhs
- Guri Hydroelectric Station (Venezuela) 47,000,000,000 kWhs
- Surgut-2 Natural Gas Plant (Russia) 39,850,000,000 kWhs
- Palo Verde Nuclear Station (United States) 32,846,202,000 kWhs
- Xiangjiaba Hydroelectric Station (China) 30,700,000,000 kWhs

Note that the ten largest power plants in the world are split between hydro and nuclear, with only one other source, natural gas, in the top ten.

The Kashiwazaki-Kariwa Nuclear Generating Station in Japan was ranked 3rd in total and 1st in nuclear, producing over 60,000,000,000 kWhs per year before it was unnecessarily closed in 2011 after Fukushima. It could reopen within the next several years depending on political developments.

The world's biggest solar array is in India at the 950 MW Kurnool Ultra Mega Solar Park. Spread over 24 square kilometers (9 square miles), the array produces a little over 2 billion kWhs per year.

China has also been growing renewables at the fastest rate in the world. Over the last three years, China has installed the equivalent of 3 Three-Gorges-Dam-worth of wind energy. China now has more wind and solar energy than the rest of the world combined.

So it's no wonder that the world's biggest wind farm, the 7,965 MW wind farm at Gansu, is also in China. It produces about 24 billion kWhs per year and covers about 50 square kilometers (19 square miles). It is planned to reach 20,000 MW by 2020 which will be the first time renewables entered the top ten global power producers.

But transmission bottlenecks, coal's undue influence, and market set-up have prevented large amounts of renewable electricity from reaching the Chinese grid. Last year, 17% of the country's renewables had to be thrown away, or curtailed. In 2016, almost half of Gansu's output had to be curtailed as it couldn't get onto the grid.

This is a global problem. Renewables are increasing faster than the infrastructure to support them.

So it's not surprising that China would keep building huge hydro-plants as well as tripling their nuclear power over the next decade. Along with increasing renewables, it's the only way to efficiently reduce their carbon footprint quickly enough to make any difference.

But what about the biggest producing natural feature? China just started construction on their second largest power plant, the 16,000 MW Baihetan Hydroelectric Plant along the Jinsha River in the upper Yangtze. Scheduled to come online in 2022, the Baihetan plant will generate about 60 billion kWhs each year for

about 100 years, more than enough to power Los Angeles, San Diego and San Francisco combined.

This river already has three other large hydroplants totaling 30,000 MW, and has a total of 85,000 MW of hydro along its length, making the river the single largest power-producing physiographic feature in the world. When the Baihetan comes online, this one river will be producing almost 500 billion kWhs per year.

Only eight countries in the world produce more energy than this single river.

(by James Conca: *https://www.forbes.com/sites/infiniti/2017/09/01/mind-over-matter-engaging-your-biggest-muscle-your-brain-in-workouts/#47c5aaeb5449)*

LANGUAGE FOCUS

13. A. Read the text from the very beginning up to the very end again and classify the nouns from it as countable and uncountable. If necessary, consult the dictionary.

NOTE that countable nouns have a plural form, *e.g. a student – students*, **uncountable nouns have no plural form,** *e.g. information*. **Some nouns can be both countable and uncountable, depending on the context they are used in.**

e.g. *Would you like **a coffee**?* (as **one** cup of coffee that we can count).
*Would you like **some coffee**?* (as **a hot drink** that we can't count).

B. Continue the lists of nouns in writing:

Countable nouns: *plants, …*
Uncountable nouns: *electricity, …*
Both countable and uncountable nouns: *(a) power, …*

14. Continue the lists with the nouns that you have written out from the text (see Exercise 13) according to the following meanings: *'a lot of', 'some', 'almost none'*. Do this in writing. Translate all the word-combinations.

NOTE that in the meaning *'a lot of'*, we use the pronouns *many/much*, in the meaning *'some'* we use the pronouns *a few/a little*, in the meaning *'almost none'* we use the pronouns *few/ little*.

We use *few/a few/ many* with countable nouns whereas *little/a little/much* with uncountable nouns.

Few/a few/ many: *plants, powers (= abilities), …*
Little/a little/much: *electricity, power (= energy, control), …*

15. Translate the following sentences from the text. NOTE that the definite article *the* before a cardinal numeral has the meaning of *'these / that'* and must be translated.

Last year, Three Gorges Dam generated about 93 billion kWhs each year, instead of **the** 193 billion kWhs that it could have generated if it had operated continuously, giving it a capacity factor of only 48%.

Note that **the** ten largest power plants in the world are split between hydro and nuclear, with only one other source, natural gas, in the top ten.

16. Complete the chart with the corresponding verbs. Put down all the four forms of the verbs and try to memorize them.

Noun	**Verb**
building	
split	
transmission	
production	
construction	
growth	
flow	
ramp	
division	
cost	
saying	

COMPREHENSION CHECK

17. Complete the following sentences according to the text.

1) … have prevented large amounts of renewable electricity from reaching the Chinese grid.
2) The world's biggest … Kurnool Ultra Mega Solar Park.
3) Renewables are increasing faster … .
4) In 2016, almost half of Gansu's … curtailed as it couldn't get onto the grid.
5) China would keep … .
6) … , this one river will be producing almost 500 billion kWhs per year.
7) China has also been growing renewables … .
8) Along with increasing renewables, it's … to make any difference.

18. Substitute the words and word combinations in bold type with their synonyms from the text.

1) According to the World Bank's 2016 Doing Business rankings, businesses in Pakistan have estimated losses from power outages at up to a **colossal** 34 % of **every year** income.
2) The substation was a transmission **obstacle** limiting the power to be transferred from the northern and western areas of the country.
3) Constructing the pipeline might cause cost increases that could **shorten** water use.
4) After a summer of construction, boring power lines and installing the units, two electric vehicle charging stations **were launched** and are now ready for use.

5) They can make a more environmentally friendly choice and **reduce the amount of carbon dioxide emitted by transport**.
6) **Objects permanent in character** are the ones which are found on the land as they were placed by nature such as streams, lakes, ponds, shores, and beaches; sometimes including highways and streets, walls and fences, trees and hedges, and the like.
7) In April of 2014, the United Nation's Intergovernmental Panel on Climate Change recommended **becoming three times as great** the amount of energy use from renewable energy and nuclear power in order to keep climate change within safe limits of two degrees Celsius.
8) In discussing climate change, politicians and media often speak of the need to increase «renewable energy» sources **to reduce greenhouse gas emissions**.
9) Some of the Chinese **dams** are **extremely large**.
10) We should **distribute** electricity more efficiently and **shorten** its usage as much as we can.
11) Newly built utilities need to **become connected to the system** of energy supply according to **the market project.**
12) If we **continue spending** natural resources in **large** quantities **every year**, the next generation would meet a serious energy crisis.

19. Match the words and word-combinations in column A with the words and word-combinations in Column B to make up all possible word-combinations.

A	B
1) coal's	a) capacity factor of 84%
2) the single largest	b) set-up
3) the world's biggest solar array	c) production
4) a whopping	d) of the world combined
5) market	e) undue influence
6) annual electricity	f) power-producing physiographic feature
7) the rest	g) is in India

20. Mark the following statements as True (T), False (F) or No Evidence (NE). If the statement is false or has no evidence, give your reason for this.

1) The Surgut-2 Natural Gas Power Plant tops the list of the ten biggest power plants.
2) The biggest power plants in the world are thermal and nuclear.
3) The global problem is that the renewables are increasing faster than the infrastructure to support them.
4) Only one wind farm is in the top ten biggest power plants.
5) The Kurnool Ultra Mega Solar Park in India is the world's biggest solar array.
6) China now has more wind and solar energy than the rest of the world combined.
7) Aviation is also responsible for many different emissions with very distinct characteristics.
8) The world's biggest wind farm is located in India.

9) China builds huge hydro-plants in order to curtail carbon footprint.

21. Answer the questions.

In what paragraphs are the adjectives with the meaning ‘extremely big / large’? What are they?

In what paragraphs are the words or expressions with the meaning ‘only one’? What are they?

In what paragraphs are the words or expressions with the meaning ‘every year’? What are they?

Which is the biggest nuclear power plant? Where is it located? What is its capacity factor?

Which is the biggest solar array? Where is it located? What can you say about its capacity factor?

Which is the biggest wind farm? Where is it located? What can you say about its capacity factor?

Which is the biggest hydroelectric power plant? Where is it located? What can you say about its capacity factor?

Which is the biggest natural gas power plant? Where is it located? What can you say about its capacity factor?

Which is the smallest (of the listed above) nuclear power plant? Where is it located? What can you say about its capacity factor?

Which is the smallest (of the listed above) natural gas power plant? Where is it located? What can you say about its capacity factor?

UNIT 3. THERMAL POWER PLANT

PRONUNCIATION PRACTICE

1. Read the following words paying attention to the pronunciation of the sound [ɔ:].

A. For, four, before, course, morning, normal, north, water draw, awful, source, force, store, pour, modern, inform, install, transport, effort, support, subordinate, explore, hydraulic, enormous, according, important, ordinary.

B. 1) Onshore wind energy is the lowest cost renewable energy source. 2) A motor releases stored energy and converts it to motion. 3) Prospecting, mining or processing of ores containing uranium or thorium is regulated by law. 4) Because conserving energy has become more important, manufacturers are making more efficient machines. 5) The Three Gorges Dam is the world's largest hydropower project. 6) Albert Einstein reported that an enormous amount of energy could be obtained from a small amount of matter. 7) Ordinary water is used for a cooling system. 8) Highly trained operators work in the control room of a power plant.

2. Read the following pairs and compare the pronunciation of [a:] with other vowel sounds. NOTE that the words are different in their meaning.

[ɔ:] – [ɔɪ]	[ɔ:].– [ə:]	[ɔ:].– [əu]
ore – oil	walk – work	law – low
bore – boil	born – burn	form – foam
sore – soil	for – fur	north – nose
north – noise	force – furnace	norm – known
explore – exploit	storing – stirring	store – stone

3. Mark the beginning and the end of a subordinate clause with a vertical line '|'. Read the sentences in a loud voice making pauses in the places marked with '|'.

MODEL: *The Itaipu Hydroelectric Dam | located on the border between Brazil and Paraguay | is the largest operational hydroelectric energy producer in the world.*

1) Civil and power engineers develop systems that produce electricity using renewable energy sources, such as wind, solar, or biofuels. 2) Natural gas is a mixture of gases (methane, nitrogen, carbon dioxide, etc.) which are rich in hydrocarbons and are naturally found in atmosphere. 3) Power engineers collect data relating to commercial or residential development, population, or power system interconnection to determine operating efficiency of electrical systems. 4) You know I have not seen construction engineering as a separate degree from civil, I have seen it more like a concentration within civil. Civil engineering as I have seen it is a very broad category including structural, geotechnical, and even environmental in some places. Even construction management as a contractor is a concentration within civil engineering. 5) Citing data from the world's biggest developers of coal-fired power plants, Urgewald, a Berlin-based environmental group, found that of all the new coal generation expected to go online over the next decade, Chinese companies will build nearly half of it. 6) China as the fastest expanding nuclear power producer in the world has 38 nuclear power reactors in operation and 19 under construction. 7) Scotland's carbon footprint measures all greenhouse gas emissions expressed in 'carbon dioxide equivalents' generated at home and abroad in the production and transport of the goods and services that we consume.

GRAMMAR PRACTICE

4. Analyze the sentences with relative clauses from Exercise 3. Explain how the subordinate clause is connected with the main clause.

MODEL:

A. *The Itaipu Hydroelectric Dam* **|** *located* ***on the border between Brazil and Paraguay*** **|** *is the largest operational hydroelectric energy producer in the world.* **–** There is no special connector, the subordinate clause contains Participle II (located).
B. The Itaipu Hydroelectric Dam **|** ***which is located on the border between Brazil and Paraguay*** **|** *is the largest operational hydroelectric energy producer in the world.* **–** The relative pronoun ***which*** is used to connect the subordinate clause to the main clause.

5. Choose the correct word for each of these sentences. NOTE that we use *who* for people, *which* for things and *that* in both cases.

1) The amount of energy (*who, which, that, −*) is generated by the Itaipu Dam helps meet demands from the two countries, Brazil and Paraguay.
2) About 90% of the energy (*who, which, that, −*) generated by the Itaipu plant is used by Brazil.
3) The *Itaipu Hydroelectric* Dam's reservoir (*who, which, that, −*) covers an area of 1,350km² is the seventh-largest reservoir in Brazil.
4) The project was a massive dam (*who, which, that, −*) would harness the river's energy and turn it into electrical power.
5) What career options are there for people (*who, which, that, −*) work in power plants as operation engineers (инженеры по эксплуатации)?
6) Construction is a business for early risers, i.e. for those (*who, which, that, −*) get out of bed early in the morning. The English used to say (*who, which, that, −*) the early bird catches the worm.
7) Most construction jobs (*who, which, that, −*) requiring no experience tend to be temporary or part-time (to begin with).
8) Understanding exactly (*which, that, what*) construction workers do and (*which, that, what*) are employed on particular projects really requires a deeper knowledge of many kinds of construction jobs.
9) The area (*which, whose, where*) you live and its energy resources are prime factors in determining what kind of power you use.

6. Identify the Infinitive in the following phrases.

Switching to local fuel types; according to relevant analyses, it is possible to construct hundreds of water power plants in Belarus; to be compared to existing plants; in order to power manufacturing machines; they relate to earth; I aspire to become an engineer; the idea of applying knowledge to real life problems; I chose to apply to a technical university, a field trip to a construction site, it is up to you to find the solution to a problem; to understand nuclear energy; so as to provide with electricity; to be able to solve the problem; to refer to a fact.

7. **Define the function of the Infinitive. Translate the sentences. NOTE that the Infinitive can be used 1) as subject: *To get** more women into construction is the primary task of current construction and engineering policy; It is necessary **to get***

*more women into construction = **To get** more women into construction is necessary;* **2) as object:** *The finalists were glad **to have been awarded** prizes*; **3) as attribute:** *The aim **to break down** stereotypes and barriers that construction industry belongs only to men and thus **to build** new heights provides women with opportunities **to break into** the career within this sector;* **4) as predicate:** *The fact that there aren't many women in construction means that you **should do** your best in this sector and **become** successful*; *My dream **is to realize** all my career ambitions*; **5) as adverbial modifier: (of purpose)** *So as **to be** a success, you must work hard*; **(of result)** *Today's women are so skilled and successful as **to start** the shift in a traditional distribution of gender roles in the sphere of construction and engineering*.

1) In order to effectively implement wind energy related projects, it is necessary to carry out actual measurements to determine the size of wind energy resources, to launch the production of equipment suitable for Belarus' climatic conditions. 2) Not these points but some others are to be considered to decide the best optimized location of the power plant. 3) To generate electricity, water must be in motion. This is kinetic (moving) energy. 4) If you're thinking of a career in construction but are unsure where to start, the university is ready to propose a wide range of options available to you. 5) How to get your first construction job with little or no experience may seem an impossible task. 6) Visitor centres of the *Électricité de France*, the largest world's electric utility company, offer interactive exhibitions to help learn more about power generation and also to book a free tour of any of its nuclear power stations. 7) The *European Women in Construction & Engineering (WICEA) Awards* is designed to find the most inspiring women within construction and engineering across Europe. 8) Nearly all of the young people believe that the key to success is to work hard. 9) The generation of energy to provide us with light, heat and other modern conveniences is often overlooked. 10) All energy-consumers are looking for ways to lower their energy bill.

READING PRACTICE

Vocabulary for Study

appurtenances [əˈpəːtənənsɪz] дополнительные устройства / принадлежности / гарнитура; вспомогательное оборудование
as for что касается
as follows следующим образом
cable tray [ˈkeɪbəl `treɪ] кабельный лоток, желоб
civil and structural works строительно-монтажные работы
commissioning [kəˈmɪʃənɪŋ] ввод (объекта) в эксплуатацию
concrete pouring [ˈkɔnkriːt `pɔːrɪŋ] заливка бетона, укладка бетонной смеси
conduit [ˈkɔnd(j)uɪt], [-dɪt] изоляционная трубка для кабеля
coupling [ˈkʌplɪŋ] сопряжение, сцепление, сочленение, спаривание
dewatering system водоотливная система
disposal [dɪsˈpəʊz(ə)l] уборка, удаление, вывоз
drains [dreɪnz] сточные трубы

duct work [`dʌkt ˌwəːk] воздуховод
electrical installation [ɪˈlektrɪkəl ˈɪnstə`leɪʃən] электрооборудование здания; внутренняя электропроводка
expansion tank [ɪksˈpænʃən `tæŋk] расширительный бак / резервуар / цистерна
facility [fəˈsɪlɪtɪ] здание, объект; *зд.* электростанция
feed water [`fiːd ˌwɔːtə] вода для компенсации потерь при шлюзовании или охлаждении; подпиточная вода; очищаемая вода
flue gas [`fluː ˌgæs] дымовой / отработанный / топочный газ; газообразные продукты горения
furnace [ˈfəːnɪs] печь
grounding (earthing) [ˈgraʊndɪŋ] заземление
high pressure steam пар высокого давления
instrumentation and control installation установка контрольно-измерительных приборов
low pressure water heater водонагреватель низкого давления
mechanical installation activities монтажные работы
piping, tubing монтаж трубной обводки
placement and interconnection размещение и подсоединение
raceway [ˈreɪsweɪ] канал для внутренней прокладки кабеля
removal
earth removal земляные работы; землеройные работы
rock removal удаление породы
soil removal удаление, выемка, снятие (почво)грунта; удаление грязи
rotating equipment вращающееся оборудование; устройства с приводом для вращательных операций
shaft alignment [ˈʃɑːft ə`laɪnmənt] центрирование валов
super heater [ˌs(j)uːpə `hiːtə] пароперегреватель
superheated steam перегретый пар
supports for the cables опорные конструкции для кабеля
surface runoff поверхностный сток воды
system equipment оборудование, комплекс оборудования
to comply with [kəmˈplaɪ] соответствовать, подчиняться (правилам)
to make operational and tested быть готовым к работе / эксплуатации и прошедшим все испытания
to make up составлять
to pass on проходить дальше
to pass out of выходить из
to pass through проходить через
to rotate [rəʊˈteɪt] вращаться
to verify [ˈverɪfaɪ] проверять (на соответствие / с помощью приборов), сверять, подтверждать (путем проверки)
valve [vælv] клапан, вентиль, задвижка; **valves** трубопроводная арматура
vent [vent] вентиляционное отверстие / труба / канал; вытяжная труба; **vents** дренажные отверстия

8. Read the international words and guess their meaning. Mind the stress.

cable [ˈkeɪbəl	engineering [ˌendʒɪˈnɪərɪŋ]	planning [ˈplænɪŋ]
components [kəmˈpəʊ.nənts]	expansion [ɪksˈpænʃən]	pump [pʌmp]
condenser [kənˈdensə]	foundation [faʊnˈdeɪʃən]	risks [rɪsks]
control [kənˈtrəʊl]	functioning [ˈfʌŋkʃənɪŋ]	service [ˈsəːvɪs]
conventional [kənˈvenʃənəl]	infrastructure [ˈɪnfrəˌstrʌktʃə]	systems [ˈsɪstəmz]
design [dɪˈzaɪn]	installations [ˌɪnstəˈleɪʃənz]	tank [tæŋk]
drains [dreɪnz]	licensing [ˈlaɪsənsɪŋ]	tested [ˈtestɪd]
electrical [ɪˈlektrɪkəl]	organization [ˌɔːgənaɪˈzeɪʃən]	thermal [ˈθəːməl]
electricity [ˌelɪkˈtrɪsətɪ]	phases [ˈfeɪzɪz]	turbine [ˈtəːbaɪn]

9. Read these words. Underline the [n] sounds and circle the [ŋ] sounds.

Plant, burning, natural, understanding, conventional, functioning, industrial, furnace, then, working, turbine, and, enter, heating, into, condenser, vent, going, done, construction, planning, organization, engineering, licensing, commissioning.

10. Match the English and Russian equivalents.

1) supports for the cables	a) проверять (на соответствие)
2) feed water	b) трубопроводная арматура
3) to comply (with)	c) поверхностный сток воды
4) low pressure water heater	d) комплекс оборудования
5) valves	e) очищаемая вода
6) rock removal	f) опорные конструкции для кабеля
7) to verify	g) размещение и подсоединение
8) system equipment	h) центрирование валов
9) surface runoff	i) перегретый пар
10) appurtenances	j) удаление породы
11) shaft alignment	l) водонагреватель низкого давления
12) placement and interconnection	m) установка контрольно-измерительных приборов
13) superheated steam	n) вспомогательное оборудование
14) instrumentation and control installation	o) соответствовать (правилам)

11. Answer the following question and read the text below to check your answer.

Why is a thermal power plant called a steam one?

Thermal Power Plant: Its Operation and Stages of Construction

A thermal power plant is the most conventional source of electricity. The thermal power plant generates electricity from the burning of fossil fuel (like coal,

oil, natural gas) in a large industrial furnace. For better understanding how the plant works we'd like to present further steps of its functioning as follows:

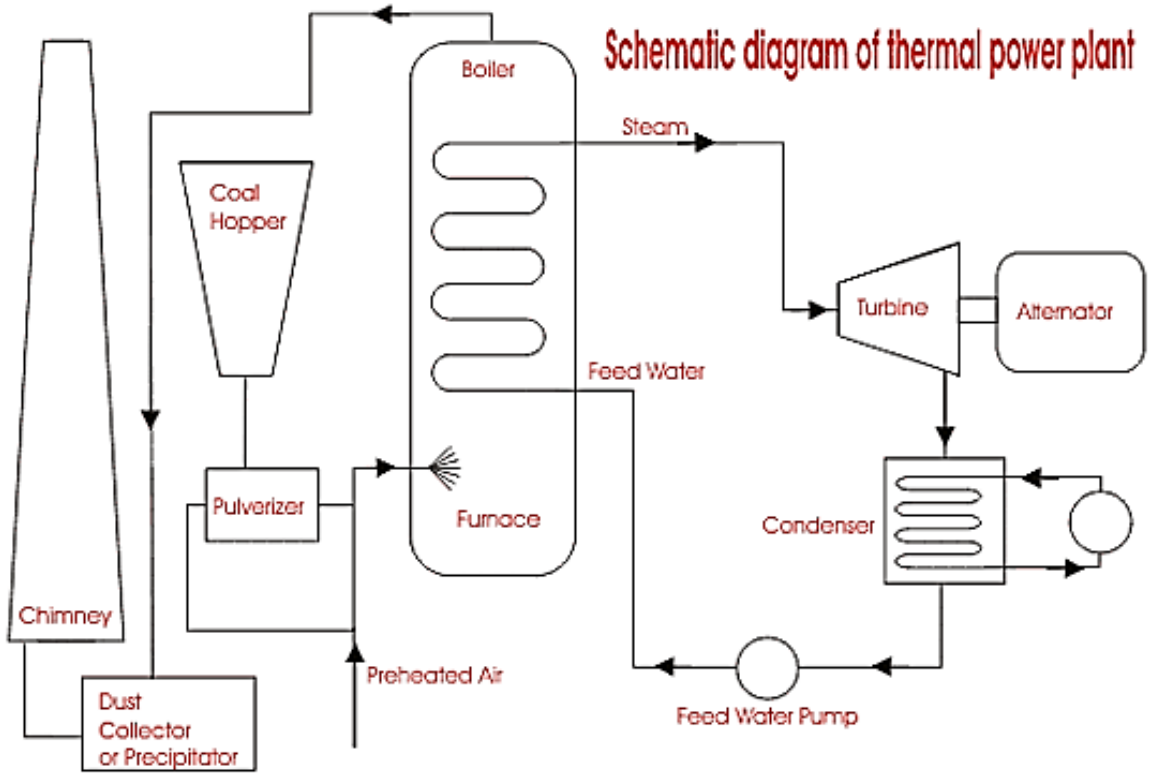
– Hot flue gas thus generated is used to heat water – the working fluid to generate electricity.

– Then water is converted to high pressure steam in the boiler.

– This steam is then passed through the super heater, where it is heated up.

– The superheated steam passes on the turbine at high speed.

– In the turbine this steam force rotates the turbine blades: in the turbine the stored potential energy of the high pressure steam is converted into mechanical energy.



https://electricalstudy.sarutech.com/thermal-power-generation-plant-or-thermal-power-station/index.html

– After rotating the turbine blades, the steam has lost its high pressure, it passes out of the turbine blades and passes on the condenser.

– In the condenser the cold water is circulated with the help of the pump which condenses the low pressure wet steam.

– This condensed water is then supplied to a low pressure water heater where the low pressure steam increases the temperature of the feed water, it is then again heated in a high pressure heater where the high pressure steam is used for heating.

So a typical thermal power station operates on a cycle.

As for its construction activities, they consist of three phases: preparatory, construction, and commissioning ones.

The preparatory phase includes planning and organization, engineering and licensing, risks and construction infrastructure activities. The goal of this stage is to

determine «What» is going to be done, «How» things are going to be done, «Who» will be doing activities, «How much» activities will cost, and «When» the construction will be completed.

The construction phase is made up of the following main steps:

– civil and structural works that include, for example, protective works against tsunami / flooding; construction of erosion control and surface runoff system; excavation; earth / soil / rock removal and / or disposal; site dewatering system works, etc.;

– mechanical installation activities that begin after concrete pouring involve placement and interconnection of system equipment. Interconnections between the equipment are generally made by piping, tubing or duct work. The equipment is placed on supports or foundation. Rotating equipment requires shaft alignment and coupling. Valves, vents, drains, expansion tanks and other piping appurtenances are also included in mechanical installation activities;

– electrical and instrumentation and control (I&C) installation activities generally include: raceway, supports for cables, conduit and cable tray installations; equipment and site grounding, and etc.

The commissioning phase covers a wide range of activities leading to putting into service a new facility. During commissioning the structures, systems and components are verified to comply with the design, to be made operational and tested.

LANGUAGE FOCUS

12. Derive nouns with a negative meaning from the following nouns with the help of negative prefixes *de-*, *dis-*, *un-*. Translate them.

MODEL: ***de-*** + *mobilization* = ***de****mobilization*

De-: watering, forestation, installation, activation, formation, gradation, nomination, centralization, compression, contamination;
Dis-: integration, organization, advantage, agreement, approbation, ability, coloration, connection, disarrangement, position;
Un-: happiness, helpfulness, tidiness, clearness, decidedness, acceptability, believability, changeability, certainty, concern.

13. Look back at the text and write out 8 phrases with the Infinitive (Active or Passive). Translate them.

14. A. Turn the underlined verb forms from the passive into the active. Add the agent *they* if necessary.

MODEL: *Hot flue gas <u>is used</u> to heat water. → They <u>use</u> hot flue gas to heat water.*

1) Water is converted to high pressure steam. 2) This steam is then passed through the super heater, where it is heated up. 3) The superheated steam is entered into the turbine at high speed.

B. Write out 9 more sentences containing the passive voice and turn the verb forms into the passive.

15. Paraphrase the following words and word-combinations by using your active vocabulary.

A round; to work; to transmit; a purpose; to be examined; to become liquid; to follow; accessories associated with a particular activity or style of living; basic physical and organizational structures and facilities for the operation of a society or enterprise; machinery; putting into service; to involve; to consist of; a compound of oxygen and hydrogen with highly distinctive physical and chemical properties to be supplied to a boiler from a tank or condenser for conversion into steam; relating to or associated with heat; a pipe or a tube through which something (such as water or wire) passes; two or more wires running side by side; a device used for high-temperature heating.

COMPREHENSION CHECK

16. Complete the following sentences according to the text.

1) A typical thermal power station operates … .
2) Thermal plant construction activities consist of three phases: … .
3) … in the boiler.
4) After rotating the turbine blades, the steam … .
5) In the condenser … .
6) The construction phase … steps
7) This condensed water … water heater.
8) The commissioning phase … into service a new facility.
9) The goal of the preparatory stage is … .

17. Substitute the words and word combinations in bold type with their synonyms from the text.

1) The firm will look after the mechanical and electrical **piece of equipment that was put together and made ready for use** for a new central office.
2) The annual amount of mechanized **earth digging operations** comes up to thousands of millions of cubic meters.
3) An example of **basic facilities and installations that help a community run** is roads and power lines for a new housing development.
4) Books and laptops are main students' **possessions**.

5) These are **mechanical devices using pressure to move liquids, or to compress gases**.
6) The builders didn't **act according to** the architect's instructions.
7) The steam was then piped to the **piece of equipment that reduces gases to their liquid or solid form**, where it was converted back into water.
8) After five years of construction the plant became **ready for use**.
9) Before the facility is put into service it must **be found out whether it is working correctly or how effective it is**.

18. Match the words and word-combinations in column A with the words and word-combinations in Column B to make up all possible word-combinations.

A	B
1) consist of	a) is to determine
2) operates on	made up of
3) The goal of this stage	of system equipment
4) The construction phase is	the design
5) surface	a cycle
6) placement and interconnection	pouring
7) are verified to comply with	runoff system
8) generates electricity from	three phases
9) are verified to be made	its functioning as follows
10) concrete	operational and tested
11) we'd like to present further steps of	the burning of fossil fuel

19. Mark the following statements as True (T), False (F) or No Evidence (NE). If the statement is false or has no evidence, give your reason for this.

1) Civil and structural works begin after concrete pouring.
2) Solar thermal technologies capture the heat energy from the sun and use it for heating or the production of electricity.
3) Electrical and instrumentation and control (I&C) installation activities are those that are responsible for electrical distribution equipment installations.
4) Mechanical installation activities include installation and commissioning of hydro generators and large electric motors.
5) During the putting into service stage all the facilities of a thermal power plant are verified to comply with the design, to be made operational and tested.
6) The superheated steam enters the turbine and rotates its blades.
7) The preparatory stage aims at completing the construction work within the specified duration; within the budget assigned for the project and with technical and administrative specifications.
8) A thermal power plant is an extraordinary source of electricity.
9) The thermal power plant generates electricity from nuclear fission in a large industrial furnace.

10) Civil and structural works are two disciplines in the field of engineering.

20. Answer the following questions.

1) Does a thermal power plant operate on a cycle?
2) What is the goal of the preparatory phase?
3) What steps do civil and structural works include?
4) What steps are mechanical installation activities made up of?
5) Electrical and instrumentation and control (I&C) installation activities generally include: protective works against tsunami / flooding; construction of erosion control and surface runoff system; excavation; earth / soil / rock removal and / or disposal; site dewatering system works, don't they?
6) What kind of source of electricity is a thermal power plant?
7) When do mechanical installation activities begin?
8) Is steam converted to superheated steam in the super heater or in the generator?
9) Do you agree that planning and organization of any construction work denote the process during which efforts and decisions are made to achieve the goals at the desired time in the desired way?
10) The construction phase covers a wide range of activities leading to putting into service a new facility, doesn't it?

UNIT 4. NUCLEAR POWER PLANT

PRONUNCIATION PRACTICE

1. Read the following words, paying attention to the pronunciation of the sound [ŋ].

A. Long, strong, wing, bring, string, breaking, taking, splitting, milling, tailing, building, bringing, cleaning, working, engineering, supplying, informing.
B. 1) Engineering involves designing and constructing objects, operating machines and mechanisms, making calculations and problem-solving. 2) Splitting an atom releases a lot of energy, especially considering its size. 3) Keeping a chain reaction going is very difficult. 4) The neutrons slow down passing through water. 5) Plants are generating energy by heating water. 6) Building and operating a nuclear power plant is regulated by law. 7) Being informed about nuclear energy involves defining the concerns people have, gathering the facts and evaluating the information.

2. Group the words according to the pronunciation of the following sounds and read them aloud.

[u:]	[ju:]

Who, flue, fuel, room, approve, soon, nuclear, regulate, loop, truly, computing, choose, footage, contribution, document, group, Kurnool, evaluate, tool, coolant, security, schedule, unit, future, shoot, understood, footprint, distribute, utensil.

3. Mark the end of the parentheses with a vertical line '|'. Read the sentences making pauses in the places that you marked with '|'.

1) In general a nuclear power plant is more efficient. 2) It goes without saying that we should save natural resources. 3) First of all the construction of a nuclear power plant is regulated by safety requirements. 4) By the way, safety and quality requirements for nuclear power plants are continuously evolving. 5) As a result constructing and commissioning a nuclear power plant requires high technology investments and involves complex systems and interfaces. 6) Generally speaking nuclear power capacity worldwide is increasing steadily, with about 50 reactors under construction. 7) It is safe to say that the plant design, materials and personnel are ready before starting construction. 8) Needless to say that the most successful projects are those that have been carefully planned. 9) On the one hand most reactors on order or planned are in the Asian region. On the other hand there are major plans for new units in Russia. 10) To cut a long story short many countries with existing nuclear power programs either have plans to, or are building, new power reactors.

GRAMMAR PRACTICE

4. Identify Participle I and Participle II forms. Translate them.

NOTE that The Participle is a descriptive word (like an Adjective) made from the Verb. Like verbs participles come in two varieties: past and present. They are two of the four forms that every verb has. Look at the chart below.

	Infinitive	Past Simple	**Participle II (Past Participle)**	**Participle I (Present Participle)**
regular verb	to stop	Stopp**ed**	stopp**ed**	stopp**ing**
	to realize	Realiz**ed**	realiz**ed**	realiz**ing**
	to open	Open**ed**	open**ed**	open**ing**
irregular verb	to be	**was / were**	**been**	be**ing**
	to do	**Did**	**done**	do**ing**
	to think	**Thought**	**thought**	think**ing**

The Gerund is similar to a Participle I form (a word ending in ***-ing***) that is made from the Verb but functions as the Noun. So the Gerund may be used 1) **as subject**, e.g., ***Engineering*** *is an interdisciplinary field of knowledge*; 2) **as object**, e.g., *I hate* ***going on*** *a field trip to a construction site but I prefer* ***working*** *in the laboratory*; 3) **as predicative**, e.g. *Our business* ***is building*** *photovoltaic, wind and hydro power plants*. The Gerund may be preceded by a preposition, e.g. *I'm interested* ***in***

engineering; may be modified by a possessive pronoun or a noun in the Possessive Case, e.g., *My Mom objected to* ***my (my brother's) applying*** *to a technical university.*

To study – studied, studied, studying; to learn – learnt, learnt, learning / learned, learned, learning; to use – used, used, using; to call – called, called, calling; to ask – asked, asked, asking; to close – close, closed, closing; to place – placed, placed, placing; to provide – provided, provided, providing; to want – wanted, wanted, wanting, to like – liked, liked, liking, to answer – answered, answered, answering; to construct – constructed, constructed, constructing.

To build – built, built, building; to go – went, gone, going; to sit – sat, sat, sitting; to come – came, come, coming; to put – put, put, putting; to set – set, set, setting; teach – taught, taught, teaching; to catch – caught, caught, catching; to buy – bought, bought, buying; to sell – sold, sold, selling; to think – thought, thought, thinking; to understand – understood, understood, understanding; to write – wrote, written, writing.

5. Identify Participle I and Participle II forms within the predicate of the sentence. See the model:

MODEL: *Engineering education* ***is offered*** *for many decades in different directions.*
'Is' is an auxiliary verb; **'offered'** is Participle II (Past Participle)

A. 1) Civil engineers are employed primarily by government departments, utilities, architectural firms, builders and engineering firms. 2) Environmental engineers are highly demanded today. 3) Anyone who provides engineering services to the public must be licensed. 4) Major construction projects such as roads, airports, tunnels, dams and bridges are designed by civil engineers. 5) Civil engineers are demanded to possess a very broad skill set, from geology to foreign languages. 6) A hundred years ago a strong civil (as well as military) engineering degree program was based on the practical use of a number of dead and alive languages.

B. 1) Construction is one of the industries with the highest projections for new employment opportunities: positions are ranging from unskilled laborer and helper jobs to roles that are requiring extensive training, education, and skills. 2) Everyone who is involved in construction work has health and safety duties when s/he is fulfilling the work. 3) Climate is rapidly changing. Demands for clean water are exceeding the amount of water supply. 4) I'm not an engineer yet, I'm taking a chemical engineering program at University. But I'm enjoying problem solving process with hammer, duck-tape (скотч) and creativity. 5) California Electrician School is developing the necessary skills for entry-level employment in three major electrician sectors: Residential, Commercial and Industrial.

6. Define the function of the numbered words and decide which of them is the Gerund, and which is the Participle (I or II).

(1) Advanced skills in mathematics, (2) including algebra, geometry, trigonometry, calculus (математический анализ) and statistics are crucial to a civil engineer, who must apply the appropriate mathematical formulas and principles in his design work as well as to problem (3) solving. As project budgets and costs are an integral part of his responsibilities, a civil engineer must also be proficient in (4) reading and (5) interpreting financial spreadsheets.

He must be highly (6) skilled in physics and the practical application of scientific rules, methods and the technology (7) involved in the many aspects of the project, (8) including design principles, construction methods and materials, soil analysis, and numerous environmental factors. It is also important for a civil engineer to be (9) skilled in architectural design techniques and (10) working with blueprints, maps, (11) drawings and models, as well as computer programs (12) used in architectural design and construction.

Civil engineers must be also (13) skilled «active listeners» to get the full benefit from the ideas of others and to communicate their own ideas both orally and in (14) writing, often to those without a background in (15) engineering.

READING PRACTICE

Vocabulary for Study

costly [ˈkɔstlɪ] дорогостоящий, дорогой
Dominion Generation's North Anna Power Station АЭС «Норт Анна» американской электроэнергетической компании Dominion Generation's
employment [ɪmˈplɔɪmənt] занятость
International Atomic Energy Agency (IAEA) Международное агенство по атомной энергии (МАГАТЭ)
It goes without saying Само собой разумеется
lengthy [ˈleŋθɪ] длительный; слишком длинный, растянутый
(opinion) poll опрос общественного мнения, результаты опроса общественного мнения
outbuildings служебные постройки
parking lots места стоянки автомобилей
perception [pəˈsepʃən] восприятие, ощущение; осознание, понимание
permit [ˈpəːmɪt] разрешение
plant turnover оборачиваемость реального основного капитала; коэффициент оборачиваемости основного капитала
preliminary [prɪˈlɪmɪnərɪ] предварительный
preparatory [prɪˈpærət(ə)rɪ] подготовительный; предварительный
project management управление строительством / проектами; проектирование
regulatory ˌ[regjuˈleɪtərɪ] властный; регулирующий
regulatory body регламентирующий орган; отдел нормативных и законодательных актов
suspicious [səsˈpɪʃəs] подозрительный, недоверчивый
to accelerate [əkˈseləreɪt] ускорять
to accompany [əˈkʌmpənɪ] сопровождать

to determine [dɪˈtəːmɪn] определять, устанавливать
to devise [dɪˈvaɪz] разрабатывать; придумывать, изобретать
to enlarge [ɪnˈlɑːdʒ] увеличивать, расширять
to erect [ɪˈrekt] сооружать, воздвигать, устанавливать, монтировать
to house вмещать, содержать
to permit [pəˈmɪt] разрешать
to presuppose [ˌpriːsəˈpəʊz] предполагать (заранее); заключать в себе, включать в себя
to put in вводить (в действие)
to recede [rɪˈsiːd] отступать; удаляться; отказываться
to recede from memory стираться из памяти

7. Read the international words and guess their meaning. Mind the stress.

accelerate [əkˈseləreɪt]
acceleration [əkˌseləˈreɪʃən]
activity [ækˈtɪvɪtɪ]
administrator [ədˈmɪnɪstreɪtə]
agency [ˈeɪdʒənsi]
atomic [əˈtɔmɪk]
committee [kəˈmɪtɪ]
infrastructure [ˈɪnfrəˌstrʌktʃə]
component [kəmˈpəunənt]
computing [kəmˈpjuːtɪŋ]
constant [ˈkɔnstənt]
contribution [ˌkɔntrɪˈbjuːʃən]
cost [kɔst]
demonstrate [ˈdemənstreɪt]
documentation [ˌdɔkjəmenˈteɪʃən]
factor [ˈfæktə]
indicate [ˈɪndɪkeɪt]
installation [ˌɪnstəˈleɪʃən]
integrate [ˈɪntɪgreɪt]
international [ˌɪntə'næʃ(ə)n(ə)l]
license [ˈlaɪsəns]
location [ləuˈkeɪʃən]
management [ˈmænɪdʒmənt]
memory [ˈmeməɪ]
national [ˈnæʃənəl]
operator ['ɔp(ə)reɪtə]
parking [ˈpɑːkɪŋ]
perception [pəˈsepʃən]
period [ˈpɪərɪəd]
phase [feɪz]
priority [praɪˈɔrɪti]
procedure [prəˈsiːdʒə]
process [ˈprəuses]
project [ˈprɔdʒekt]
public [ˈpʌblɪk]
reactor [riˈæktə]
regulation [ˌregjəˈleɪʃən]
selection [sɪˈlekʃən]
specialist [ˈspeʃəlɪst]
standard [ˈstændəd]
start [stɑːt]
system [ˈsɪstəm]
technical [ˈteknɪkəl]
ventilation [ˌvɛntɪˈleɪʃən]

8. Read the proper names.

International Atomic Energy Agency [ˌɪntə'næʃ(ə)n(ə)l əˈtɔmɪk ˈenədʒi `eɪdʒənsi], Dominion Generation's North Anna Power Station [dəˈmɪnjən ˌdʒenəˈreɪʃənz ˈnɔːθ 'ænə 'pauə `steɪʃ(ə)n], Virginia [vəˈdʒɪnjə], USA [ˌjuːes`eɪ].

9. Circle the word with a different consonant sound.

1)	teacher	chair	chance	change	church	technique
2)	construct	centre	call	nuclear	technical	location
3)	project	general	energy	agency	regulation	major
4)	lengthy	health	these	faith	thanks	theory

10. Answer the following question and read the text below to check your answer.

What are the stages of a construction process?

Nuclear Power Plant Construction Process: Planning and Organization Activities

The construction of a nuclear power plant is a lengthy, costly and complicated process.

First of all, it starts with the so-called decision-making steps that take into consideration a great number of technical documentation such as the Energy Permit, the Location Permit, the Construction Permit, licenses and approvals demonstrating that Government departments and regulatory bodies are strongly involved in the nuclear power plant construction procedure. So it goes without saying that the permits and other technical documentation are based on a wide variety of specialist studies and a strong public participation component. Thus these documents also consider the international Nuclear Safety Standards devised by the International Atomic Energy Agency (IAEA); the national safety, health and environmental regulations; various energy and natural resources committees' drafts, which together aim to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity all over the world.

The next set of preliminary steps presupposes a stage of site selection and evaluation for nuclear installations. It includes the factors which determine the priority of construction. The major ones are as follows:

- future growth in electricity demand;
- availability of water. Since all nuclear reactors require water to operate, they must be erected near a lake or a river (although it's possible to construct an artificial lake, as with the Dominion Generation's North Anna Power Station in central Virginia, USA);
- a large amount of space, at least, 500 acres to house outbuildings for ventilation equipment, storage for fuel and waste, parking lots, and computing facilities;
- ease with which the new station can be integrated into the national transmission network;
- environmental impacts of both the nuclear power station and its related infrastructure;
- construction period and its cost;
- public's perception of the nuclear power unit safety. A recent poll indicates that today's public is less suspicious of nuclear plants than it was in the past, as disasters like Chernobyl recede from memory. People are less excited about putting in nuclear plants near the place they live.
- employment. Most plants are a few miles outside small-to-midsize towns because they necessitate a large work force. Some 2,000 people are needed to build a plant, and about 500 people are required to serve as technicians, reactor operators, engineers, security guards, and administrators.

In general, safety, quality assurance and control, contracting systems, cost control, and scheduling are constantly accompanied by project management activities in nuclear power plant construction: right from the preparatory phase to plant turnover and to commissioning.

LANGUAGE FOCUS

11. Define a part-of-speech meaning of the words in bold type and translate them according to the context.

1) **Since** all nuclear reactors require water to operate, they must be erected near a lake or a river.
a) preposition b) conjunction c) adverb
2) The major **ones** are as follows.
a) noun b) numeral c) adjective
3) … about 500 people are required to serve **as** technicians, reactor operators, engineers, security guards, and administrators.
a) preposition b) conjunction c) adverb
4) … environmental impacts of **both** the nuclear power station **and** its related infrastructure.
a) conjunction b) adverb c) pronoun
5) … 500 acres to **house** outbuildings for ventilation equipment, storage for fuel and waste, parking lots, and computing facilities.
a) noun b) adverb c) verb
6) Thus these documents also consider the international Nuclear Safety Standards …
a) preposition b) conjunction c) adverb
7) … **as** disasters **like** Chernobyl recede from memory.
a) preposition, verb b) conjunction, adverb c) adverb, adverb

12. Give the four forms of the following verbs.

To accelerate, to accompany, to be, to become, to consider, to determine, to devise, to do, to come, to encompass, to enlarge, to erect, to go, to have, to house, to permit, to presuppose, to put in, to read, to recede, to set, to sit, to split, to spread, to take, to write.

13. Paraphrase the following words and word-combinations by using your active vocabulary.

To cost a lot of money; an official statement giving the right to do something; an aria of land to park a car; very long; complex; asking a lot of people the same questions in order to find out their opinion on the subject; to take into account; to forget gradually; to make someone or something part of a larger group; to go faster; something that you do in order to help be successful; a promise; planning to happen at a certain time;

making a plant operable; to increase; the value of energy that a plant sells during a particular period of time; responsibility for organizing and supervising a construction project; to combine; the basic systems such as transport and communication that a country or organization uses in order to work effectively; to work out, to fix; a group of people that has the official power to control an activity and to make it sure that it is done in a satisfactory way.

14. Translate the following extract.

There is a clear need for new generating capacity around the world, both to replace old fossil fuel units, especially coal-fired ones, which contribute a lot of CO_2 emissions, and to meet increased expectations for electricity in many countries. There are about 127,000 generating units worldwide, 96.5% of these of 300 MWe or less, and one-quarter of the fossil fuel plants are over 30 years old. There is scope for both large new plants and small ones to replace existing units 1:1, all with near-zero CO_2 emissions.

COMPREHENSION CHECK

15. Complete the following sentences according to the text.

1) A great number of technical documentation demonstrate …
2) The permits and other technical documentation are based on …
3) The permits and other technical documentation also consider …
4) The so-called decision-making steps take into consideration …
5) A site selection and evaluation stage includes …
6) Safety, quality assurance and control, contracting systems, cost control, and scheduling are constantly accompanied by …

16. Substitute the words and word combinations in bold type with their synonyms from the text.

1) The construction of a nuclear power **installation** is a lengthy, costly and complicated process.
2) All technical documentation is based on **many different types** of specialist studies and a strong public participation component.
3) **Different** energy and natural resources committees' **plans** aim to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity all over the world.
4) **Accessibility** of water is one of the **main** factors that determine the priority of construction.
5) The next **main** factor is the ease with which the new **plant** can be integrated into the national **"electric grid"**.
6) **As** all nuclear reactors require water to operate they must be **built** near it.

17. Match the words and word-combinations in column A with the words and word-combinations in Column B to make up all possible word-combinations.

A	B
1) to put in / to erect	a) accompany
2) national safety, health	b) from memory
3) to presuppose	c) are based on
4) to accelerate and enlarge	d) a nuclear power plant
5) permits and technical documenta-tion	e) Nuclear Safety Standards
6) today's public is	f) a site selection and evaluation stage
7) to recede	g) and environmental regulations
8) project management activities	h) decision-making steps
9) to devise	i) the contribution
10) the so-called	j) a lengthy, costly and complicated process
11) Most plants	k) less suspicious of nuclear plants
12) both the nuclear power station and	l) necessitate a large work force
13) Nuclear power plant construction is	m) demand
14) future growth in electricity	n) its related infrastructure

18. Answer the following questions.

1) What technical documentation do the so-called decision-making steps take into consideration?
2) Government departments and regulatory bodies are not interested in the nuclear power plant construction procedure, are they?
3) What international standards and regulations serve as a basis for national numerous power plant construction permits, licenses and approvals?
4) What factors determine a stage of site selection and evaluation? Can you continue this list?
5) Do you agree with the statement that modern people are less excited about erecting nuclear power plants near the place where they live? Whatever your answer should be, give your reasoning on this issue.
6) Is it obligatory to erect nuclear power stations near water? Why?
7) What does the expression "ease with which the new station can be integrated into the national transmission network" mean?
8) What stages does a pre-construction process of a nuclear power plant include?
9) What activities accompany all the stages of nuclear power plant construction?

19. Translate the following sentences into English. Pay special attention to the words in bold type.

1) **Количество рабочих мест увеличивается** каждый год.

2) Возведение атомной электростанции включает два **предварительных этапа**: этап **принятия решений** и этап **выбора и оценки площадки**.
3) **Нормы по ядерной безопасности разработаны Международным агентством по атомной энергии (МАгАтЭ)**.
4) Ядерные катастрофы наподобие Чернобыля **постепенно забываются**.
5) Спрос на электроэнергию **растет**.
6) Как показывает **опрос**, людей все меньше и меньше **беспокоит** возведение атомной станции рядом со своим местом жительства.
7) В основе содержания **нормативно-правовой документации**, **разного рода разрешений, лицензий и согласований** лежат многочисленные **специальные исследования** и мнение общественности.
8) Правительство требует **ускорить** возведение **комплекса необходимых сооружений и оборудования** на атомной станции.
9) **Управление проектами сопровождает** все **фазы** строительства атомной станции: начиная с **подготовительного** этапа и заканчивая **введением ее в эксплуатацию**.
10) Большинство атомных электростанций располагается вблизи **небольших** городов.
11) Строительство атомной электростанции – **очень длительный** и **сложный** процесс.
12) Атомным станциям требуется **большое количество рабочих рук**.

UNIT 5. NUCLEAR REACTOR

PRONUNCIATION PRACTICE

1. Practice the pronunciation of the prefixes *re-* [ri:], *de-* [di:], pre- [pri:].

[ri:]	[di:]	[pri:]
act – react	code – decode	process – preprocess
activate – reactivate	form – deform	stage – pre-stage
use – reuse	construct – deconstruct	school – preschool
fuel – refuel	compose – decompose	occupied – preoccupied
store – restore	control – decontrol	paid – prepaid
force - reinforce	compress – decompress	caution – precaution
search – research	gradation – degradation	dominant – predominant
produce – reproduce	commission - decomission	construction – preconstruction
construct – reconstruct	generation – degeneration	production – preproduction
cycle – recycle	hydrate – dehydrate	condition – precondition

2. Read the word pairs paying attention to the shift of stress.

proˈduce – ˈproduct	eˈlectrical – elecˈtricity
ˈgenerate – geneˈrator	mainˈtain – ˈmaintenance
ˈoperate – opeˈrator	ˈequal – eˈquation

ˈmoderate – modeˈrator
ˈpressure – pressuˈrizer
ˈcommerce – comˈmercial
ˈcivil – ciˈvilian
ˈradiate – radiˈation
ˌradioˈactive – ˌradioacˈtivity
transˈform – ˌtransforˈmation
conˈdense – condenˈsation
conˈtaminate – contamiˈnation
exˈperiment – experimenˈtation
proˈnounce – pronunciˈation
ˈinstrument – ˌinstrumenˈtation

2. Group the words according to the stress pattern A, B or C.

MODEL: *re ˈac tor* (3 syllables, 2nd syllable is stressed) → □ ˈ□ □ *Stress pattern B.*

Stress Pattern A. ˈ□ □
Stress Pattern B. □ ˈ□
Stress Pattern C. □ ˈ□ □

Device, design, center, purpose, creating, uranium, turbine, process, reaction, develop, maintain, according, conversion, conduct, proceed, construct, transfer, coolant, equipment, conserve, contractor, service, commission, derived, control, advanced, contrast, purpose, circuit, fossil, unit, resulting, remain, transmission, awarding, dispose, enrichment, compound, equipped, concrete, decay, release, solution, special, amount, mechanic.

GRAMMAR PRACTICE

4. Define the function of the numbered words and decide which of them is the Gerund, which is the Infinitive, and which is the Participle (I or II).

Nuclear Power Plant Preconstruction and Construction Activities

Contracts (1) Awarding. The civil works, boiler, turbine, auxiliary plant, electrical and control and instrumentation contracts form part of the main contracts in terms of which the overall construction plan is (2) implemented. (3) Derived from these, many smaller companies are (4) involved as subcontractors.

Site Establishment. This stage deals with the provision of the infrastructure (5) required for the main contractors (6) to begin work. Land needs (7) to be levelled, water, sewerage and electrical services (8) to be provided, roads (9) constructed and construction offices (10) established. The terrain needs (11) to be fenced off and security control and first aid facilities (12) put in place.

Construction Proper. Construction starts with the (13) setting out and excavation of foundations. If the power station is (14) to use a conventional (15) wetcooling system, the trenches and pipe work for the (16) cooling water (17) ductings must (18) be in place before construction of the turbine hall begins. Although a number of areas are under construction at the same time, the main areas are the foundations of the boiler house, turbine hall, (19) cooling towers and chimneys. The period from site establishment and commencement of civil work, to the point where the first boiler and turbine can (20) be commissioned, is

approximately four years. Subsequent units would (21) be commissioned at intervals of nine to twelve months.

Commissioning. Auxiliary plant systems need (22) to be commissioned first (23) to provide logistical support for boiler and turbine operation. These include water treatment, coal supply and ash (24) handling systems, electrical supplies and the transmission network. Boiler and turbine (25) commissioning initially involves the (26) cleaning of all water, steam and auxiliary pipework. Important equipment such as motors, pumps, lights and control circuits are among the first items (27) to be commissioned. Safety checks and (28) testing are (29) carried out before any plant is (30) commissioned. Plant and equipment that has (31) been (32) commissioned is (33) «taken over», for example, by ESCOM[5], although the contractor still remains responsible for defects. A production unit boiler, turbine and generator) is (34) taken over by ESCOM and (35) put into commercial operation once all the tests have (36) been successfully (37) carried out.

5. Write out noun chains (N+N+…) from the text in Exercise 1 and translate them.

READING PRACTICE

Vocabulary for Study

advanced gas-cooled reactor усовершенствованный газоохлаждаемый (ядерный) реактор
alloy [ˈælɔɪ] сплав
boiling water reactor реактор с кипящей водой, кипящий (ядерный) реактор
breeder [ˈbriːdə] реактор-размножитель
civilian [sɪˈvɪliən] гражданский, штатский
common [ˈkɔmən] общий; совместный; обыкновенный, обычный, простой
design features особенности конструкции
deuterium [djuːˈtɪərɪəm] дейтерий, тяжёлый водород
fast breeder reactorреактор-размножитель на быстрых нейтронах
gas-cooled reactor реактор с газовьм охлаждением, газоохлаждаемый ядерный реактор
graphite [ˈgræfaɪt] графит
in contrast [ˈkɔntrɑːst] в отличие, в противоположность
light-water-cooled graphite-moderated reactor водоохлаждаемый ядерный реактор с графитовым замедлителем, легководный реактор с графитовым замедлителем
liquid [ˈlɪkwɪd] жидкий, водянистый; жидкость
loop [luːp] цикл, петля, виток
military [ˈmɪlɪt(ə)rɪ] военный
multiple [ˈmʌltɪpl] многочисленный, многократный, множественный
ordinary [ˈɔːdɪn(ə)ri] обычный, обыкновенный, простой, ординарный

[5] ESCOM is a South African electricity public utility established in 1923 as the Electricity Supply Commission (ESCOM)

pressurized [ˈpreʃəraɪzd] (находящийся) под давлением; герметический, герметизированный
pressurized heavy-water reactor ядерный реактор с тяжеловодным замедлителем и теплоносителем под давлением, тяжеловодный ядерный реактор с водой под давлением, реактор с тяжеловодным замедлителем и теплоносителем под давлением
pressurized water reactor корпусной водо-водяной энергетический ядерный реактор, ядерный реактор с водой под давлением, реактор с водным замедлителем и теплоносителем под давлением
purpose [ˈpəːpəs] цель, намерение, предназначение
radiopharmaceutical [ˌreɪdioʊˌfɑːməˋsjutɪkəl] радиоактивный медицинский препарат; радиофармацевтический препарат (средство); радиоиндикатор
small-modular reactor маломодульный ядерный реактор
thorium [ˈθɔːrɪəm] торий
to be operated эксплуатироваься
to clad [klæd] ***(cladded, cladded)*** плакировать, покрывать, облицовывать; *adj*. с защитным покрытием
to flash into *зд.* быстро преобразоваться в; осени́ть, прийти́ в го́лову; блесну́ть (о догадке); бы́стро промелькну́ть, пронести́сь; замелька́ть;
to simplify [ˈsɪmplɪfaɪ] упрощать
to slow down замедлять
to use up израсходовать
weapons [ˈwepənz] оружие, вооружение

6. Read the international words and guess their meaning. Mind the stress.

basic [ˈbeɪsɪk]	graphite [ˋgræfaɪt]	potential [pə(ʊ)ˈtenʃəl]
centre [ˈsentə]	magnesium [magˈniːzɪəm]	process [ˈprəʊsəs]
concentration [ˌkɔns(ə)nˈtreɪʃ(ə)n]	material [məˈtɪərɪəl]	radiopharmaceutical [ˌreɪdɪəʊˏfɑːməˊsjuːtɪk(ə)l]
diagnosis [ˌdʌɪəgˈnəʊsɪs]	medical [medɪk(ə)l]	resource [rɪˈsɔːs]
electricity [ɪˌlekˈtrɪsɪtɪ]	military [ˊmɪlɪt(ə)rɪ]	therapy [ˈθerəpi]
engineer [ˌendʒɪˈnɪə]	moderator [ˈmɔdəreɪtə]	thorium[ˋθɔːrɪəm]
experimentation [ɪkˌsperɪmenˈteɪʃn]	multiple [ˈmʌltɪpl]	training [ˈtreɪnɪŋ]
generate [ˈdʒenəreɪt]	neutrons [ˈnjuːtrɔnz]	type [taɪp]
	operate[ˈɔpəreɪt]	uranium [juˈreɪniəm]
	physics [ˈfɪzɪks]	

7. Match the words with the same vowel sound.

spread	see
design	sometimes
light	steady
pressurize	steam
be	bread
breeder	sign

8. Read the proper names.

CANDU [kændu] (it stands for Canada Deuterium Uranium) is a Canadian pressurized heavy-water reactor; Magnox [ˈmægnəks]

9. Match the English and Russian equivalents.

1) design features	a) эксплуатироваться
2) purpose	b) газоохлаждаемый ядерный реактор
3) advanced gas-cooled reactor	c) реактор-размножитель на быстрых нейтронах
4) pressurized water reactor	d) особенности конструкции
5) boiling water reactor	e) замедлять
6) radiopharmaceuticals	f) (пред)назначение
7) fast breeder reactor	g) корпусной водо-водяной энергетический ядерный реактор
8) pressurized heavy-water reactor	h) усовершенствованный газоохлаждаемый ядерный реактор
9) light water-(cooled) graphite-(moderated) reactor	i) легководный реактор с графитовым замедлителем
10) to slow down	j) радиофармацевтические препараты
11) to operate	k) работать, действовать
12) to flash into	l) реактор с тяжеловодным замедлителем и теплоносителем под давлением
13) gas-cooled reactor	m) кипящий ядерный реактор
14) to be operated	n) быстро преобразоваться в
15) to use up	o) покрывать
16) to clad	p) израсходовать

10. Answer the following question and read the text below to check your answer.

What is a nuclear reactor?

Types of Nuclear Reactors

All nuclear reactors are devices designed to maintain a chain reaction producing a steady flow of neutrons generated by the fission of heavy nuclei. They are, however, differentiated either by their purpose or by their design features. In terms of purpose, they are subdivided into research, civilian and military reactors.

Research reactors are operated at universities and research centres in many countries, including some where no nuclear power reactors are operated. These reactors generate neutrons for multiple purposes like producing radiopharmaceuticals for medical diagnosis and therapy, developing weapons or energy production technology, for training purposes, for nuclear physics experimentation, and

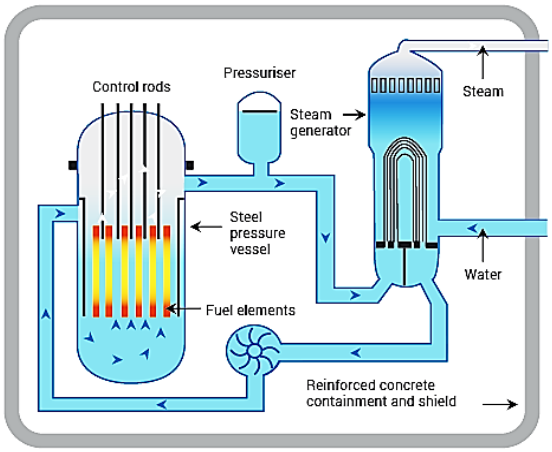
conducting basic research. There are about 245 research reactors operating in 55 countries with more under construction.

*Civilian (*or *commercial) reactors* are used to generate “atoms for peace”, that is energy for electricity and sometimes also steam for district heating.

Military reactors are those creating materials that can be used in nuclear weapons and those generating electricity for military ships, submarines and military bases. Many ships and submarines have nuclear power plants of their own. Power plant operators control power generating plants on land and aboard ships and submarines. They operate boilers, turbines, nuclear reactors and portable generators.

According to their design features, there are six main reactor types in use around the world. The various designs use different concentrations of uranium for fuel, different moderators to slow down the fission process, and different coolants to transfer heat. The most common reactor type is the pressurized water reactor (PWR), representing 290 of the world’s 447 reactors now operating.

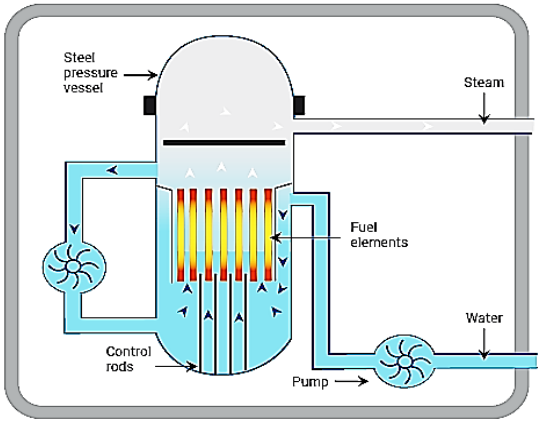
A Pressurized Water Reactor (PWR)



Pressurized Water Reactors

Pressurized water reactors (PWRs) are the most common type of reactor worldwide. PWRs use ordinary (or “light”) water as both coolant and moderator. The coolant is pressurized to stop it from flashing into steam and to keep it liquid during operation. Powerful pumps circulate the water through pipes, transferring heat that boils water in a separate, secondary loop. The resulting steam drives the electricity-producing turbine generators.

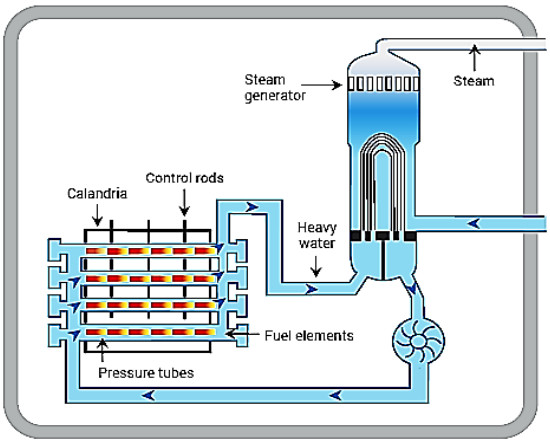
A Boiling Water Reactor (BWR)



Boiling Water Reactors

Boiling water reactors (BWRs) make up 15% of reactors globally. In a BWR, light water acts as both coolant and moderator. The coolant is kept at a lower pressure than in a PWR, allowing it to boil. The steam is passed directly to the turbine generators to produce electricity. While the absence of a steam generator simplifies the design, radioactivity can contaminate the turbine.

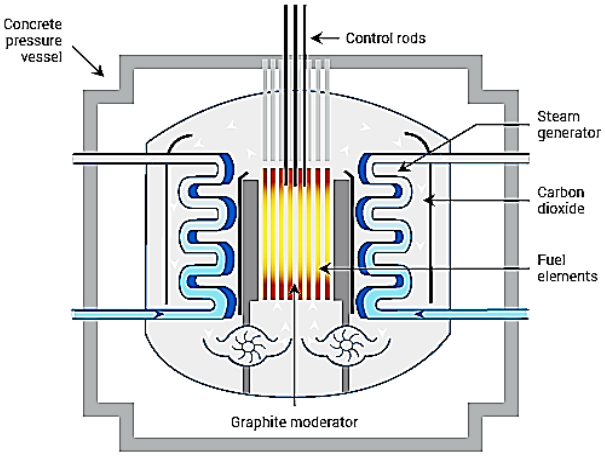
A Pressurized Heavy Water Reactor (PHWR/Candu)



Pressurized Heavy Water Reactors

Also known as CANDU reactors, pressurized heavy water reactors (PHWRs) represent about 12% of the reactors in the world and are used at all Canadian nuclear power generation stations. They use heavy water as both coolant and moderator, and use natural uranium as fuel. As in a PWR, the coolant is used to boil ordinary water in a separate loop. CANDU reactors can be refueled without shutting the reaction down.

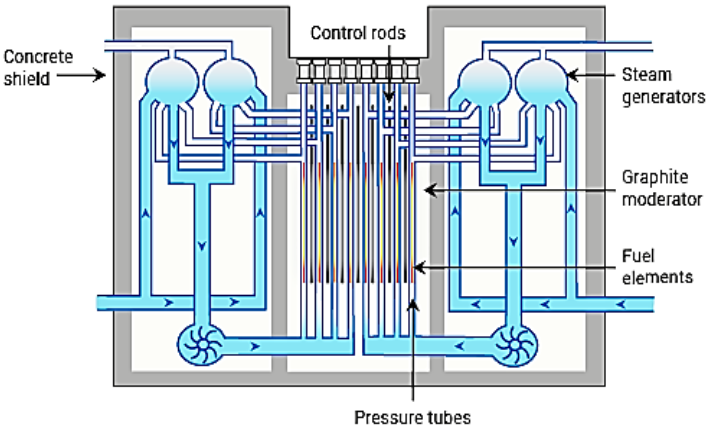
An Advanced Gas-cooled Reactor (AGR)



Gas-Cooled Reactors

Gas-cooled reactors (GCRs) are in use only in the United Kingdom. There are two types, the Magnox (named from the magnesium alloy used to clad the fuel elements) and the advanced gas-cooled reactor (AGR). Both types use carbon dioxide as the coolant and graphite as the moderator. The Magnox uses natural uranium as fuel, while the AGR uses enriched uranium. Like CANDU reactors, these designs can be refueled while operating.

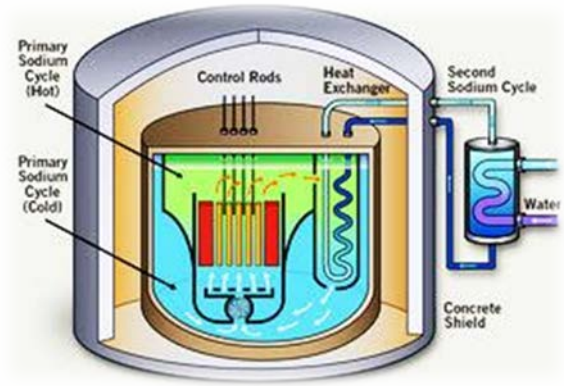
A Light Water Graphite-moderated Reactor (LWGR/RBMK)



Light Water Graphite Reactors

Light water graphite reactors (LWGRs) are used in Russia, with ordinary water as the coolant and graphite as the moderator. As with BWRs, the coolant boils as it passes through the reactor and the resulting steam is passed directly to turbine generators. Early LWGR designs were often built and operated without the safety characteristics and features required elsewhere. The well-known 1986 accident at Chernobyl (Ukraine) happened to a reactor of this type.

A Fast Breeder Reactor



Fast Breeder Reactors

Because slow neutrons are more likely to split uranium atoms, most reactor types are designed to make use of them. In contrast, fast breeder reactors (FBRs) use fast neutrons to convert materials such as uranium-238 and thorium-232 into fissile materials, which then fuel the reactor. The fast breeder reactor is the one which converts uranium into plutonium while operating, creating more fuel than it uses up. This process, combined with recycling, has the potential to increase available nuclear fuel resources in the very long term.

(based on https://www.euronuclear.org/1-information/energy-uses.htm)

LANGUAGE FOCUS

11. Derive adverbs from the following adjectives. Translate them.

MODEL*: full – fully*

a) Main, direct, global, ordinary, common, exact, precise, certain, heavy, light, possible, primary, secondary, real, great, important, slow, excellent;
b) fast, hard, quick, high, late, good.

12. Look back at the text and copy out 5 phrases with Participle I and 5 phrases with Participle II.

	Participle I	Participle II
1)		
2)		
3)		
4)		
5)		

13. Define a part-of-speech meaning of the words in bold type and translate them according to the context.

1) The fast breeder reactor is the **one** which converts uranium into plutonium while operating, creating more fuel than it uses up.
a) numeral b) noun c) adverb
2) They are differentiated **either** by their purpose **or** by their design features.

a) pronoun, conjunction b) conjunction c) adverb, conjunction
3) PWRs use ordinary (or “light”) water as **both** coolant **and** moderator.
a) pronoun, conjunction b) conjunction c) adverb, conjunction
4) Research reactors are operated at universities and research centres in many countries, including **some** where no nuclear power reactors are operated.
a) adjective b) noun c) pronoun
5) The coolant is pressurized to stop **it** from flashing into steam and to keep **it** liquid during operation.
a) adjective b) noun c) pronoun

14. Give the four forms of the verbs. Translate them.
MODEL: *to give – gave – given – giving*

To operate, to be, to keep, to make up, to slow down, to enrich, to have, to build, to produce, to circulate, to transfer, to minimize, to simplify, to do, to go, to come, to run, to tell, to read, to write, to say, to speak, to contaminate.

COMPREHENSION CHECK

15. Complete the following sentences according to the text.

1) Light water graphite reactors (LWGRs) are used in …
2) Fast breeder reactors (FBRs) use …
3) There are two types of gas-cooled reactors (GCRs), the …
4) Pressurized heavy water reactors (PHWRs) use heavy water as …
5) Pressurized water reactors (PWRs) are …
6) In a boiling water reactor (BWR), …
7) All nuclear reactors are differentiated …
8) Magnesium alloy is used …
9) A breeder reactor is a kind of reactor which …

16. Substitute the words and word combinations in bold type with their synonyms from the text.

1) Research reactors **are used** at universities and research centres in many countries, including some where no nuclear power reactors **act**.
2) The most **popular** reactor type is the pressurized water reactor (PWR).
3) The steam is passed **straight** to the turbine generators to produce electricity.
4) The coolant is used to boil **usual** water in a separate loop.
5) The coolant is pressurized to stop water from **turning into** steam and **to remain fluid** during operation.
6) Like CANDU reactors, these designs can be refueled while **working**.
7) **Conversely**, fast breeder reactors (FBRs) use fast neutrons **to change** materials such as uranium-238 and thorium-232 into fissile materials, which then fuel the reactor.

8) A breeder reactor creates more fuel than it **consumes**.
9) While the absence of a steam generator **makes** the design **less complicated**, radioactivity can contaminate the turbine.

17. Match the words and word-combinations in column A with the words and word-combinations in Column B to make up all possible word-combinations.

A	B
1) subdivided into	a) the pressurized water reactor
2) nuclear	b) medical diagnosis and therapy
3) to transfer	c) the fission process
4) developing weapons or	d) purposes
5) to clad	e) the fuel elements
6) the most common reactor type is	f) research, civilian and military reactors
7) differentiated	g) to the turbine generators
8) radiopharmaceuticals for	h) energy production technology
9) nuclear physics	i) research
10) is passed directly	j) by their design features
11) training	k) weapons
12) conducting basic	l) experimentation
13) around	m) heat
14) to slow down	n) the world

18. Paraphrase the following words and word-combinations by using your active vocabulary.

Primarily; everywhere; vice versa; totally; straight; numerous; to make smth easier; covered; mixture; aim; a type of nuclear reactor that produces more fissionable material than it consumes; practice; a radioactive drug, compound used in physiological study or in the diagnosis and treatment of disease; an object which is used to kill or hurt people in a fight or a war; to consume; a machine which is used to produce nuclear energy or the place where this machine and other related machinery and equipment is kept.

19. Answer the following special questions.

1) What do we understand by the term ‘nuclear reactor’?
2) What are the reasons for the differentiation of nuclear reactors?
3) Where are the purpose-reactors applied?
4) How many design-features-reactors are there in the world? What are they?
5) Which reactor uses ordinary water as both coolant and moderator: a pressurized water or a boiling water one?
6) Which of the reactors uses carbon dioxide as the coolant and graphite as the moderator?

7) Which of the reactors uses ordinary water as the coolant and graphite as the moderator?
8) What is a fast breeder reactor like?
9) What are the pressurized heavy water reactor principles of work?
10) What is a light water reactor like?
11) What are the boiling water reactor principles of work?
12) What do we understand by the term ‘research reactors’?
13) What do we call ‘civilian reactors’?
14) What do we call ‘military reactors’?

ПРЕЗЕНТАЦИЯ

СОСТАВЛЕНИЕ ПЛАНА ПРЕЗЕНТАЦИИ

Первый шаг в подготовке любого задания – записать всё то, о чём вы хотите сказать, и на основе этого составить план своего выступления, то есть определить, с чего лучше всего начать, а чем – закончить, что обязательно упомянуть, а что можно не затрагивать.

Вот несколько советов:

1. Запишите, что вашей аудитории нужно или интересно будет узнать по теме вашего выступления
2. Может помочь составление списка вопросов, ответы на которые вы намерены дать. Эти ответы и лягут в основу выступления.
3. Располагайте части выступления в таком логическом порядке, который будет понятен аудитории. Ей будет легче следить за вашей мыслью. Не перескакивайте постоянно с одного на другое.
4. Приводите примеры. Они помогут понять вашу точку зрения.

КАК НАЧАТЬ ПРЕЗЕНТАЦИЮ?

Безусловно, публичное выступление заставляет нервничать, но если вы хорошо подготовлены, то будете чувствовать себе более уверенно. Для этого, приступая к работе над презентацией и публичным выступлением, следует сразу задать себе следующие вопросы. Прежде всего, это «С кем я собираюсь говорить?» и «Что они уже знают?». Во-вторых, «Где я выступаю?», «Какие там возможности для этого?». Вам приходится брать в расчёт наличие аппаратуры и оборудования, например, экран, если хотите использовать PowerPoint. В-третьих, «Какова цель моей презентации?», то есть «Я хочу дать информацию, произвести впечатление, убедить или продать товар?» И последнее – «Сколько времени мне для этого надо?»

Ответы на эти вопросы оказывают огромное влияние на то, что вы включите в свою презентацию и как вы это сделаете. Некоторые для этого сначала записывают свои мысли, а затем пробуют расположить их по смысловым группам, таким образом, создавая основу своей речи. Короткие шпаргалки на небольших карточках, которые удобно держать в руке во время

выступления, также помогают чувствовать себя уверенно. Если вы выступаете с электронной презентацией, вы должны подготовить слайды. Для этого надо собрать все изображения, диаграммы и т.п. и расположить их в нужном порядке. Как только вы почувствуете, что всё организовано правильно, можно начать готовить начало выступления – вступление.

Даже если аудитория знакома с вами, рекомендуется представиться и назвать свою должность. Затем объяснить, о чём вы планируете говорить и в какой последовательности. Упомяните, какой тип будете презентации вы использовать – например, электронную или в виде постера. Следует уточнить, когда слушатели могут задать интересующие вопросы – во время выступления или в конце. На первом слайде разместите основные пункты плана вашей речи. Также будет нелишним сообщить слушателям о том, что вы предоставите им раздаточный информационный материал; это поможет им слушать вас более внимательно.

USEFULL PHRASES FOR THE INTRODUCTION	ПОЛЕЗНЫЕ ФРАЗЫ ДЛЯ ВВЕДЕНИЯ
Good morning, afternoon, etc.	Доброе утро, день и т.п.
Hello. It’s nice to see you (all).	Привет. Приятно (всех) вас видеть.
I’m … from … and it’s a pleasure to be with you today	Я …, и мне приятно сегодня быть с вами.
My name’s … and I’m a … -year student of … (name of the department).	Меня зовут …, и я студент … курса …факультета.
I’m … and I study at the … course of … (name of the department).	Я …, и я учусь на … курсе … факультета.
I’d like to explain how … works.	Я хотел бы объяснить, как работает …
I’d like to give you some information about …	Я хотел бы дать информацию о …
I’m going to talk about/tell about …	Я собираюсь поговорить/рассказать о …
The purpose of my talk is …	Цель моего выступления – …
First of all, we’ll look at …, and then … . Finally, …	Прежде всего, мы рассмотрим …, затем … . В конце, …

If you want to ask me any questions, please interrupt.	Если хотите задать вопрос, не стесняйтесь перебивать.
I'll explain first of all and then you can ask me any questions at the end.	Сначала я всё разъясню, а затем в конце вы сможете задать вопросы.
I want to turn now to …	Я хочу перейти к …

КАК ИСПОЛЬЗОВАТЬ НАГЛЯДНЫЙ МАТЕРИАЛ (ГРАФИКИ, ДИАГРАММЫ И Т.П.)?

USEFULL PHRASES FOR REFERRING TO VISUAL AIDS	ПОЛЕЗНЫЕ ФРАЗЫ ДЛЯ ИСПОЛЬЗОВАНИЯ ДИАГРАММ И ГРАФИКОВ
I'd like to show you a chart/graph which represents …	Я бы хотел показать вам диаграмму/график, которая отражает …
This chart/graph represents …	Эта диаграмма/график отражает …
If we take a look we can see …	Если мы взглянем, мы увидим …
I'd like to draw your attention to …	Я бы хотел привлечь ваше внимание к …
Take a look at …	Взгляните на …
Let's look now at …	Давайте посмотрим на …
As you can see, …	Как вы видите, …
You will see …	Вы увидите …
You will notice …	Вы заметите …
You can see that …	Вы видите, что …

УБЕЖДЕНИЕ

Вот несколько советов, чтобы ваша презентация была убедительной:

1. Хорошо подготовьтесь. У вас должны быть все необходимые факты и данные, и они должны быть точными.
2. Дайте достаточно сведений справочного характера, но не перегружайте ими аудиторию.
3. Будьте готовы подкрепить каждое своё заявление доказательствами.

4. Очень полезным будет подготовить для аудитории распечатки с детальной технической или финансовой информацией. Слушатели смогут знакомиться с данными в привычном для себя темпе и обращаться к ним по мере необходимости.
5. Вы должны говорить с энтузиазмом. Улыбайтесь и не забывайте про зрительный контакт со слушателями.
6. Не бойтесь тишины.
7. Не торопитесь! Не спешите и говорите внятно.
8. Будьте готовы к вопросам!

ЗАКЛЮЧИТЕЛЬНАЯ ЧАСТЬ ПРЕЗЕНТАЦИИ

В заключении следует:
1. Ещё раз напомнить аудитории основные положения вашего выступления
2. Подвести итоги
3. Поблагодарить слушателей
4. Предложить задавать вопросы.

USEFULL PHRASES FOR ENDING YOUR PRESENTATION	ПОЛЕЗНЫЕ ФРАЗЫ ДЛЯ ЗАКЛЮЧЕНИЯ
We’ve looked at …, … and …	Мы рассмотрели …, … и …
I’ve discussed …, … and …	Мы обсудили …, … и …
It seems clear that …	Очевидно, что …
It’s my view that …	На мой взгляд, …
Thank you for your attention.	Спасибо за внимание.
I’ll be happy to answer any questions you may have.	Я буду счастлив ответить на любые ваши вопросы.

ПОСТЕРНАЯ ПРЕЗЕНТАЦИЯ

Постерная презентация, или постерный доклад, представляет собой подготовленное устное выступление по выбранной теме со зрительной опорой в виде плаката.

Составив с планом презентации, напишите короткий (!) текст под каждым пунктом плана. По возможности, используйте иллюстрации. Определитесь с компоновкой материала. Распечатайте плакат, прикрепите его на стену. После выступления будьте готовы ответить на вопросы.

Требования к оформлению постера:

1. Плакат долен быть формата А2 или А1 в горизонтальном или вертикальном расположении. Заглавие, информация об авторе должны располагаться сверху. Буквы заглавия должны быть не менее 2,5 см в высоту. Остальной текст должен легко читаться с расстояния в 1,5 м.
2. Сформулируйте заглавие так, чтобы оно отражало суть вашей презентации
3. Обязательно давайте пояснение графической информации.
4. Используйте на плакате цифры, буквы, стрелки, чтобы показать нужный порядок следования частей вашей презентации.
5. Нет необходимости заполнять каждый квадратный сантиметр. Оставляя пустое пространство, вы выделяете смысловые блоки.
6. Используйте цвета и графику, чтобы привлечь внимание

КРИТЕРИИ ОЦЕНКИ ПРЕЗЕНТАЦИИ

Оценивание презентации представляет собой выставление баллов (минимум 1 балл, максимум 5 баллов) за выполнение требований, предъявляемых к презентации. К таким требованиям относятся:

1. Содержание
   Хорошо ли подготовился оратор?
   Разбирается ли он в теме?
2. Организация
   Есть ли введение? заключение?
   Грамотно ли выстроена структура выступления?
3. Голос
   Выступал ли оратор убедительно и с воодушевлением?
   Достаточно ли внятно говорил?
   Сумел ли заинтересовать?
   Произносил или читал своё выступление?
   Была ли скорость речи нормальной для слушателей?
4. Манера выступления
   Был ли выступающий «зажат»?
   Использовал ли подходящие жесты?
   Был ли зрительный контакт с аудиторией?
   Вовлекал ли её в беседу?
5. Наглядные пособия
   Использовались ли наглядные пособия?
   Легко ли их было разглядеть?
   Помогли ли они?
   Полученные баллы затем суммируются и переводятся в отметку.

РАЗДЕЛ КОНТРОЛЯ ЗНАНИЙ

ОБРАЗЦЫ ТЕМАТИЧЕСКИХ ТЕСТОВ

VOCABULARY AND GRAMMAR TEST ON PART 1 «MY CAREER AMBITIONS»

1. Fill in the gaps with prepositions.

Each position = 1 pt→10 pt

§ 1. A major is a specific subject area that students specialize (1) …. Typically, between one-third and one-half of the courses you'll take at college will be (2)… your major or related (3) … it.

§ 2. At some colleges, you can even: major (4) ... two fields, have a major and a minor (a specialization that requires fewer courses than a major), create your own major.

§ 3. At most four-year colleges, and in the case of many majors, you won't have to pick a major until the end (5) … your sophomore* year. This gives you plenty of time to check out various subjects and see which ones interest you. Some majors – like areas (6) ... engineering – are exceptions to this rule. You have to commit to these fields (7) … study early so you have time to take all the required courses.

§ 4. If you're earning a two-year degree, you'll probably select a major at the start because the program is much shorter.

§ 5. Take courses in areas that appeal to you, and then think (8) … which subject truly motivates you.

§ 6. If you're not sure about your college major while you're in high school, don't worry. Most students switch their major during college. Even students who think they are sure about what they want to major (9) … often change their mind. (10) … example, you might begin college as a physics major but then you might switch to electrical engineering.

*sophomore ['sɔfəmɔ:] the second year of college/university studies; a second-year student

2. Read the text from Exercise 1 once again. Define the meaning of the word or word combination according to the text.

Each position = 2 pt→10 pt

1. college (§ 1)

1) a building used for an educational purpose	2) studies	3) the faculty, students and the administration

2. fewer(§ 2)

1) less	2) some	3) fever

3. various (§ 3)

1) small	2) diverse	3) many

4. switch (§ 6)

1) turn from one railroad track to another	2) change	3) manufacture

5. change their mind (§ 6)

1) remember	2) make different one's opinion	3) vary

3. Read the text from Exercise 1 and complete the following statements.

Each position = 2 pt→10 pt

1. According to the text, you can take (§ 3)

1) many majors	2) one major	3) two majors

2. Based on the information in the text, we may conclude that its author is

1) a student	2) the administration	3) a teacher

3. We can guess from the text that the author advises us

1) to earn a Bachelor degree	2) to earn a Master's degree	3) to earn a Doctoral degree

4. The text describes to us

1) a secondary education system	2) the process of formal learning	3) the process of getting higher education

5. The style of the text is

1) poetic 2) vulgar 3) official

4. Match the branches of engineering with the spheres of their responsibility.

Each position = 2 pt→20 pt

1) Agricultural engineering	a) planning, design, project management and construction of everything we see around us in the built environment
2) Biomedical engineering	b) the way electrical energy is produced and used in homes, the community and industry
3) Civil Engineering	c) design, create and improve systems and machinery that are used for domestic, public and industrial purposes
4) Pharmaceutical Engineering	d) designing better methods of farming and forestry, conserving and developing the world's natural resources
5) Transport Engineering	e) designing, testing and improving machinery and equipment used at sea
6) Electrical Engineering	f) detailed risk assessment studies before a project begins
7) Environmental Engineering	g) the development of different types of equipment used to monitor and treat patients
8) Mechanical Engineering	h) design, test and improve systems and structures that are used to move people, cars, trains, ships, etc.
9) Risk Engineering	i) protecting the environment by assessing the impact a project has on the air, water, soil, and noise levels in its neighbourhood
10) Marine Engineering	j) design and operate equipment that produces life-saving drugs and medicine

5. *Complete the sentences.*

Each correct position = 4 pt→20 pt.;
Minus 0,5 pt for one spelling mistake

1. **T**… is a thing used to help do a job.
2. To **p**… means to supply with mechanical or electrical energy.
3. **P**… is a place where an industrial or manufacturing process takes place.
4. **C**… is the action of building something.
5. **E**… is a person who designs, builds, and maintains machines and structures.

6. Translate the words and word combinations in italic.

Each correct position = 5 pt→30 pt.
Minus 0,5 pt for one spelling mistake
Minus 3 pt for one grammar mistake

1) Civil engineering is one of (1) *старейших* engineering disciplines (2) *ответственных за* maintaining society's infrastructure. 2) Civil projects (3) *охватывают* the full range of civil, agricultural and commercial sectors. 3) Maths is important for civil engineers, particularly geometry, but you don't need (4) *изучать* it in depth as electronics and electrical engineers do. 4) – Is it difficult to be a technical student? – It really (5) *зависит от* your interest. If you are interested in the branch, it becomes (6) *легче* for you.

Total = 100 pt

VOCABULARY AND GRAMMAR TEST ON PART 2 «BASIC NOTIONS OF POWER ENGINEERING»

1. Fill in the gaps with articles where necessary.

Each position= 1 pt→10pt

§ 1. In 1831 scientist Michael Faraday discovered that when a magnet is moved inside 1)… coil of wire, 2)… electric current flows in the wire. An electricity *generator* is a device that converts 3)… form of energy into electricity. Generators operate because of the relationship between magnetism and electricity. Generators that convert kinetic (mechanical) energy into electrical energy produce nearly all of 4)… electricity that consumers use.

§ 2. A common method of producing electricity is from generators with an *electromagnet* – a magnet produced by electricity. The generator has a series of insulated coils of wire that form a stationary cylinder. This cylinder surrounds a rotary electromagnetic shaft. When 5)… electromagnetic shaft rotates, it induces 6)… small electric current in each section of the wire coil. Each section of the wire coil becomes a small, separate electric conductor. The small currents of the individual sections combine to form one large current. This current is 7)… electricity that moves through power lines from generators to consumers.

§ 3. 8) … electric power plant uses a turbine or similar machine to drive these types of generators. Different types of turbines include steam turbines, gas combustion turbines, water turbines, and wind turbines.

§ 4. A turbine converts the kinetic energy of 9)… fluid (liquid or gas) to mechanical energy. In a turbine generator, a moving fluid pushes a series of blades mounted on a shaft, which rotates the shaft connected to a generator. 10)… generator

converts the mechanical energy to electrical energy based on the relationship between magnetism and electricity.

§ 5. In 2016, about 65% of total U.S. electricity generation was from steam turbines that use … biomass, coal, geothermal energy, natural gas, nuclear energy, and solar thermal energy. These types of power plants are about 33% efficient, which means that for every 100 units of primary heat energy that goes into a power plant, only 33 units are converted to useable electrical energy.

2. Read the text from Exercise 1 once again. Define the meaning of the word or word combination according to the text.

Each position= 2 pt→10 pt

1. operate (§ 1)

1) work	2) produce	3) serve

2. power lines (§ 2)

1) transmission lines	2) electric wires	3) electric flow

3. drive (§ 3)

1) produce	2) supply power to	3) move along

4. rotate (§ 2,4)

1) pump through	2) convert	3) turn around

5. efficient (§ 6)

1) satisfactory and economical to use	2) with a minimum of waste or unnecessary effort	3) necessary

3. Read the text from Exercise 1 and complete the following statements.

Each position = 2 pt→10 pt

1. According to the text, magnetism and electricity are

1) interconnected	2) forms of power	3) produced in a generator

2. Based on the information in the text, we may conclude that a turbine is

1) the main part of a power plant	2) one of the parts of a power plant	3) a part of generator

3. The text describes

1) different sources of electricity	2) ways to generate electricity	3) types of power plant

4. The figures, presented in the text, show that we use

1) use half of the energy produced by a power plant	2) convert into electricity less than a quarter of the energy at a power plant	3) produce 33 % of electricity at a power plant

5. The text is written in the form of

1) an explanation	2) a report	3) a description

4. Open the brackets putting the verb in Active or Passive Voice to complete the text.

Each position = 2 pt→20 pt

In 1895, German physicist Wilhelm Roentgen 1. (to discover) that an invisible energy 2. (to give off) by an electrical current inside a vacuum tube. He 3. (to call) this unknown energy an “x ray” because it had no name. French chemist Marie Curie 4. (to study) “uranium rays” and 5. (to find out) what they were: radioactivity. In 1904, British physicist Ernest Rutherford 6. (to recognize) that an enormous amount of energy could be obtained from a small amount of matter. The following year, Albert Einstein 6. (to propose) his famous theory about the relationship between energy and matter: $E=mc^2$. It 7. (to mean) “energy 8. (to equal) mass times the speed of light squared.” Now it 9. (to know) that the energy 10. (to come from) within the atom itself.

5. Complete the sentences.

Each correct position = 4 pt→20 pt.;
Minus 0,5 pt for one spelling mistake

1. **F**… is the splitting of the nucleus of an atom

2. **R**… means being a resource, such as solar energy or firewood, that is never used up to the end.
3. **C**… means change (something, like energy) into another form.
4. **V**… is the rate at which energy is drawn from a source that produces a flow of electricity in a circuit.
5. **R**…. **e**…. is energy that comes from the Sun.

6. Translate the words and word combinations in italic.

Each correct position = 5 pt→30 pt
Minus 0,5 pt for one spelling mistake
Minus 3 pt for one grammar mistake

Atoms are the smallest units of matter that have all the 1) *свойства элемента*. Atoms combine to form molecules. Atoms are composed of smaller particles known as 2) *протоны, нейтроны и электроны*. The first two particles form the nucleus. *Электроны* have 3) *отрицательный электрический заряд*. Under certain circumstances, the nucleus of a very large atom like 4) *ураний* or plutonium can 5) *расщепляться* and release vast amount of energy.

Total = 100 pt

VOCABULARY AND GRAMMAR TEST ON PART 3 «THE CONSTRUCTION OF THERMAL AND NUCLEAR POWER PLANTS»

1. Read the text and do exercises 1.1 and 1.2.

All-Weather Construction Method

§ 1. Construction work is affected by such weather conditions as snow fall, rain fall, high-low ambient* temperature, strong sunlight and etc. especially at a site in a severe climate. The influence of weather is one of the reasons for delays in a construction schedule.

§ 2. The all-weather construction method was used in Japan at Kashiwazaki-Kariwa Unit No. 6 for the reactor building and at Higashidori Tohoku Electric Power Co. Unit No. 1 for the reactor building, the turbine building and the auxiliary building.

§ 3. To assure that work can be conducted continually and to protect the worksite from weather conditions, an ‘all-weather’ construction method is primarily applied to the major buildings of the nuclear power plant. It provides an environment that is enclosed and isolated from the ambient weather, and is equipped with cranes to install rebar**, forms and mechanical bulk commodities.

§ 4. The all-weather construction method improves productivity during an unfavorable season for construction. *It* provides a factory-like environment which is especially useful to secure the environment and the quality of site works. It also protects the equipment installed through an open top construction. So it brings activities that can be conducted outdoors and indoors.

§ 5. To optimize the entire schedule, the all-weather construction method requires elaborate and detailed planning and engineering.

*ambient = surrounding on all sides
**Rebar = арматура

1.1. Define the meaning of the word or word combination according to the text.

Each position = 2 pt→10 pt

1. affected (§ 1)

1) taught	2) felt	3) influenced

2. auxiliary (§ 2)

1) extra	2) major	3) minor

3. cranes (§ 3)

1) machines used for lifting and moving light things	2) machines used for lifting and moving heavy things	3) birds with long legs and long necks

4. brings activities (§ 4)

1) comes with something	2) causes a particular situation	3) does for relaxation

5. elaborate (§ 5)

1) simple	2) complicated	3) work

1.2. Complete the following statements.

Each position = 2 pt→10 pt

1. According to this passage an all-weather construction method is used for

1) nuclear power plant construction	2) wind turbine building	3) thermal power plant construction

2. Based on the information in the text, we may conclude that an all-weather construction method makes

1) natural and cultural conditions better	2) working conditions better	3) working conditions worse

3. The passage suggests that the influence of weather is one of the reasons for

1) flight delays	2) delays in a construction schedule	3) starting without delay

4. The pronoun *It* in the 2nd sentence of § 4 refers to

1) an all-weather construction method	2) construction	3) unfavorable season

5. An all-weather construction method is suitable in

1) unfavorable weather	2) sunny weather	3) rainy weather

2. Choose the necessary word.

Each position = 1 pt→10 pt

Supporters of nuclear power hope (1) (*when, that, this*) small nuclear reactors, unlike large plants, will be able (2) (*to compete, compete, competing*) economically

with other of electricity. But according to M.V. Ramana, a Professor at the University of British Columbia, this is likely to be a vain hope. In fact, according to Ramana, in the absence of a mass market, they (3) (*may be, may to be, maybe*) even (4) (*expensiver, most expensive, more expensive*) than large plants.

The modern small modular reactor (SMR) is designed to be (5) (*build, builded, built*) economically in factory-like conditions (rather than onsite), and with capacities between approximately 10 MWe and 300 MWe.

(6) (*There, It, Thus*) is growing interest in SMRs to provide electricity to service small electricity grids, and possibly to provide heat for resource industries. SMRs can also be added incrementally to (7) (*more large, larger, funny*) grids as demand grows.

(8) (*Some, several, a little*) SMR designs are in advanced stages of development, including (9) (*some, several, a little*) designed to be fully underground, minimizing land use, staffing, and security needs. Some designs include passive safety systems, and can operate for up to (10) (*for, four, fourth*) years without refuelling.

3. Complete the sentences. The initial letter the word begins with is given.

Each correct position = 4 pt→20 pt
Minus 0,5 pt for one spelling mistake

1) **E…** is a secondary source of energy.
2) We visited the **s…** of our future house.
3) The **b…** of a turbine is a flat wide part of it that pushes against air.
4) The fuel for nuclear power plants is **u…**, a dense metal found in rocks and soil around the world.
5) **N…** energy is a clean energy resource that supplies electrical demand without releasing carbon dioxide into the atmosphere.

4. Make up sentences.

Each correct position = 5 pt→10 pt

1) *conservation* / does / energy / word / saving / the / mean?
2) areas / involved / engineers / in / are / many / civil / environmental.

5. Translate the words and word combinations in italic.

Each correct position = 5 pt→40 pt
Minus 0,5 pt for one spelling mistake
Minus 3 pt for one grammar mistake

1) Regulations require *компании, занимающиеся производством и распределением электроэнергии,* to develop detailed plans to prepare for emergencies.
2) The water *собирается* at the bottom of the cooling tower and *используется* again in the third loop.
3) Gases take up *больше* volume than liquids.
4) *Обозначая* different things in different contexts the term “integration” is very popular in engineering and management.

5) A cooling tower is usually the power plant's *самая высокая* structure.
6) What's the *самый лучший* way to generate *больше* power?
7) An *электрическая сеть* is an interconnected network for delivering electricity from producers to consumers.

Total = 100 pt

ОБРАЗЦЫ ТЕСТОВ ДЛЯ ИТОГОВОГО КОНТРОЛЯ

EXAMINATION VOCABULARY AND GRAMMAR TEST

1. Read the text and do exercises 1.1 and 1.2.

Design and Construction as an Integrated System

§ 1. In the planning of facilities, it is important to recognize the close relationship between design and construction. These processes can be best viewed as an integrated system where design is a process of creating the description of a new facility, usually represented by detailed plans and specifications, and construction planning is a process of identifying activities and resources required to make the design a physical reality. Construction is the implementation of a design envisioned by architects and engineers.

§ 2. In both design and construction, numerous operational tasks must be performed with a variety of precedence* and other relationships among the different tasks. Several characteristics are unique to the planning of constructed facilities and should be kept in mind even at the very early stage of the project life cycle. These include the following:

– § 3. Nearly every facility is custom** designed and constructed, and often requires a long time to complete.

– § 4. Both the design and construction of a facility must satisfy the conditions peculiar to a specific site. Because each project is site specific, its execution is influenced by natural, social and locational conditions such as weather, labor supply, local building codes, etc.

– § 5. Since the service life of a facility is long, the anticipation*** of future requirements is difficult. Because of technological complexity and market demands, changes of design plans during construction are not uncommon.

*Precedence = 1) priority of importance; 2) the condition of being more important than something or someone else and therefore coming or being dealt with first
**custom = repeated practice
***anticipation = the act of preparing for something to happen

1.1. Define the meaning of the word or word combination according to the text.

Each position = 2 pt→10 pt

1. facilities (§ 1)
1) something that makes 2) skills in doing 3) something that is built

an activity easier	something	for a specific purpose

2. implementation (§ 1)

1) realization	2) application	3) dictation

3. unique (§ 2)

1) universal	2) very special	3) many

4. Several (§ 2)

1) many	2) some	3) every

5. Both the design and construction (§ 4)

1) each process is included	2) neither is included	3) no process is included

1.2. Complete the following statements.

Each position = 2 pt→10 pt

1. According to the text, the pronoun *these* in § 2 means

1) several characteristics	2) stages of the project life cycle	3) constructed facilities

2. Based on the information in the text, we may conclude that the execution of each project depends on

1) natural and cultural conditions	2) various conditions of natural, social and locational character	3) natural , social, economic and other locational conditions

3. We can guess from the text that design and construction make

1) an integrated system	2) two separate units	3) a disintegrated system

4. It is difficult to make future requirements for a building because

1) its service period is long	2) the service life of a facility	3) weather conditions are unpredictable

5. It’s probable that § 6 would discuss

1) maintenance activities	2) pre-construction processes	3) construction activities

2. Choose the necessary word.

Each position = 1 pt→10 pt

A. A nuclear power plant looks like a standard thermal power station with one exception: the heat source in it is a (1) (*nucleus, nuclear reactor, nuclear fission*). As it is typical of all conventional thermal power stations the (2) *(heat, steam, water)* is used to generate (3) *(heat, steam, water)* which drives a steam turbine connected to a generator which produces electricity.

A steam turbine is a common feature of all thermal power plants. (4) (*It, She, He*) was invented in 1884 by Sir Charles Parsons, whose first model was connected to a dynamo that generated 7.5 kW of electricity. Exceptional feature of the nuclear power plant is the (5) (*nucleus, nuclear reactor, nuclear fission*) and its safety and auxiliary systems.

B. Hydropower, or hydroelectricity, uses the motion of water to turn a turbine and generate electricity. The water may (1) (*be, is, to be*) in a moving river, moving from (2) (*more higher to more lower, higher to lower, more high to more low*) elevations through a specially constructed dam, or in the motion of ocean tides or waves.

Hydropower, (3) (*an older, the oldest, the most old*) renewable energy source, has (4) (*the highest, higher, the most highest*) efficiency of all power conversion process. The potential water head is available right next to the turbine, so (5) (*there are, they are, it is*) no energy conversion losses. The efficiency is in the range of 85 to 90 %.

3. Complete the sentences. The initial letter the word begins with is given.

Each correct position = 4 pt→20 pt;
Minus 0,5 pt for one spelling mistake

1) The word ***c…*** means saving energy.
2) **E…** is a versatile and adaptable form of energy.
3) Generation, **t…** and **d…** are three main steps in getting electricity to customers.
4) The company chose a new **s…** for its office building.

4. Make up sentences.

Each correct position = 5 pt→10 pt

1) very / plants / nuclear / little / release / power / radiation.
2) to / do / molecules / atoms / form / combine?

5. Translate the words and word combinations in italic.

Each correct position = 5 pt→40 pt.
Minus 0,5 pt for one spelling mistake
Minus 3 pt for one grammar mistake

1) The water used as a *охлаждающая жидкость* is necessary for a chain reaction.
2) The way heat energy *преобразуется* into electrical energy is basically the same as in a coal power plant.
3) The science of how heat moves *называется* thermodynamics.
4) We must protect the environment *лучше*.
5) The breeder reactor uses *обогащенный* uranium.
6) Unlike the utility the *подрядчик* neither owns the plant nor has to operate it.
7) “Integration” is a term widely *употребляемый* in engineering and management.
8) Electricity is the *самая удобная* form of energy.

Total = 100 pt

ПРЕДМЕТНО-ТЕМАТИЧЕСКОЕ СОДЕРЖАНИЕ ЗАЧЁТА И ЭКЗАМЕНА

Темы к зачету

1. Engineering.
2. My career ambitions.
3. My University.
4. Building materials.
5. Energy.
6. Atoms, Molecules and Other Particles.
7. Electricity Basics.

Темы к экзамену

1. My University Studies.
2. Types of Power Plants.
3. Types of Power Plants: Advantages and Disadvantages.
4. The Green House Effect.
5. The Biggest Power Plants.
6. Thermal Power Plant: Its Operation and Stages of Construction.
7. Nuclear Power Plant Construction Process: Planning and Organization Activities.
8. Nuclear Power Plant Preconstruction and Construction Activities.
9. Types of Nuclear Reactors.

ВСПОМОГАТЕЛЬНЫЙ РАЗДЕЛ

УЧЕБНАЯ ПРОГРАММА ПО ДИСЦИПЛИНЕ «ИНОСТРАННЫЙ ЯЗЫК (АНГЛИЙСКИЙ)»

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Регистрационный № УД-ФЭС 102-15 /уч.

ИНОСТРАННЫЙ ЯЗЫК

(английский)

Учебная программа учреждения высшего образования

по учебной дисциплине для специальностей:

1-37 03 02 Кораблестроение и техническая эксплуатация внутреннего водного транспорта;

1-70 04 02 Теплогазоснабжение, вентиляция и охрана воздушного бассейна;

1-70 04 03 Водоснабжение, водоотведение и охрана водных ресурсов;

1-70 07 01 Строительство тепловых и атомных электростанций;

1-70 04 01 Водохозяйственное строительство;

1-27 01 01 Экономика и организация производства (по направлениям)

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ПОЯСНИТЕЛЬНАЯ ЗАПИСКА

Учебная программа по учебной дисциплине «Иностранный язык (английский)» разработана для специальностей 1-37 03 02 «Кораблестроение и техническая эксплуатация внутреннего водного транспорта», 1-70 04 02 «Теплогазоснабжение, вентиляция и охрана воздушного бассейна», 1-70 04 03 «Водоснабжение, водоотведение и охрана водных ресурсов», 1-70 07 01

«Строительство тепловых и атомных электростанций», 1-70 04 01 «Водохозяйственное строительство», 1-27 01 01 «Экономика и организация производства».

Целью изучения дисциплины является формирование иноязычной коммуникативной компетенции будущего специалиста, позволяющей использовать иностранный язык как средство профессионального и межличностного общения.

В процессе достижения главной цели решаются следующие **задачи**:

- *познавательные*, позволяющие сформировать представление об образе мира как целостной многоуровневой системе (этнической, языковой, социокультурной и т.п.); об уровне материальной и духовной культуры; системе ценностей (религиозно-философских, эстетических и нравственных); особенностях профессиональной деятельности в изучаемых странах;
- *развивающие*, позволяющие совершенствовать речемыслительные и коммуникативные способности, память, внимание, воображение, формирование потребности к самостоятельной познавательной деятельности и т.д.;
- *воспитательные*, связанные с формированием общечеловеческих, общенациональных и личностных ценностей, таких как: гуманистическое мировоззрение, уважение к другим культурам, патриотизм, нравственность, культура общения;
- *практические*, предполагающие овладение иноязычным общением в единстве всех его компетенций (языковой, речевой, социокультурной, компенсаторной, учебно-познавательной), функций (этикетной, познавательной, регулятивной, ценностно-ориентационной) и форм (устной и письменной), что осуществляется посредством взаимосвязанного обучения всем видам речевой деятельности в рамках определенного программой предметно-тематического содержания, а также овладения технологиями языкового самообразования.

Учебная дисциплина базируется на знаниях курса средней общеобразовательной школы и связана с «Обзорными лекциями по специальности». Знания и умения, полученные студентами при изучении данной дисциплины, позволяют осуществлять коммуникацию на английском языке в различных ситуациях профессиональных и деловых взаимоотношений, а также выполнять реферирование, аннотирование и перевод профессионально значимых англоязычных текстов и научных работ.

В результате изучения учебной дисциплины «Иностранный язык (английский)» студент должен:

знать:

- систему иностранного языка в его фонетическом, лексическом и грамматическом аспектах;
- социокультурные нормы бытового и делового общения в современном поликультурном мире;
- историю и культуру страны изучаемого языка;
- основные формы культурной коммуникации;

уметь:

- вести общение профессионального и социокультурного характера на иностранном языке, сочетая диалогические и монологические формы речи;
- читать литературу на иностранном языке по профилю обучения (изучающее, ознакомительное, просмотровое и поисковое чтение);
- использовать иностранный язык в качестве инструмента профессиональной деятельности: перевод, реферирование и аннотирование профессионально ориентированных и научных текстов, выступление с публичной речью, составление деловой документации;
- использовать стилистические нормы иностранного языка в соответствии с ситуацией профессиональных или деловых взаимоотношений;

владеть:

- системой иностранного языка в его фонетическом, лексическом и грамматическом аспектах;
- правилами речевого этикета;
- рациональным и эффективным языковым поведением в ситуациях межкультурной коммуникации.

Освоение данной учебной дисциплины обеспечивает формирование следующих компетенций:

АК-2. Владеть системным и сравнительным анализом.

АК-4. Уметь работать самостоятельно.

АК-5. Быть способным порождать новые идеи (обладать креативностью).

АК-6. Владеть междисциплинарным подходом при решении проблем.

АК-7. Иметь навыки, связанные с использованием технических устройств, управлением информацией и работой с компьютером.

АК-8. Обладать навыками устной и письменной коммуникации.

АК-9. Уметь учиться, повышать свою квалификацию в течение всей жизни.

АК-10. Иметь лингвистические и коммуникативные навыки.

СЛК-2. Быть способным к социальному взаимодействию.

СЛК-3. Обладать способностью к межличностным коммуникациям.

СЛК-5. Быть способным к критике и самокритике.

СЛК-6. Уметь работать в команде.

ПК-15. Использовать информационные, компьютерные технологии.

ПК-35. Готовить доклады, материалы к презентациям.

Согласно учебным планам для специальности *1-70 04 01 «Кораблестроение и техническая эксплуатация внутреннего водного транспорта»*

на изучение учебной дисциплины отведено:

- для очной формы получения высшего образования всего 324 часа, из них аудиторных – 136 часов;

Распределение аудиторных часов по курсам, семестрам и видам занятий приведено ниже (Таблица 1).

Таблица 1.

Очная форма получения высшего образования

Курс	Семестр	Лекции, ч.	Лабораторные занятия, ч.	Практические занятия, ч.	Форма текущей аттестации
1	1			68	экзамен
1	2			34	зачет
2	3			34	экзамен

Согласно учебным планам для специальности *1-70 04 02 «Теплогазоснабжение, вентиляция и охрана воздушного бассейна»*

на изучение учебной дисциплины отведено:

- для очной формы получения высшего образования всего 309 часов, из них аудиторных – 136 часов;
- для заочной формы получения высшего образования 18 аудиторных часов.

Распределение аудиторных часов по курсам, семестрам и видам занятий приведено ниже (Таблица 2, Таблица 3).

Таблица 2.

Очная форма получения высшего образования					
Курс	Семестр	Лекции, ч.	Лабораторные занятия, ч.	Практические занятия, ч.	Форма текущей аттестации
1	1			51	зачёт
1	2			51	экзамен
2	3			34	зачёт

Таблица 3.

Заочная форма получения высшего образования					
Курс	Семестр	Лекции, ч.	Лабораторные занятия, ч.	Практические занятия, ч.	Форма текущей аттестации
1	1			6	зачёт
1	2			6	зачёт
2	3			6	экзамен

Согласно учебным планам для специальности *1-70 04 03 «Водоснабжение, водоотведение и охрана водных ресурсов»* на изучение учебной дисциплины отведено:

- для очной формы получения высшего образования всего 300 часов, из них аудиторных – 136 часов;
- для заочной формы получения высшего образования всего 255 часов, из них аудиторных – 18 часов.

Распределение аудиторных часов по курсам, семестрам и видам занятий приведено ниже (Таблица 4, Таблица 5).

Таблица 4.

Очная форма получения высшего образования					
Курс	Семестр	Лекции, ч.	Лабораторные занятия, ч.	Практические занятия, ч.	Форма текущей аттестации
1	1			51	зачёт
1	2			51	зачёт
2	3			34	экзамен

Таблица 5.

Заочная форма получения высшего образования					
Курс	Семестр	Лекции, ч.	Лабораторные занятия, ч.	Практические занятия, ч.	Форма текущей аттестации
1	1			6	зачёт
1	2			6	зачёт
2	3			6	экзамен

Согласно учебным планам для специальности *1-70 07 01 «Строительство тепловых и атомных электростанций»* на изучение учебной дисциплины отведено всего 294 ч., из них аудиторных – 136 часа.

Распределение аудиторных часов по курсам, семестрам и видам занятий приведено в Таблице 6.

Таблица 6.

Очная форма получения высшего образования					
Курс	Семестр	Лекции, ч.	Лабораторные занятия, ч.	Практические занятия, ч.	Форма текущей аттестации
1	1			68	зачёт
1	2			68	экзамен

Согласно учебным планам для специальности 1-70 04 01 «Водохозяйственное строительство» на изучение учебной дисциплины отведено всего 294 ч., из них аудиторных – 136 часа.

Распределение аудиторных часов по курсам, семестрам и видам занятий приведено в Таблице 7.

Таблица 7.

Очная форма получения высшего образования					
Курс	Семестр	Лекции, ч.	Лабораторные занятия, ч.	Практические занятия, ч.	Форма текущей аттестации
1	1			68	зачёт
1	2			68	экзамен

Согласно учебным планам для специальности 1-27 01 01 «Экономика и организация производства (по направлениям)» на изучение учебной дисциплины отведено всего 330 ч., из них аудиторных – 152 часа.

Распределение аудиторных часов по курсам, семестрам и видам занятий приведено в Таблице 8.

Таблица 8.

Очная форма получения высшего образования					
Курс	Семестр	Лекции, ч.	Лабораторные занятия, ч.	Практические занятия, ч.	Форма текущей аттестации
1	1			84	зачёт
1	2			68	экзамен

СОДЕРЖАНИЕ УЧЕБНОГО МАТЕРИАЛА

Раздел I. МОДУЛЬ СОЦИАЛЬНОГО ОБЩЕНИЯ

Тема 1.1. Социально-бытовое общение

Личностные характеристики (биографические сведения, работа, хобби т.д.).

Тема 1.2. Роль иностранного языка в профессиональном общении

Роль иностранного языка в профессиональной деятельности инженера. Роль международного сотрудничества в профессиональной деятельности.

Тема 1.3. Современные технологии и окружающая среда

Экологическая культура. Технический прогресс и глобальные проблемы человечества. Пути решения проблем защиты окружающей среды с точки зрения инженера. Экологические проблемы Беларуси, Великобритании и США в сопоставлении.

Раздел II. МОДУЛЬ ПРОФЕССИОНАЛЬНОГО ОБЩЕНИЯ

Тема 2.1. Учебно-профессиональное общение

Вклад белорусов в мировую науку и технику. Организация инженерного образования в Республике Беларусь и странах изучаемого языка: США и Великобритании. Обучение в университете. БНТУ.

Тема 2.2. Профессиональное общение

Предмет и содержание специальности. Общее представление о структуре и характере профессиональной деятельности. Избранная специальность как отрасль инженерии.

Тема. 2.3. Обмен научно-технической информацией

Обмен-научно-технической информацией (на выставке, конференции). Электронная и постерная презентации.

Тема 2.4. Аннотирование статьи по специальности

Составные части аннотации на иностранном языке. Клишированные фразы для написания аннотации.

Тема 2.5. Реферирование статьи по специальности

Основные части реферата на иностранном языке. Клишированные фразы для написания реферата.

Тема 2.6. Производственное общение

Типичные ситуации производственного общения. Социокультурные нормы делового общения. Профессиональная этика.

Раздел III. ЯЗЫКОВОЙ МАТЕРИАЛ

Тема 3.1. Фонетика

Звуковой строй иноязычной речи в сопоставлении с фонетической системой родного языка: особенности произнесения отдельных звуков (гласных, согласных), звукосочетаний, слов и фраз; расхождение между произношением и написанием; фонетическая транскрипция. Интонационное оформление фраз различного коммуникативного типа: повествования, вопроса, просьбы, приказа, восклицания. Фразовое и логическое ударение в сложном предложении.

Тема 3.2. Имя существительное

Категории числа, падежа, определённости.

Тема 3.3. Имя прилагательное

Категория степеней сравнения. Сравнительные конструкции.

Тема 3.4. Местоимение

Типы местоимений (личные, притяжательные, указательные, вопросительные, неопределённые, возвратные).

Тема 3.5. Числительное

Типы числительных (простые, производные, сложные; количественные порядковые; дробные).

Тема 3.6. Наречие

Типы наречий. Категория степеней сравнения.

Тема 3.7. Глагол

Видо-временная система (действительный, страдательный залог). Модальные глаголы и их эквиваленты. Согласование времён.

Тема 3.8. Неличные формы глагола

Инфинитив. Причастие. Герундий. Конструкции с неличными формами глагола.

Тема 3.9. Словообразование

Словообразовательные модели (существительное, прилагательное, наречие, глагол).

Тема 3.10. Служебные слова

Предлоги. Союзы. Союзные слова.

Тема 3.11. Простое предложение

Типы простых предложений; порядок слов. Члены предложения: способы выражения, правила согласования подлежащего и сказуемого. Специфические конструкции и обороты.

Тема 3.12. Сложное предложение

Типы сложного предложения (сложносочинённое и сложноподчинённое). Типы придаточных предложений. Условные предложения. Бессоюзное подчинение.

Тема 3.13. Прямая и косвенная речь

Правила перевода в косвенную речь предложений разных типов.

Тема 3.14. Профессиональная лексика

Наиболее употребительные слова и словосочетания по предметно-тематическому содержанию курса. Сочетаемость слов; свободные и устойчивые словосочетания. Общенаучная лексика и терминология.

Тема 3.15. Разговорные клише

Знакомство. Установление, поддержание контакта. Выражение просьбы. Выражение согласия, несогласия с мнением автора (собеседника). Начало, продолжение, завершение беседы. Выражение собственного мнения. Запрос о мнении собеседника. Уверенность, неуверенность.

УЧЕБНО-МЕТОДИЧЕСКАЯ КАРТА УЧЕБНОЙ ДИСЦИПЛИНЫ
очная форма получения высшего образования для специальности
1-70 04 01 «Кораблестроение и техническая эксплуатация внутреннего водного транспорта»

Номер раздела, темы	Название раздела, темы	Количество аудиторных часов					Количество часов УСР	Форма контроля знаний
		Лекции	Практические занятия	Семинарские занятия	Лабораторные занятия	Иное		
1	2	3	4	5	6	7	8	9
	1 семестр							
1.1	Социально-бытовое общение		6					
1.2	Роль иностранного языка в профессиональном общении		6					
1.3	Современные технологии и окружающая среда		6					
2.1	Учебно-профессиональное общение		6					
2.2	Профессиональное общение		6					
2.4	Аннотирование статьи по специальности		6					
2.5	Реферирование статьи по специальности		8					
3.1	Фонетика		4					
3.11	Простое предложение		4					
3.12	Сложное предложение		6					
3.14	Профессиональная лексика		6					
3.15	Разговорные клише		4					
	Итого за семестр		68					экзамен

	2 семестр							
2.3	Обмен научно-технической информацией		5					
3.2	Имя существительное		4					
3.3	Имя прилагательное		4					
3.10	Служебные слова		2					
3.4	Местоимение		2					
3.5	Числительное		2					
3.6	Наречие		4					
3.7	Глагол		4					
3.14	Профессиональная лексика		5					
3.15	Разговорные клише		2					
	Итого за семестр		34					зачёт
	3 семестр							
2.6	Производственное общение		6					
3.8	Неличные формы глагола		6					
3.9	Словообразование		6					
3.13	Прямая и косвенная речь		6					
3.14	Профессиональная лексика		6					
3.15	Разговорные клише		4					
	Итого за семестр		34					экзамен
	Всего аудиторных часов	136						

УЧЕБНО-МЕТОДИЧЕСКАЯ КАРТА УЧЕБНОЙ ДИСЦИПЛИНЫ
очная форма получения высшего образования для направления специальностей
1-70 04 02 «Теплогазоснабжение, вентиляция и охрана воздушного бассейна»
1-70 04 03 «Водоснабжение, водоотведение и охрана водных ресурсов»

Номер раздела, темы	Название раздела, темы	Количество аудиторных часов					Количество часов УСР	Форма контроля знаний
		Лекции	Практические занятия	Семинарские занятия	Лабораторные занятия	Иное		
1	2	3	4	5	6	7	8	9
	1 семестр							
1.1	Социально-бытовое общение		4					
1.2	Роль иностранного языка в профессиональном общении		4					
1.3	Современные технологии и окружающая среда		4					
2.1	Учебно-профессиональное общение		8					
3.1	Фонетика		4					
3.2	Имя существительное		4					
3.3	Имя прилагательное		4					
3.10	Служебные слова		2					
3.11	Простое предложение		4					
3.12	Сложное предложение		4					
3.14	Профессиональная лексика		6					
3.15	Разговорные клише		3					

	Итого за семестр		51					зачёт
	2 семестр							
2.2	Профессиональное общение		9					
2.3	Обмен научно-технической информацией		8					
3.4	Местоимение		4					
3.5	Числительное		4					
3.6	Наречие		4					
3.7	Глагол		4					
3.8	Неличные формы глагола		4					
3.9	Словообразование		4					
3.14	Профессиональная лексика		8					
3.15	Разговорные клише		2					
	Итого за семестр		51					экзамен
	3 семестр							
2.4	Аннотирование статьи по специальности		6					
2.5	Реферирование статьи по специальности		6					
2.6	Производственное общение		10					
3.13	Прямая и косвенная речь		6					
3.14	Профессиональная лексика		6					
3.15	Разговорные клише		2					
	Итого за семестр		34					зачёт
	Всего аудиторных часов		136					

УЧЕБНО-МЕТОДИЧЕСКАЯ КАРТА УЧЕБНОЙ ДИСЦИПЛИНЫ
очная форма получения высшего образования для направления специальностей
1-70 07 01 «Строительство тепловых и атомных электростанций»
1-70 04 01 «Водохозяйственное строительство»

Номер раздела, темы	Название раздела, темы	Количество аудиторных часов					Количество часов УСР	Форма контроля знаний
		Лекции	Практические занятия	Семинарские занятия	Лабораторные занятия	Иное		
1	2	3	4	5	6	7	8	9
	1 семестр							
1.1	Социально-бытовое общение		6					
1.2	Роль иностранного языка в профессиональном общении		4					
1.3	Современные технологии и окружающая среда		4					
2.1	Учебно-профессиональное общение		12					
3.1	Фонетика		4					
3.2	Имя существительное		4					
3.3	Имя прилагательное		4					
3.10	Служебные слова		4					
3.11	Простое предложение		4					
3.12	Сложное предложение		4					
3.14	Профессиональная лексика		10					
3.15	Разговорные клише		8					
	Итого за семестр		68					зачёт

	2 семестр							
2.2	Профессиональное общение		11					
2.3	Обмен научно-технической информацией		12					
3.4	Местоимение		4					
3.5	Числительное		4					
3.6	Наречие		4					
3.7	Глагол		4					
3.8	Неличные формы глагола		4					
3.9	Словообразование		4					
3.14	Профессиональная лексика		12					
3.15	Аннотирование статьи по специальности		10					
	Итого за семестр		68					экзамен
	Всего аудиторных часов	136						

УЧЕБНО-МЕТОДИЧЕСКАЯ КАРТА УЧЕБНОЙ ДИСЦИПЛИНЫ
заочная форма получения высшего образования

Номер раздела, темы	Название раздела, темы	Количество аудиторных часов					Количество часов УСР	Форма контроля знаний
		Лекции	Практические занятия	Семинарские занятия	Лабораторные занятия	Иное		
1	2	3	4	5	6	7	8	9
	1 семестр							
1.1	Социально-бытовое общение		2					
2.1	Учебно-профессиональное общение		2					
3.14	Профессиональная лексика		2					
	Итого за семестр		6					зачёт
	2 семестр							
2.2	Профессиональное общение		2					
2.3	Обмен научно-технической информацией		2					
3.14	Профессиональная лексика		2					
	Итого за семестр		6					зачёт
	3 семестр							
2.6	Производственное общение		2					
3.14	Профессиональная лексика		4					
	Итого за семестр		6					экзамен
	Всего аудиторных часов	18						

УЧЕБНО-МЕТОДИЧЕСКАЯ КАРТА УЧЕБНОЙ ДИСЦИПЛИНЫ
очная форма получения высшего образования для направления специальности
1-27 01 01 «Экономика и организация производства (по направлениям)»

Номер раздела, темы	Название раздела, темы	Количество аудиторных часов					Количество часов УСР	Форма контроля знаний
		Лекции	Практические занятия	Семинарские занятия	Лабораторные занятия	Иное		
1	2	3	4	5	6	7	8	9
	1 семестр							
1.1	Социально-бытовое общение		6					
1.2	Роль иностранного языка в профессиональном общении		6					
1.3	Современные технологии и окружающая среда		6					
2.1	Учебно-профессиональное общение		12					
3.1	Фонетика		6					
3.2	Имя существительное		6					
3.3	Имя прилагательное		6					
3.10	Служебные слова		6					
3.11	Простое предложение		6					
3.12	Сложное предложение		6					
3.14	Профессиональная лексика		10					
3.15	Разговорные клише		8					
	Итого за семестр		84					зачёт

	2 семестр							
2.2	Профессиональное общение		11					
2.3	Обмен научно-технической информацией		12					
3.4	Местоимение		4					
3.5	Числительное		4					
3.6	Наречие		4					
3.7	Глагол		4					
3.8	Неличные формы глагола		4					
3.9	Словообразование		4					
3.14	Профессиональная лексика		12					
3.15	Аннотирование статьи по специальности		10					
	Итого за семестр		68					экзамен
	Всего аудиторных часов	152						

ИНФОРМАЦИОННО-МЕТОДИЧЕСКАЯ ЧАСТЬ
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СРЕДСТВА ДИАГНОСТИКИ РЕЗУЛЬТАТОВ УЧЕБНОЙ ДЕЯТЕЛЬНОСТИ (МОДУЛЬ КОНТРОЛЯ)

Для оценки достижений студента рекомендуется использовать следующий диагностический инструментарий:

– устный и письменный опрос во время практических занятий;

– проведение текущих контрольных работ (заданий) по отдельным темам;

– защита выполненных в рамках управляемой самостоятельной работы индивидуальных заданий;

– зачет;

– экзамен.

ТРЕБОВАНИЯ К РАЗЛИЧНЫМ ЭТАПАМ ДИАГНОСТИКИ КОМПЕТЕНЦИЙ СТУДЕНТОВ

Проверка знаний и умений осуществляется в форме текущего, промежуточного и итогового контроля. *Текущий контроль* предусмотрен программой и осуществляется на аудиторных занятиях с целью проверки уровня владения пройденной частью языкового и речевого материала и степени сформированности коммуникативных навыков и умений. Текущий контроль осуществляется в форме комплексных заданий, лексико-грамматических тестов, коллоквиумов, собеседований.

Промежуточный контроль проводится в конце прохождения каждой темы в виде лексико-грамматических тестов и самостоятельной работы по текстам по специальности.

Итоговый контроль носит комплексный характер и проводится в двух формах: зачета и экзамена.

Оценка учебных достижений студентов на экзаменах по дисциплине «Иностранный язык (английский)» производится по десятибалльной шкале. Для оценки учебных достижений студентов используются критерии, утвержденные Министерством образования Республики Беларусь.

ЗАЧЁТ по дисциплине «Иностранный язык (английский)» основывается на результатах текущего и промежуточного контроля и направлен, с одной стороны, на проверку умения работы с текстом, а с

другой стороны, – на проверку коммуникативных навыков и умений, приобретенных студентами на соответствующем этапе обучения.

Требования к зачету:

Письменная часть

1. Лексико-грамматический тест.

2. Чтение и письменный перевод оригинального общенаучного или общетехнического текста с иностранного языка на родной со словарем. Объем – 1000 печатных знаков. Время выполнения – 45 мин.

Устная часть

1. Подготовленное высказывание по заданной ситуации (10-12 предложений) и неподготовленная беседа с преподавателем в рамках данной ситуации (6-7 реплик).

2. Реферирование оригинального или частично адаптированного культурологического или научно-популярного текста на иностранном языке; беседа на иностранном языке по содержанию текста. Объем текста – 700 печатных знаков. Время выполнения – 10 мин.

ЭКЗАМЕН включает следующие задания:

Письменная часть

1. Лексико-грамматический тест.

2. Чтение и письменный перевод оригинального профессионально ориентированного текста с иностранного языка на родной со словарем. Объем – 1300-1500 печатных знаков. Время – 45 мин.

Устная часть

1. Подготовленное высказывание по заданной ситуации и неподготовленная беседа с преподавателем в рамках данной ситуации (по предметно-тематическому содержанию дисциплины).

2. Реферирование аутентичного или частично адаптированного общественно-политического, культурологического, научно-популярного текста; беседа на иностранном языке по содержанию текста. Объем текста – 900 печатных знаков. Время – 5-7 мин.

МЕТОДИЧЕСКИЕ РЕКОМЕНДАЦИИ ПО ОРГАНИЗАЦИИ И ВЫПОЛНЕНИЮ САМОСТОЯТЕЛЬНОЙ РАБОТЫ СТУДЕНТОВ

При изучении дисциплины рекомендуется использовать следующие формы самостоятельной работы:

– подготовка сообщений, тематических докладов, презентаций по заданным темам;

– проработка тем (вопросов), вынесенных на самостоятельное изучение.

МЕТОДЫ (ТЕХНОЛОГИИ) ОБУЧЕНИЯ

Основными методами (технологиями) обучения, отвечающими целям изучения дисциплины, являются:

– *проектная технология*, представляющая самостоятельную, долгосрочную групповую работу по теме-проблеме, выбранную самими студентами, включающую поиск, отбор и организацию информации. В процессе работы над проектом речевое иноязычное общение «вплетено в интеллектуально-эмоциональный контекст другой деятельности»;

– *кейс-технология*, основу которой составляют осмысление, критический анализ и решение конкретных социальных проблем. Кейс-технология ориентирована на развитие способности студентов решать определенные жизненные ситуации, важные повседневные проблемы, с которыми они непосредственно сталкиваются в жизни;

– *симуляция*, которая применительно к иностранному языку представляет собой подражательное, разыгранное воспроизведение межличностных контактов, организованных вокруг проблемной ситуации, максимально приближенной к реальной;

– *технология обучения в сотрудничестве*, предполагающая создание условий для активной совместной учебной деятельности студентов в разных учебных ситуациях. Это обучение в процессе общения студентов друг с другом и с преподавателем при наличии общей цели и индивидуальной ответственности каждого члена группы за собственный вклад в общее дело, за выполнение общего задания;

– *технология дебатов*, представляющая собой полемический диалог, проходящий по определенному сценарию и имеющий целью убеждение третьей стороны – судей или аудитории.

– *компьютерные технологии*, предполагающие широкое использование Интернет-ресурсов и мультимедийных обучающих программ. Компьютерные технологии позволяют интенсифицировать и активизировать учебно-познавательную деятельность студентов, эффективно организовать и спланировать самостоятельную работу, совершенствовать контрольно-оценочные функции (компьютерное тестирование).

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