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РОССИЙСКОЙ ФЕДЕРАЦИИ

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Перевод профессионально ориентированных текстов

Translation of Texts for Special Purposes

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Цель данного пособия – дать студентам наглядное представление об особенностях перевода специальных текстов с английского языка на русский, а также развить навыки перевода научно-технических текстов, относящихся к различным тематикам.

Для практической работы по дисциплине «Технический перевод», преподаваемой студентам третьего года обучения отделения переводоведения и межкультурной коммуникации.

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Foreword

This Manual deals with the problem of scientific and technical texts' translation from English into Russian.

The Manual consists of two parts. **Part I** concerns the theoretical aspects of special texts' translation. Its aim is to give information about the basic peculiarities of scientific and technical texts' language and their translation, basic concepts of terminological studies, translator's false friends in terminology and recommended terminological dictionaries.

Part II consists of 10 units. The texts provided are meant for the student's self-training in translation of scientific and technical texts. The materials are taken from original special literature, and their sources are indicated. Each text is followed by the set of exercises and tasks on terminological words and word combinations used in different spheres of communication.

Part 1
Theoretical Aspects of Translation of Texts for Special Purposes

1.1. Peculiarities of Translation of Texts on Science and Technology

Nowadays nearly 70 per cent of translators work with scientific and technical texts. Translation of such kind of literature is wide-spread and highly demanded. For this reason, an in-depth theoretical study of the specific features of scientific and technical translation is an urgent problem of translation theory.

The materials which belong to different fields of knowledge and practice, science and technology are the object of special translation. The peculiarity of these materials is the exact expression of thought, which is achieved by the broad usage of terms. The main types of special translation are as follows: scientific, technical, military, legal, and economic translation.

In translation of scientific and technical texts the main task is to identify the idea or situation described in the original. The translator should understand the context in order to translate properly. The predominance of the referential function is a great challenge to the translator who must have a good command of scientific and technical terms and a sufficient understanding of the subject matter to be able to give an adequate description of the situation even if this is not fully achieved in the original. The translator is also expected to be aware of and follow the stylistic requirements of scientific and technical materials to make text acceptable to the specialist.

It is appreciated when translators are aware of the peculiarities of the sphere in which they work. To translate scientific and technical texts

properly, it is necessary to read scientific and technical literature not only in the source language, but also in the target language.

Nowadays a person can't master all the information accumulated in science and technology that have become complicated and developed. That is why translators who work with scientific and technical texts have to specialize in one or two fields of production, study regularly the special literature, be aware of the novelties in this sphere and use the experience of specialists and highly qualified translators.

The texts of science and technology have specific lexical means known only to the engineers and scientists working in the particular sphere. On the other hand, engineers who do translations sometimes do not have a good command of foreign languages. Consequently, translation should be done by a professional translator, and then it should be checked by a specialist in a corresponding field of science or technology.

The translation of special literature should conform to the standards in the target language. In this genre of translation there can't be any change of the fact of the source text. In the process of the phrase translation it is important to render a thought as clearly and exactly as possible. Consequently, the sense of the whole may not change if a translator divides a sentence into parts, replaces its parts, or joins parts.

The peculiarity of written scientific speech is that texts may contain not only verbal information, but also different formulae, symbols, tables, diagrams. It is mainly typical of the texts of such sciences as mathematics, physics, chemistry, etc. Any scientific text may contain graphic information. Translating headings in drawings the latter should be redrawn and headings should be written in Russian on the copy.

It is also important to point out that translation should be laconic. Descriptions of machines, equipment, instruments or processes of production should be illustrated in translation.

All the English and American measures should be transformed into metric equivalents.

Linear Measure

1 mile (ml) миля = 1.609 kilometres

1 yard (yd) ярд = 91.44 centimetres

1 foot (ft) фут = 30.48 centimetres

1 inch (in) дюйм = 2.54 centimenres

Square Measure

1 square mile (ml²) кв. миля = 2.59 square kilometres

1 acre (a.) акр = 0.405 hectare

1 square yard (yd²) кв. ярд. = 0.836 square metre

1 square foot (ft²) кв. фут = 929 square centimetres

1 square inch (in²) кв. дюйм = 6.45 square centimetres

Cubic Measure

1 register ton(ne) тонна регистровая = 2.83 cubic metres

1 stack стек = 3.04 cubic metres

1 cubic yard (yd³) куб. ярд = 0.76 cubic metre

1 cubic foot (ft³) куб. фут = 0.028 cubic metre

1 cubic inch (in³) куб. дюйм = 16.39 cubic centimetres

Weight Measure

1 ton(ne) (tn) (gross, long) тонна (большая, длинная) = 1.016 kilograms

1 ton(ne) (tn) (net, short) тонна (малая, короткая) = 907.18 kilograms

1 hundredweight (cwt) (gross, long) хандредвейт (большой, длинный) = 50.8 kilograms

1 hundredweight (cwt) (net, short) хандредвейт (малый, короткий) = 45.36 kilograms

1 stone стоун, стон = 6.35 kilograms

1 pound (lb) фунт = 453.59 grams

2.205 pounds = 1 kilogram

1 ounce (oz) унция = 28.35 grams

1 grain гран = 64.8 milligrams

Measures of Capacity

1 gallon = 4 quarts = 8 pints = 4.546 litres

1 quart = 2 pints = 1.138 litres

1 pint = 0.568 litre

Temperature

Prefixes are not as commonly used with temperature measurements as they are with those for weight, length, and volume. The following can be used as general guidelines to tell the weather in both Celsius and Fahrenheit.

–273.15°C = –459.67°F (Absolute Zero)

–40°C = –40°F

–30°C = –22°F

–20°C = –4°F

–17.8°C = 0°F

–10°C = 14°F

0°C = 32°F (Freezing Point)

10°C = 50°F

20°C = 68°F

30°C = 86°F

37°C = 98.6°F

40°C = 104°F

50°C = 122°F

100°C = 212°F

To convert degrees Fahrenheit to degrees Celsius, multiply by five-ninth after subtracting 32; to convert Celsius to Fahrenheit, multiply by nine-fifths and then add 32.

To sum up, the quality of scientific and technical texts' translation is highly affected by several factors: 1) translator's knowledge of the

scientific speech style (both in the source and target languages); 2) ability to choose corresponding equivalents in the target language taking into consideration their functional and stylistic peculiarities; 3) general translation skills.

1.2. Scientific Style

The peculiarities of a functional style influence the translation process and result. *Terminological units* play a great role in scientific and technical texts. (The problems of terminology are considered in 1.3.). The main characteristics of scientific texts are as follows: information value (richness of content), logicality (strict succession, clear connection between the general idea and details), exactness and objectiveness of exposition and clearness.

Monological speech has a leading position in the scientific style. Speech genres, presenting this style of language are scientific monographs, scientific articles, theses, papers, reviews, annotations, instructions, scientific reports and lectures.

Commonly scientific style is realized in the written form of speech. It is characterised by restrictions and accurate choice of words and constructions. However, such factors as the development of mass media, the growth of importance of science in the modern society, increasing amount of various conferences, symposia, seminars promote to the significance of scientific speech.

The characteristics of the language of scientific literature are determined by the aim of scientific prose, which is to give information about scientific ideas, inventions, investigations, to prove a hypothesis, to create new concepts, to disclose the internal laws of existence, development, relations between different phenomena, etc. Therefore, the language means used in the texts of this style tend to be precise,

objective, unemotional, devoid of individuality. The most generalized form of expression is also typical of scientific style.

Scientific speech is characterised by the logicality of thought, its successive and objective narration. The texts of scientific style contain exact definitions of considered concepts and phenomena, every sentence or statement is logically connected with the preceding or following information. Thus, one of the most noticeable features of this style is the *logical sequence of utterances* with clear indication of their interrelations and interdependence. It should be pointed out that scientific prose has the most developed and varied system of connectives among all the functional styles.

The next characteristic feature of scientific style is what is called *science-patterns*. There are three types of them: postulatory, argumentative and formulative. A scientific theory or conjecture, a hypothesis or a forecast must be based on facts, which are already investigated, systematized and defined. Therefore, every piece of scientific prose begins with postulatory pronouncements which are expected to be self-evident and needing no proof or additional explanation. A reference to these facts is only preliminary to the exposition of the writer's ideas and is therefore summed up in precisely formulated statements accompanied, if considered necessary, by references to sources. The author's own ideas are also expressed in the form of a doctrine or theory of a principle, an argument, the result of an investigation, conclusions, etc. The definition sentence-pattern in scientific prose, that is the sentence which sums up the ideas, facts and arguments, is generally a kind of conclusive statement.

The next observable feature of the style of scientific works and one that is paid attention to by the reader, is the use of *quotations and references*. These sometimes occupy as much as half a page. The references are often placed at the back of the book and shaped as an

appendix. They have a definite compositional pattern, which includes the name of the writer, the title of the work, the publishing house, the place (the city) and year it was published, and the page of the extract quoted or referred to.

Another feature of scientific style, which makes it distinguishable from other styles, is the frequent use of *foot-notes*, which are not of the reference kind, but *digressive in character*. This meets the requirements of the scientific style, which is logical coherence of ideas expressed by the author/authors. Anything that seems to violate this requirement or seems not to be immediately relevant to the facts described or ideas expressed but at the same time may serve indirectly to give more detailed information or back up the idea is placed in a foot-note.

Scientific functional style *does not imply slang and colloquialisms*. Moreover, evaluation is not typical of scientific prose. Evaluation is used to express the author's point of view, to make it clear and understandable, and it has rational rather than expressive character. Scientific style has a lack of emotiveness, as it doesn't serve the achievement of exactness, logicality, objectiveness and abstract character of statement.

1.2.1. Grammar and Vocabulary of the English Scientific Prose

As for lexical and grammatical peculiarities, the English scientific and technical materials contain the following ones:

1) Predicative constructions.

Scanning probe microscopes (SPMs) are a group of instruments used to study the surface character of materials from the atomic to the nanoscale.	*Сканирующие зондовые микроскопы (СЗМ) — класс микроскопов, которые используются для изучения характеристик поверхности материалов от атомного до наноразмера.*

2) Groups of attributes expressing properties and characteristics of objects and phenomena. The number of attributes may be significant: **unbalance phase angle location – положение фазового угла небаланса *(при балансировке ротора турбины)***.

3) Nominalization.

to use easily → for ease of use	**для облегчения использования**
precisely → with precision	**точно**
very easily → with the greatest ease	**легко**

4) Verbs denoting process: **effect**, **assure**, **perform**, **obtain**, **provide**, **give**, **involve**, **entail**, **imply**, **result in**, **lead to**, **to be ascribed to**, **to be attributed to**, etc. Their meaning and translation depend on the nouns which convey an important message in the sentence.

5) Emphasizing adverbs: **clearly**, **completely**, **considerably**, **essentially**, **fairly**, **greatly**, **scientifically**, **markedly**, **materially**, **perfectly**, **reasonably**, etc.

6) The Passive Voice and the Present Simple (Indefinite) Tense.

The frequent use of passive constructions reveals the impersonality of scientific speech, which is also considered a typical feature of this style. For instance, scientific experiments are generally described in the passive voice.

*These perennials **were** gradually **replaced** by food crops that have **to be replanted** every year.*	*Эти многолетние растения были постепенно заменены продовольственными культурами, которые нужно пересаживать каждый год.*
*The problem **is** rampant in economics, the social sciences and even the natural sciences, but it **is** particularly egregious in biomedicine.*	*Эта проблема является угрожающей в экономике, общественных науках и даже социальных, но она в особенности актуальна в биомедицине.*

7) The use of the pronoun **we** instead of **I**, as the authors of scientific works tend to sound impersonal.
8) Impersonal passive constructions are often used with the verbs such as **suppose**, **assume**, **presume**, **conclude**, **infer**, **point out**, etc., as in: **'It should be pointed out'**, **'It must not be assumed'**, **'It must be emphasized'**, **'It can be inferred'**, etc.
9) Absence of articles, especially the definite one, before the names of details in technical descriptions, names of scientific fields.
10) The Plural form of material nouns: **fats**, **oils**, **greases**, **sands**, **wools**, **steels**, **gasolines**.
11) Usage of the preposition **of** for the Genitive Case: **body of masonry – массив / тело каменной кладки**; **cost of installation – стоимость монтажа; затраты на установку (оборудования); mechanical equivalent of work – механический эквивалент работы; modulus of continuity – модуль непрерывности.**
12) Causative-consecutive conjunctions and logical connectives: **since**, **therefore**, **it follows that**, **so**, **thus**, **to imply**, **to involve**, **to lead to**, **to result in**.
13) Fixed word-order in sentences.

There is an observable difference in the syntactical characteristics of sentences in the exact sciences (mathematics, chemistry, physics, etc.) and in the humanities (culturology, philology, history, etc.). The passive constructions frequently used in the scientific works of the exact sciences are not indispensable in the scientific literature on the humanities. This is explained by the fact that the information and methods of investigation applied in the humanities are less objective. Syntactical patterns depend on the necessity to quote passages under observation and to amplify arguments. In the humanities some seemingly well-known pronouncement may be and frequently is subjected to revaluation. In the

exact sciences the data may be accepted without question or doubt and therefore needs no comment or additional explanation.

Here are two samples of scientific prose. The first one is from a book on linguistics:

"Some countries are officially bilingual (or multilingual) in the sense that they have two (or more) official languages, national or regional. Two well-known examples of officially bilingual countries are Canada and Belgium, each of which has experienced language-problems of the kind that were referred to in the previous section. An equally well-known example of an officially multilingual country, which has not experienced any comparable language-problems, is Switzerland. Other countries, though not officially bilingual (or multilingual), have two (or more) different languages spoken within other borders. Most countries of the world fall into this latter category. Furthermore, although it does not follow from what has been said so far, in most countries, whether they are officially bilingual (or multilingual) or not, there are whole communities that are bilingual (or multilingual) in the sense that their members commonly use two (or more) languages in their daily lives. It is not the case, of course, that all the citizens of an officially bilingual (or multilingual) country use, or even know, more than one language. Bilingualism in communities – and henceforth I will use 'bilingualism' to cover multilingualism as well – in what we are connected with here". [1]

The second sample is taken from a book on nanotechnologies:

"The actual discovery of fullerenes came about through Smalley and Kroto's experiments on an instrument Smalley invented to study molecules and clusters of atoms. Kroto was interested in Smalley's laser vaporization technique to verify a theory he had about the carbon thrown off by long-chain carbons in interstellar space. Kroto thought that carbon-

[1]Lyons, John. Language and linguistics: an introduction / John Lyons. – 19th print. – Cambridge: Cambridge University Press, [2009]. – p.281.

rich red giant stars were giving off complex carbon species that radio astronomy should be able to detect.

The research group tried to figure out the structure for the carbon's unique chemical signature using an instrument called a mass spectrometer (which measures the wavelengths and energies of elements). It finally came together late one night when Smalley pieced together a construction paper and adhesive type polygon that had the all important 60 vertices in a highly symmetrical closed shell. This new carbon molecule (C_{60}) was nicknamed the buckyball. While graphite contains carbon atoms formed in flat sheets, buckyballs are open spherical cages with strong carbon-to-carbon bonds". [2]

The remarkable contrast between these two extracts lies in the fact that the second one requires a far greater amount of background knowledge than the first one. It is evident that both samples are impersonal in form. However, they differ in the amount of objectivity, the first being less objective in stating data. Moreover, in the first sample views and opinions are expressed while in the second none are given. In both excerpts the syntax is affected by logical reasoning, and there are no language means expressing emotions.

Nevertheless, it should be mentioned that emotiveness is not entirely or categorically excluded from the English scientific literature. There may be hypothesis, pronouncements and conclusions which are backed up by strong belief, and therefore call for the use of some emotionally coloured language elements. The author's emotional presentation of facts and ideas and our emotional reaction to them may convey important and valuable information.

[2] Wlliams, Linda, Nanotechnology Demystified. – New York: McGraw-Hill Companies, 2007. – p.12-13.

1.2.2. Grammar and Vocabulary of the Russian Scientific Prose

As well as in English, the *precision* of Russian scientific speech implies the *broad usage of terminology*. Special and terminological lexical units are broadly used in scientific speech. In these latter days the role of the international terminology has increased. It is especially evident in the sphere of economics (**маркетинг**, **кредит**, **тендер**, **франшиза**, etc.). The increasing role of international words in the Russian terminological vocabulary reflects, on the one hand, the tendency to the international standardization of the language of science, and on the other hand, it indicates that the means of the scientific style do not belong to the common lexis of language. Scientific style does not possess the property of accessibility. However, it doesn't mean that the less understandable the text is, the more scientific it is. Pseudoscientific style of exposition, which is not characterised by informational content is the drawback of speech.

The peculiarity of vocabulary usage in scientific speech is that polysemic stylistically neutral words are used in the scientific style not only in all their meanings, but in one meaning only. For instance, dictionaries give several definitions of the verb **видеть**, but in scientific prose it is used in the meaning *сознавать, понимать*: *Мы **видим**, что уравнение имеет единственное решение*. The verb **считать** commonly expresses the meaning *делать какое-либо заключение о ком-либо или чем-либо, признавать, полагать*. The same is true about such verbs as **служить**, **характеризовать**, **составлять**.

The usage of nouns and adjectives in one terminological meaning is also typical. For example, **тело**, **сила**, **движение**, **количество**, **развитие**, **отношение**, **измерение**, **явление**, **образование**, **действие**, **распределение**, **влияние**, **свойство**, **состояние**, **условие**, **значение**, **определение**, **множество**, **кислый**, **тяжёлый**, etc.

The tendencies for generalization and abstraction are expressed in scientific speech by predominance of abstract words over concrete ones. Nouns with abstract meanings are rather frequent: **мышление**, **возможность**, **перспективы**, **истина**, **гипотеза**, **точка зрения**, **обусловленность**, etc.

The vocabulary of scientific style is characterised by relative *homogeneity* and *limitedness*. This is expressed in the rare use of synonyms. The length of the text in scientific style is increased not by the use of different words, but by the use of the same words as many times as it is necessary.

Scientific style demonstrates the author's detachment, the objective character of information. It is expressed by the use of such words and word combinations as **считается**, **известно**, **есть основания полагать**, **предположительно**, **можно сказать**, **следует подчеркнуть**, **надо обратить внимание**, etc. This fact also explains the use of passive constructions, in which the agent (the doer) of the action is expressed not by the grammatical form of the subject in the nominative case, but by the form of subordinate part of the sentence in the instrumental case or is not mentioned. The use of the pronoun **мы** can be explained by the same idea.

Tendency for logicality in scientific speech causes the active use of composite sentences. For example: *Программа автоматически перерисовывает график, чтобы отобразить на нем изменения, внесенные вами*. Complex sentences with adverbial clauses of cause and condition are typical. For example: *Если генератор перегружен или есть короткое замыкание в подключенном оборудовании, индикатор работы погаснет, засветится индикатор перегрузки и напряжение в сети подключенного оборудования будет отключено*.

The use of parenthesis also serves to express the thought logically. The most wide-spread in scientific style are the following ones: **во-первых**, **во-вторых**, **наконец**, **итак**, **таким образом**; **конечно**, **по-видимому**, **как утверждают…**, **согласно теории**, etc.

One more observable feature of scientific style in the Russian language is the frequent use of the short form of the adjective. For example: *Эта болезнь особенно **опасна** для новорожденных и детей первых месяцев жизни*. *Весьма **существенна** роль поверхностной энергии самих наполнителей, зависящая от химической природы их поверхности*.

The verbs ending with **-ся** also characterize the Russian scientific prose. For example: ***феномен объясняется***, ***прибор применяется***, ***вещество получается***, etc.

One more characteristic feature is the Plural form of material nouns: **стали**, **смолы**, **топлива**.

1.3. Terms and Terminology

Scientific and technical literature is characterised by the use of terminological units.

Hundreds of thousands of words and word-combinations (word-groups) belong to the terminological systems of science, technology, trade, law, sports, the arts, etc. These linguistic units are not used or even understood by people outside the particular speciality. Every field of science or activity has its specialized vocabulary. There is a special medical vocabulary, and similarly special terminologies for chemistry, physics, power engineering, economics, building construction, aviation, and many others.

Term, as traditionally understood, is a word or a word-combination which is specifically used within a particular branch of science, technology, trade, law, sports or the arts to convey a concept peculiar to

this particular field. For instance, the lexical units **heat sink ability – способность к поглощению тепла** and **bag collector – рукавный фильтр** belong to the terminological system of power engineering. The terms **reinforced concrete – железобетон** and **workability – обрабатываемость**; **технологичность (материала)**; **удобообрабатываемость**; **удобоукладываемость** belong to the sphere of building construction. Terms always come in clusters, which form the system of names for the concepts of study when taken together. It should also be pointed out that terms do not contain any emotional or subjective connotations.

In modern linguistics there are several controversial problems concerned with terminology. The first is the puzzling question of whether a term loses its terminological status when it comes into common usage. Nowadays it occurs very frequently, because various elements of the media of communication (TV, radio, popular magazines, science fiction, the Internet, etc.) equip people with knowledge from different scientific fields, technology, social life, trade, law, sports and the arts. The expansion of technique and general education also lead to the passing of terms into common literary vocabulary. It is quite natural that under the circumstances numerous terminological units pass into general usage, though they don't lose the connection with their specific domains.

The first point of view is expressed by the linguists who believe that only those words which have retained their exclusiveness and are not used, known or recognized outside their specific sphere may be regarded as terms. According to this opinion, words associated with the economical sphere, such as **account – счет**, **bargain – торговая (биржевая) сделка**, **budget – (государственный) бюджет**, **tax – финансовая смета**, **налог**; **сбор**; **пошлина** can't be considered economical terms as they are in more or less common usage.

According to the opposite point of view, any terminological system is supposed to include all the linguistic units conveying concepts peculiar to a particular branch of knowledge, regardless of their exclusiveness. Modern research of various terminological systems has shown and proved that there is no impenetrable wall between terminology and the general language system. On the contrary, terminologies seem to follow the same rules and laws as the units of language for general purposes. Hence, exchange between terminological systems and the “common” vocabulary is quite a normal phenomenon, and it would be wrong to consider a term as something “special” and isolated.

Terms are generally associated with a definite branch of science, serving the needs of a highly developed technology. But it should be pointed out that due to the rapid dissemination of scientific and technical ideas, particularly in the exact sciences, it is possible to observe the process of “de-terminization”, that is, some scientific and technical terms begin to function outside the narrow field they belong to and eventually begin to develop new meanings. However, the overwhelming majority of terminological units do not undergo the process of de-terminization and circulate only in scientific domain. Thus, such terms begin to be used, may develop new terminological meanings, and pass out of usage within one particular sphere. Science and technology are the most prolific in coining new linguistic units. The necessity to penetrate deeper into the essence of things and phenomena gives rise to new concepts, which require new words and word-combinations to denote them. As a rule, a term makes more direct reference to an object or phenomenon than a descriptive explanation, a non-term. It causes the rapid creation of new terms in any developing field of study.

It is necessary to mention that the general vocabulary used in scientific literature conveys its direct referential meaning, that is, words and word-groups used in scientific literature always tend to be used in their primary

logical meaning. A word used in scientific prose is unlikely to be polysemantic, in contrast to the belles-lettres style. Furthermore, terms don't tend to depend on the context. As a rule, the possibility of ambiguity is generally avoided. Moreover, terms are coined so as to be self-explanatory to the greatest possible degree. However, despite this a new terminological unit in special literature is usually explained. Likewise, neutral and common literary words employed in scientific literature are explained, even in case their meaning is only slightly changed, either in the context (by a parenthesis or an attributive phrase) or in a foot-note.

The exchange of terms between various fields of study is a typical phenomenon for modern scientific prose. The most interesting and topical scientific problems appear at the intersection of disciplines of two or more sciences. Their special languages become closer, enrich each other, exchange terms and produce new terms. Collaboration of specialists in related sciences has proved successful in many spheres. As languages of the disciplines possess their own, unique features, the exchange of terminology may be regarded as a natural result of this collaboration. Mathematics has priority in this respect, as mathematical terms have left their own field and function freely in other sciences and humanities, including linguistics. For instance, in computational linguistics there are terms of mathematics (**set**, **graph**, **integral**), linguistics (**word**, **meaning**, **name**), and terms typical only of this scientific discipline: **Zipf's law – закон Ципфа**.

Two other controversial problems in the field of terminology are *polysemy* and *synonymy* of terminological units.

There are linguists in whose opinion an "ideal" term should be monosemantic (i.e. it should have only one meaning). Polysemantic terms may cause misunderstanding, and that is a serious problem in professional communication, as well as in translation of special

discourse. On the one hand, this requirement seems quite reasonable. On the other hand, facts of the language do not meet it. Different terminological systems abound in polysemantic terms. The adequacy of their translation is wholly dependent on the context. In the terminology of construction, the term **building** may denote *a structure made of a strong material such as stone or wood that has a roof and walls* (“*здание”, “строение*”) and, at the same time, *the process of building houses, factories, office buildings* (“*строительство*”).

Another controversial problem of terminology concerns synonyms. As far as some linguists are concerned, terms should not have synonyms because, consequently, scientists and other specialists would name the same objects and phenomena in their field by different terms and it would not be possible to come to any agreement. Nevertheless, there are many terms in different spheres, which do possess synonyms. For instance, **engine** – **motor**, **plaster** – **stucco**.

1.4. Translation of Terms

Translation of technical terms is absolutely dependent on the translator’s knowledge of the subject matter of the source text. Translators must take great pains to get familiar with the system of terms in the corresponding sphere and make good use of terminological dictionaries and other books of reference, as well as online resources.

It is necessary to remember that a term is usually translated by a corresponding term of the target language. Such ways of translation as analogues, using synonyms and descriptive translation are used only when there are no equivalent terms for translation.

Terms are relatively context-free language units though the context often helps to identify the specific field to which the term belongs. As a rule, English scientific and technical terms have their permanent equivalents in the respective Russian terminological systems: **heater** –

нагревательный прибор; **alkaline medium** – **щелочная среда**; **silicic acid** – **кремниевая кислота**; **spherical shell** – **сферическая оболочка**.

Many terminological equivalents in the Russian language have been formed from the English terms by transcription or loan translations: **container** – **контейнер**, **file** – **файл**, **design** – **дизайн**. Terminologies possess international units: **atom** – **атом**, **proton** – **протон**, **focus** – **фокус**, **plus** – **плюс**, **diode** - **диод**. In some cases there are parallel forms in Russian: one formed by transcription (a loan-word) and the other which is usually a native word, e.g.: **эквивалентность** and **равенство**; **баланс** and **равновесие**; **резистор** and **сопротивление**; **бустер** and **ускоритель**; **индустрия** and **промышленность**, **installation** – **инсталляция** and **установка**. The correct choice is absolutely necessary in this case.

Translators make their choice considering whether the source text is highly technical or not, because a borrowed term is usually more familiar to specialists than to laymen. Translators have also to take into consideration the possible differences between the two forms in the way they are used in the target language. For example, the Russian word **индустрия** is restricted in usage and somewhat old-fashioned.

Much attention is paid to the systematic character of new words. In many fields there are special rules of terms' formation to denote concepts and objects of a particular class. For instance, the names of different kinds of electron tubes are formed by analogy with the term **electrode** indicating the number of electrodes used in the tube (**diode**, **triode**, **tetrode**, **pentode**, **hexode**, **heptode**, etc.); a number of special electronic devices have the element **-tron** in their sructure (**additron**, **carcinotron**, **cryotron**, **exitron**, **ignitron**, **klystron**, **permatron**, **phantastron**, **plasmatron**, **platinotron**, **skiatron**, **thryatron**, etc.);

chemical terms ending with **-ite**, **-ate** denote salts (**sulfate**, **sulfite**, **nitrite**), etc.

From the point of view of its structure a term may 1) consist of one word or 2) be a word combination of one key-word and one or several adjuncts specifying or modifying the meaning of the term. These terms are wide spread and may cause difficulties while translating. Such combinations may consist of two or more elements.

a. ***A word combination consisting of two words.*** The first element may be translated into Russian in different ways:

1) by an adjective (**distribution shaft** – **распределительный вал**; **fuel cock** – **топливный кран**);

2) by a noun in the Genitive case (**isobutylene oxide** – **оксид изобутилена**; **failure detection** – **обнаружение неисправностей**; **accumulator cell** – **элемент аккумулятора**; **land retirement** – **эрозия почвы**, **выдувание почвы**);

3) by a noun with a preposition (**split burner** – **горелка с рассекателем**, **carbon cloth** – **ткань из углеродного волокна**);

4) by a compound (**development engineer** – **инженер-разработчик**; **electrical engineer** – **инженер-электрик**);

5) by a participial construction (**unbounded coating** – **многослойная изоляция (трубопровода), состоящая из несвязанных между собой слоёв; designed experiment – эксперимент, проводимый по заранее составленной программе**);

6) by other descriptive means (**squawk altimeter** – **высотомер, показания которого выведены в ответчик**; **square engine** – **двигатель, в котором диаметр цилиндра равен ходу поршня**).

b. ***A word combination consisting of several components.*** Translating such kind of combinations it is necessary to stick to the following succession of actions:

1) translate the dependent noun (the last word of the word-group);

2) analyse the semantic relations between the members of the word-combination and divide them into sense-groups (it should be analysed from left to right);

3) translate the word-combination beginning with the dependent word and then translate every sense group from right to left.

For instance, **car speed calculation problem**.

1. Translate the last word **problem – проблема**.

2. Divide the whole word-combination into sense-groups: 1) **car speed**; 2) **calculation problem**.

3. Translation: **проблема вычисления скорости автомобиля**.

Attributive combinations may begin with an adjective. In this case it is necessary to determine which word it modifies (**dynamic braking circuit – цепь реостатного тормоза**, **general reactor equation – общее уравнение ядерного реактора**).

The terminological systems of many fields of knowledge such as mathematics, physics, chemistry, biology, geology, medicine, technology contain so-called eponymic units. Those are terms the structure of which includes the proper names of outstanding scientists, inventors, doctors, etc. For example: **watt – ватт**, **Weierstrass theorem – теорема Вейерштрасса**, **Marfan syndrome – синдром Марфана**.

If there is a proper name in preposition, it is translated by an adjective, a noun in the Genitive case, or a noun with a preposition:

Kirchhoff's first law – первый закон Кирхгофа;

London Air Traffic Control Centre – Лондонский центр управления воздушным движением.

If there is a participle in the middle of the attributive construction it may be translated into the Russian language by a noun in the Genitive case (**decision-making system – система принятия решений**).

A new foreign term demands an exact decoding by the logical and linguistic analysis of this word and its connection with the context and formation of a precise monosemantic equivalent.

From the point of view of the understanding and translation difficulty terms may be classified into three groups:

1) Terms denoting realia of other countries. Several ways of translation are possible: a) by a Russian term, the form of which is connected with a form of an English word (international terms); b) by a Russian term, the form of which is not connected with a form of an English term; c) the meaning of a multi-word English term has a fully equivalent Russian term; d) the general meaning of a multi-word term coincides with the meaning of an analogous Russian term, but their components are different.

2) Terms denoting realia of other countries, but having generally accepted Russian terminological equivalents.

3) Terms denoting realia of other countries and not having generally accepted Russian terminological equivalents. Translation of such terms may be done in the following ways: a) description of an English term; b) word-for-word translation; c) partial or full transliteration; d) transliteration and word-for-word translation; e) transcription; f) transcription and translation.

It is necessary to mention that the main mistake in translation of such terms is that translators sometimes try to find a literal equivalent of the English term in Russian materials. Such approach is not completely correct as it is important to render the specific character of foreign realia. Furthermore, these terms may express concepts typical only of foreign reality and, consequently, they may not correspond to the realia accepted in Russian special texts. Translators can also make a mistake as a result of wrong referring of a term to one of the groups mentioned above and choice of an inadequate way of translation. One more

translator's mistake is word-for-word translation when an English term or its components are analogous to a Russian term, but they have another meaning. In translation it is necessary to take into consideration the meaning of the term in the particular situation and concrete context. It is also necessary to take into account the possible changes of term's meaning if it is used in the plural form.

Thus, correct understanding and translation of terms depend not only on good knowledge of the language, but also on being aware of foreign and Russian realia.

1.5. Translator's False Friends in Terminology

English and Russian terms can be more or less similar in form but different in meaning. Such words are often referred to as the so-called translator's false friends. These linguistic units are of great interest to the translators as they are naturally inclined to take this formal similarity for the semantic proximity and to regard the words that look alike as permanent equivalents. However, their formal similarity suggesting that they are interchangeable may cause translation errors. As a rule, the formal similarity is the result of the two words having the common origin, mainly derived from either Greek or Latin.

Translator's false friends can be classified into two main groups. The first group includes words which are similar in form but completely different in meaning. E.g.:

ambulatory *галерея для прогулок; крытая внутренняя галерея монастыря* (but not *амбулатория*);

ammunition *боеприпасы; снаряды, патроны; подрывные средства* (but not *амуниция*);

angle *угол* (but not *ангел*);

benzene *бензол* (but not *бензин*);

billet *полено; чурбан; плашка; толстая палка;* метал. *заготовка, би'ллет, сутунка* (but not *билет*);

clay *глина, глинозем; ил, тина; тело, плоть; глиняная трубка* (but not *клей*);

compositor *наборщик* (but not *композитор*);

data *данные; факты; сведения; информация* (but not *дата*);

decoration *наружная и внутренняя отделка, украшение дома* (but not *декорация*);

dome *купол; свод;* тех. *колпак* (but not *дом*);

fabric *ткань, текстура, материя, материал; изделие, фабрикат; выделка; структура, строение, устройство; сооружение, здание, остов* (but not *фабрика*);

furniture *мебель; обстановка; оборудование, оснастка* (but not *фурнитура*);

parol *устное показание, заявление* (but not *пароль*);

probe мед. *зонд;* тех. *зонд, щуп; зондирование; космическая исследовательская ракета; автоматическая научно-исследовательская работа* (but not *проба*);

resin *смола; канифоль; камедь* (but not *резина*).

The second group contains words which are not fully interchangeable though there are common elements in their semantics:

armature эл. *якорь*; эл. *броня (кабеля)*; зоол., бот. *панцирь* (but not only *арматура*);

apparatus *прибор, инструмент; машина; механическое устройство; установка; приспособление* (but not only *аппарат* or *аппаратура*);

block *корпус*; *квартал домов* (but not only *блок*);

compass (часто pl) *циркуль; граница; предел(ы); окружность; круг; объем, обхват; диапазон* (but not only *компас*);

concrete *бетон* (but not only *конкретный*);

conductor *дирижер; гид; руководитель;* физ. *проводник;* эл. *провод; жила; молниеотвод* (but not only *кондуктор*);

construction *строительство, стройка; строение, здание* (but not only *конструкция*);

control *управление; регулирование; регулировка; проверка* (but not only *контроль*);

design *проект; план; чертеж; конструкция; расчет; рисунок, эскиз; узор* (but not only *дизайн*);

figure *цифра; число; цена; изображение, картина, статуя; иллюстрация, рисунок* (в книге); *диаграмма, чертеж* (but not only *фигура*);

film *пленка; легкий слой; оболочка; перепонка; фотопленка, кинопленка; тонкая нить* (but not only *фильм*);

instrument *орудие; прибор; аппарат* (but not only *инструмент*);

machine *станок; велосипед; автомобиль; самолет; швейная машинка; механизм; аппарат; человек, работающий как машина* или *действующий машинально* (but not only *машина*);

metal *расплавленное стекло, стекломасса*; pl *рельсы; щебень;* ж.-д. *балласт;* полигр. *гарт* (but not only *метал*);

mixture *смешивание; смесь* (but not only мед. *микстура*)

plaster *штукатурка* (but not only *пластырь*);

production *производительность; выработка, добыча; производство, изготовление; изделия* (but not only *продукция*);

project *план; программа (строительства и т.п.); строительный объект, осуществляемое строительство* (but not only *проект*);

structure *здание, сооружение, строение; устройство* (but not only *структура*);

tank *цистерна, бак, резервуар; искусственный* или *естественный водоем;* радио *колебательный контур* (but not only *танк*).

1.6. Terminological Lexicography

The aim of terminological lexicography is to present a systematic description of the exact names of special (specialised) concepts and phenomena as part of a particular field of study. Terminography is concerned with the compiling of specialised (professional languages) dictionaries. Its purpose is not to create new terminological units, but to prevent the wrong use, understanding and translation of existing ones by means of compiling glossaries of special terminologies within a given branch of knowledge.

The content of terms employed to convey special concepts is a reflection of the object itself, therefore they can be regarded as the basic units of knowledge. It is only natural to consider that subject-specialists are usually interested in the realities that the terms denote. Consequently, terminological dictionaries may be of encyclopaedic kind: the definitions of terms as special names resemble descriptions of corresponding extralinguistic objects. Terminological systems perform the functions of ‘knowledge banks’, which can serve as the basis for knowledge acquisition.

1.6.1. List of Terminological Dictionaries

1. Акжигитов Г.Н., Акжигитов Р.Г. Англо-русский медико-биологический словарь сокращений: Ок. 25000 терминов. – М.: Наука, 2001. – 426 с.
2. Англо-русский политехнический словарь / Сост. Ю.Г.Синдеев. – Ростов н/Д: Феникс, 2002. – 831 с.
3. Англо-русский, русско-английский экологический словарь-справочник: Ок. 10000 слов. единиц / Ассоц. Сикемп и Ин-т моря в заливе Ньюфаунд (Флорида, США); Центр деят. эколог.

образования и Новый культур. и экон. опыт (Москва, Россия); Сост.: А.Ю.Зубков и др. – М.: Издат. Дом «Муравей-Гайд», 2000. – 352 с.
4. Англо-русский словарь компьютерных и Интернет-терминов = Computer & Internet Dictionary. English-Russian / Гл. ред. Й.Хедт. – М.: Moscow International Publishers, 2000. – 409 с.
5. Англо-русский словарь математических терминов: Ок. 20000 терминов / Мат. ин-т им. В.А.Стеклова Рос. АН: Редкол.: П.С.Александров и др. – 3-е изд., стер. – М.: Мир, 2001. – 414 с.
6. Англо-русский словарь по пищевой промышленности = English-Russian Dictionary of Food Industry: ок. 42000 терминов / [В.И.Дашевский, Г.М.Бардышев, А.Л.Прогорович и др.]; под ред. Л.П.Ковальской. – 5-е изд., стер. – М.: РУССО, 2004. – 664, [1] с.
7. Англо-русский словарь по химии и химической технологии: Ок. 65000 терминов / Под ред. В.В.Кафарова. – М.: РУССО, 2002. – 583 с.
8. Англо-русский химический словарь = English-Russian Chemical Dictionary / М.Б.Газизов, Р.Ф.Каримова, Н.Х.Мифтахова, Н.Н.Газизова; Федер. агентство по образованию, ГОУ ВПО «Казан. гос. технол. ун-тет». – Казань: КГТУ, 2005. – 700 с.
9. Англо-русский экологический словарь: Ок. 35000 терминов = English-Russian Ecological Dictionary / Г.Н.Акжигитов, И.И.Мазур, Г.Я.Маттис и др.; Под общ. рук. Г.Н.Акжигитова. – 2-е изд., стер. – М.: Рус. яз., 2001. – 603 с.
10. Болотина А.Ю., Якушева Е.О. Англо-русский и русско-английский медицинский словарь = English-Russian and Russian-English Medical Dictionary: ок. 24000 терминов. – М.: РУССО, 2006. – 541 с.
11. Борисова Л.И. «Ложные друзья» переводчика с английского языка: [Словарь] / Составитель Л.И.Борисова; Под ред. В.Н.Комиссарова. – М.: ВЦП, 1982. – 184 с.
12. Булатов А.И., Пальчиков В.В. Англо-русский словарь по нефти и газу = English-Russian Dictionary on Oil and Gas: ок. 24000 терминов: ок. 4000 сокр. – М.: РУССО, 2005. – 400 с.
13. Ваулина Е.Ю., Рычков В.Н. Термины современной информатики: программирование, вычислительная техника, Интернет: англо-русский, русско-английский словарь: более 6000 слов, устойчивых словосочетаний и сокращений. – М.: Эксмо, 2007. – 636, [1] с.
14. Воскобойников Б.С. Современный англо-русский словарь по машиностроению и автоматизации производства = Modern English-Russian Dictionary of Mechanical Engineering and Industrial Automation: ок. 15000 терминов. – М.:РУССО, 2003. – 307 с.
15. Гольдберг А.С. Англо-русский словарь по энергетике и защите окружающей среды: Ок. 40000 терминов и 5000 сокр. – М.: РУССО, 2001. – 768 с.

16. Долинская И.М. Англо-русский архитектурный словарь = English-Russian Architectural Dictionary: (20000 слов). – М.: Жираф, 2000. – 302 с.
17. Кедринский В.В. Англо-русский словарь по химии и переработке нефти: Ок. 60000 терминов. – 5-е изд., стер. – М.: РУССО, 2001. – 767 с.
18. Коваленко Е.Г. Англо-русский экологический словарь: Ок. 32000 терминов = English-Russian Ecological Dictionary. – М.: ЭТС, 2000. – 781 с.
19. Кравченко Н.В. Бизнес-лексика: англо-русский, русско-английский словарь. – М.: Эксмо, 2008. – 671 с.
20. Лугинский Я.Н., Фези-Жилинская М.С., Кабиров Ю.С. Англо-русский словарь по электротехнике и электроэнергетике = English-Russian Dictionary of Electrical and Power Engineering: с указ. рус. терминов: ок 45000 терминов. – 4-е изд., испр. – М.: РУССО, 2003. – 611, [1] с.
21. Масловский Е.К. Англо-русский словарь по вычислительным системам и информационным технологиям: ок. 55000 терминов. – М.: РУССО, 2003. – 812 с.
22. Новый англо-русский биологический словарь = New English-Russian Biological Dictionary: более 72000 терминов [авт.: О.И.Чибисова, Н.Н.Смирнов, С.Г.Васицкий и др.; спец. науч. ред. О.И.Чибисова] – М.: РУССО, 2003. – 913, [1] с.
23. Новый англо-русский словарь-справочник пользователя ПК– персонального компьютера / Сост.: О.Н.Знак, А.Г.Калашник. – 3-е изд. – Ульяновск: Стрежень: Лерокс, 2001. – 382 с.
24. Пивовар А.Г. Большой англо-русский финансово-экономический словарь. – 2-е изд., испр. / Под ред. В.И.Осипова. – М.: Издательство «Экзамен», 2003. – 960 с.
25. Русско-английский политехнический словарь: Ок. 90000 терминов / Кузнецов Б.В., Перлов Н.И., Янковский Г.Н. и др.; Под ред. Б.В.Кузнецова. – 7-е изд., стер. – М.: РУССО, 2001. – 723 с.
26. Русско-английский физический словарь = Russian-English Dictionary of Physics: ок. 76000 / [В.А.Абрамов, Н.П.Ерпылев, З.В.Игнатьева и др.]; под ред. В.Д.Новикова. – 3-е стер. изд. – М.: РУССО, 2003. – 913 [1] с.
27. Сайфуллин Р.С., Сайфуллин А.Р. Универсальный лексикон: химия, физика и технология (на русском и английском языках) = Universal Concise Dictionary: Chemistry, Physics and Technology (English and Russian): Справ. – М.: Логос, 2002. – 447 с.
28. Современный англо-русский политехнический словарь = Modern English-Russian Polytechnical Dictionary: 125000 слов / [сост. В.В.Бутник]. – М.: Вече, 2006. – 512 с.

1.6.2 List of Recommended Lexicographic Online Resources

1. Онлайн-словарь ABBYY Lingvo.Pro [Электронный ресурс] / Режим доступа: http://lingvopro.abbyyonline.com/ru
2. Словарь Мультитран [Электронный ресурс] / Режим доступа: http://www.multitran.ru/
3. AcronymFinder: Index [Электронный ресурс] / Режим доступа: http://www.acronymfinder.com/
4. Computer Glossary, Computer Terms – Technology Definitions and Cheat Sheets from WhatIs.com [Электронный ресурс] / Режим доступа: http://whatis.techtarget.com/
5. Dictionary and Thesaurus Merriam-Webster Online [Электронный ресурс] / Режим доступа: http://www.merriam-webster.com/
6. Britannica Online Encyclopedia [Электронный ресурс] / Режим доступа: http://www.britannica.com/
7. English to French, Italian, German & Spanish Dictionary – WordReference.com [Электронный ресурс] / Режим доступа: http://wordreference.com/
8. FOLDOC – Computing Dictionary [Электронный ресурс] / Режим доступа: http://foldoc.org/
9. Onelook Dictionary Search [Электронный ресурс] / Режим доступа: http://www.onelook.com/
10. Sokr.ru – словарь сокращений русского языка [Электронный ресурс] / Режим доступа: http://sokr.ru/
11. The American Heritage Dictionary of the English Language [Электронный ресурс] / Режим доступа: http://ahdictionary.com/
12. Webopedia: Online Computer Dictionary for Computer and Internet Terms and Definitions [Электронный ресурс] / Режим доступа: http://www.webopedia.com/
13. WordWeb: English dictionary, thesaurus, and word finder software [Электронный ресурс] / Режим доступа: http://wordweb.info/
14. Your Dictionary: The Dictionary You Can Understand [Электронный ресурс] / Режим доступа: http://www.yourdictionary.com/

Questions and Tasks

1. What is the main goal of technical translation?
2. What specific requirements is the technical translator expected to meet?
3. What problems is the theory of technical translation concerned with?
4. What are the main stylistic characteristics of scientific literature?
5. What grammatical peculiarities does the English scientific prose have?
6. What grammatical and lexical features are typical of the Russian scientific style?
7. What are the controversial problems connected with terminology?
8. What are the two major types of translator's false friends?
9. Make a list of 30 translator's false friends used in literature on science and technology.
10. What is the purpose of terminological dictionaries?

Part 2

Special Translation Practice

1. Read the text.
2. Identify different types of a) terminological units; b) grammatical forms and structures.
3. Review the possible ways of solving each particular problem involved.
4. Translate the text. Approximate timing is 90 minutes.
5. Check your translation.
6. While checking the translation in class correct obvious errors and discuss doubtful cases with your lecturer or fellow-students.
7. Make a summary of the text, following the instructions:

Summary is a representation of the contents of complete works in brief. It is expected to be about a sixth or a tenth of the original in length. In order to make a good clear summary of a text you have to go through the following stages:

a. Make a list of all the points you find important.
b. Think about how you can paraphrase and modify topic sentences. This will help you to reproduce the contents of the text in your own words.
c. Use the following expressions in your summary:

- *I'm going to be talking about …*
- *The subject of my talk is …*
- *The title of the text is …*
- *The text concerns the problem (information, data) …*
- *The main idea of the text is …*
- *I'd like to underline (stress) that …*
- *It should be said that …*
- *It is interesting (= of interest) to note that …*
- *I would like to draw your attention to …*
- *Now I come to …*
- *Here we can say …*
- *In conclusion I'd like to pay your attention to the fact that …*
- *Summing up all that has been said …*
- *Hence, it follows that …*
- *This brings us to the conclusion that …*
- *Thus, we may conclude that …*

Unit 1

Medicine

1. Read, translate and give the summary of the text "A Dearth of New Meds".

A Dearth of New Meds

Drugs to treat neuropsychiatric disorders have become too risky for big pharma

Schizophrenia, depression, addiction and other mental disorders cause suffering and cost billions of dollars every year in lost productivity. Neurological and psychiatric conditions account for 13 percent of the global burden of disease, a measure of years of life lost because of premature mortality and living in a state of less than full health, according to the World Health Organization.

Despite the critical need for newer and better medications to treat a range of psychiatric and neurodegenerative diseases, including Alzheimer's and Parkinson's, drugs to treat these diseases are just too complex and costly for big pharmaceutical companies to develop. The risk of spending millions on new drugs only to have them fail in the pipeline is too great. That's why many big drug companies are pulling the plug on R&D for neuropsychiatric and other central nervous system (CNS) medicines.

Our team at the Tufts Center for the Study of Drug Development has arrived at this conclusion after conducting surveys of pharmaceutical and biotechnology companies about the drug development process. These surveys allow us to generate reliable estimates of the time, cost and risk of designing new drugs. Our analyses show that central nervous system agents are far more difficult to develop than most other types.

One of the problems with neuropsychiatric drugs is that they take so long to develop. A CNS drug, we have found, will spend 8.1 years in human testing – more than two years longer than average for all agents.

It also takes more time to get regulatory approval – 1.9 years, compared with an average of 1.2 years for all drugs. Counting the six to ten years typically spent in preclinical research and testing, CNS drugs take about 18 years to go from laboratory bench to patient.

Few compounds survive this gauntlet. Only 8.2 percent of CNS drug candidates that begin human testing will reach the marketplace, compared with 15 percent for drugs overall. Failures also tend to occur later in the clinical development process, when resource demands and costs are at a peak. Only 46 percent of CNS candidates succeeded in late-stage (phase III) trials, compared with 66 percent on average for all drugs. As a result, the cost of developing a CNS drug is among the highest of any therapeutic area.

What makes these drugs so risky? Assessing whether or not a candidate for, say, a new antibiotic works is relatively straightforward – either it kills the bacterium or it doesn't – and a course of treatment typically lasts a few days, which obviates the need for long-term testing for safety and efficacy. CNS compounds, in contrast, have it a lot tougher. It is difficult to judge if a reduction of schizophrenic episodes or a cognitive improvement in Alzheimer's patients is the result of a drug or a random fluctuation in the patient's condition. Treatment periods can last as long as a patient's lifetime. It is no wonder success rates are low.

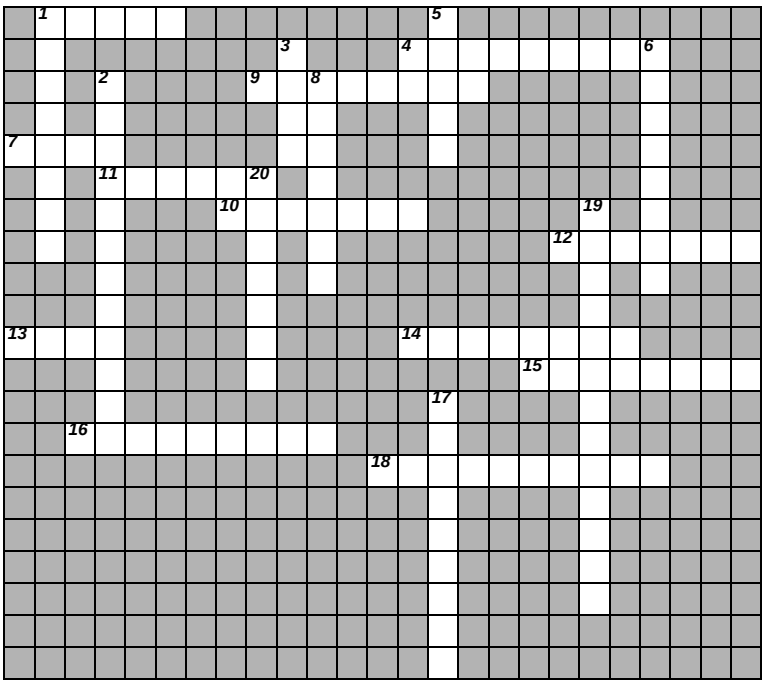
Some help is on the way. The Coalition Against Major Diseases, made up of government agencies, drug companies and patient advocacy groups, has developed a standardized clinical trials database that will allow researchers to design more efficient studies of new treatments, initially for Alzheimer's and Parkinson's. President Barack Obama's health reform law also contains several provisions that could provide incentives for innovation in areas of unmet medical need. One is the Cures Acceleration Network, which authorizes the National Institutes of Health to help academic researchers screen for promising compounds.

Ultimately, making new CNS medicines may depend on a networked approach to innovation, in which many organizations share in the risks and the rewards. It is clear that the challenges of developing new neuropsychiatric medicines are greater than any one company, institution or organization can bear alone.

From Scientific American (August 2011),
by Kenneth I.Kaitin and Christopher P.Milne.

*2. Use the clues below to fill in the spaces of the crossword puzzle. The answer to each clue starts in the box with the same number as the clue. If the clue is under **Across**, write the letters from left to right; if the clue is under **Down**, write the letters down the column. Place one letter in each box. Find the Russian equivalents of the words.*

Medical Terms Puzzle



Across:

1. *A disease that mainly affects children in which the neck becomes swollen and painful.*
4. *A shop that sells medicines, beauty products, and toiletries.*
7. *A pain that is continuous and unpleasant, but usually not very strong.*
9. *A place where people stay when they are ill or injured and need a lot of care from doctors and nurses.*
10. *An artificial tooth.*
11. *If you _____, your body shakes slightly, for example because you are cold or frightened.*
12. *Someone who is receiving medical treatment.*
13. *The part of your body at the end of your leg, on which you stand.*
14. *A medical condition in which you have difficulty sleeping.*
15. *A serious medical condition in which your body does not produce enough insulin to reduce the amount of sugar in the blood.*
16. *A serious illness affecting your lungs that makes it difficult for you to breathe.*
18. *Someone whose job is to prepare medicines for sale in a shop or in a hospital.*

Down:

1. *A substance that you take to treat an illness, especially a liquid you drink.*
2. *A piece of paper that a doctor gives you that says what type of medicine you need.*
3. *A painful disease that makes the joints in your toes swell.*
5. *The organ inside your head that allows you to think and feel, and controls your body.*
6. *A situation in which a disease spreads very quickly and infects many people.*
8. *A sign that someone has an illness.*
17. *A statement about what disease someone has, based on examining them.*
19. *A doctor who deals with children and the medical treatment of their illnesses.*
20. *To become fit and healthy again after an illness or injury.*

3. Match the words in the left-hand column with those in the right to make terminological word-combinations. Find their Russian equivalents.

drug	evidence
blood	termination
metabolic	addiction
x-ray	section
fatal	transplantation
hemoglobin	sample
Caesarean	attack
tentative	disturbances
heart	diagnosis
kidney	readings

4. Which is the odd one out in each group, in terms of the main word stress?

Example **vac**cine **med**icine pre**scrip**tion (answer: prescription; stress on second syllable)

1. allergy asthma bronchitis
2. heart failure sore throat breast cancer
3. hepatitis typhoid tuberculosis
4. illness sickness infection
5. neurologist dentist surgeon
6. surgery ambulance transfusion
7. injury operation fever

5. During this course you are to compile a Vocabulary (Glossary) of scientific and technical terminology. It should contain 300 terminological units used in 10 fields of science and technology (30 in each sphere). Here is the example of the Glossary of Medical Terms:

№	English Term	Russian Equivalent
1	abscess	нарыв
2	appendicitis	аппендицит
3	blood test	анализ крови
4	bruise	синяк
5	cancer	рак
6	cholera	холера
7	contagious disease	заразное заболевание
8	fracture	перелом
9	giddiness	головокружение
10	injection	укол
11	measles	корь
12	mental disease	психическое заболевание
13	neurological disease	невралгия
14	neurosis	невроз
15	obesity	ожирение
16	ointment	мазь
17	plague	чума
18	prescription	рецепт

19	preventive	профилактика заболеваний
20	rheumatism	ревматизм
21	scarlet fever	скарлатина
22	slimming	похудение
23	smallpox	оспа
24	stethoscope	стетоскоп
25	tuberculosis	туберкулез
26	typhoid	брюшной тиф
27	typhus	сыпной тиф
28	ulcer	язва
29	wound	рана
30	x-ray	рентген

Unit 2

Technology

1. Read, translate and give the summary of the text "Smart Materials".

Smart Materials

Nearly every industry, including biomedicine, energy, chemicals, and electronics, is affected by nanoscale. Nanoscale materials / processes are responsible for the behavior of materials. Many applications have just been waiting for the right materials to come along – such as economical solar cells or super efficient electrical lines. These materials may make global energy problems a chapter in old history books. As other times of progress (Iron Age, Bronze Age, Industrial Age, and Information Age), with nanomaterials, we are entering a new age – the *Molecular Age*.

Nanomaterials such as carbon nanotubes or nanoshells have superpowers compared to regular carbon or silica particles. Carbon nanotubes, for example, have 100 times the strength of steel, conduct heat better than a diamond, and carry electricity better than copper. Similarly, nanomaterials such as buckyballs, single-walled nanotubes (SWNTs), nanoshells, quantum dots, and microcapsules have been called *smart materials*, and their versatility has not been lost on the science and engineering communities.

Like science, engineering focuses on several research areas, such as aerospace, biomedical, chemical, electrical, environmental, mechanical, and nuclear. However, all areas share a common denominator: advanced materials. Engineers work toward improving or understanding the specific properties of materials. Since nanomolecules and nanotubes were discovered, scientists and engineers have rushed to test all the possibilities these materials offer. Everyone wants to find new ways to use them.

For example, plastics research made possible everything from storage containers and toys to contact lenses and artificial joints. Plastic was the new big thing in the 1950s and 1960s. It changed the way people lived. Lots of things became so cheap to make that they were just thrown away when they got dirty and scratched. (The benefit of this disposable mindset is still being debated, however.)

Nanomaterials seem to be heading in the same direction, but perhaps in a more environmentally tolerable way. Their special properties at the molecular level make plastics seem prehistoric by comparison. Table 8-1 compares the various properties of different nanomaterials.

Engineers now have even greater strength, heat conductance, molecular changeability, electricity transmission, and flexibility to work with. Not only will new solutions to old problems such as disease be found because of their research, but completely new products (unimagined today) are possible. As these products become available, we'll wonder what took us so long to think of them. When technology allows us to mix and match atoms, anything is possible!

Table 8-1 Nanomaterials offer different advantages depending on the application.

Nano Property	Organic Polymers	Metals	Semi-conductors	Ceramics	Carbon
Optical		☆☆☆	☆☆☆		☆
Mechanical	☆	☆		☆	☆☆☆
Electrical		☆☆			☆☆☆
Magnetic		☆		☆☆☆	
Catalytic				☆☆	☆
Absorptive	☆☆☆				

From "Nanotechnology Demystified" (2007),
by Linda Williams and Dr. Wade Adams.

2. The column A includes word combinations denoting branches of industry. The column B includes words and word combinations denoting products. Find the matches.

A	**B**
1. chemical industry	**a.** petrol
2. automobile industry	**b.** block of flats
3. construction industry	**c.** gear stick
4. pharmaceutical industry	**d.** operating system
5. textile industry	**e.** acid
6. film industry	**f.** silk
7. software industry	**g.** documentary
8. oil industry	**h.** medication

3. Match the terms with their definitions and find their Russian equivalents.

camcorder, desktop, **hands-free, handset**, **icon, laptop**, **pager**, **palmtop**, **remote control, software**

a. a small computer that you can carry with you;

b. a small piece of equipment you carry with you that makes a noise to tell you to phone someone or go somewhere;
c. a small camera used for recording pictures and sounds onto videotapes;
d. equipment that can be operated without using your hands, for example by using a headset or a remote control;
e. a screen on a computer that shows icons of the programs that are available;
f. a very small computer that you can hold in your hand;
g. a piece of equipment that you use for controlling a machine such as a television or stereo system from a short distance away;
h. the programs used by computers for doing particular jobs;
i. the part of a telephone that you hold next to your ear or a small piece of electronic equipment that you hold and use for controlling another piece of equipment from a distance;
j. a small picture on a computer screen that you choose by pressing a button with your mouse in order to open a particular program.

4. Match the words in the left-hand column with those in the right to make terminological word-combinations. Find their Russian equivalents.

advanced	camera
global	engineering
Internet	technology
genetic	cloning
virtual	connection
digital	village
human	reality

5. Make up a Glossary of 30 terms used in the sphere of technology.

Unit 3

Physics

1. Read, translate and give the summary of the text "Why Neutrinos Might Wimp Out".

Why Neutrinos Might Wimp Out

Particles that go beyond light speed? Not so fast, many theoretical physicists say

In case you missed the news, a team of physicists reported in September that the tiny subatomic particles known as neutrinos could violate the cosmic speed limit set by Einstein's special theory of relativity. The researchers, working on an experiment called OPERA, beamed neutrinos through the earth's crust, from CERN, the laboratory for particle physics near Geneva, to Gran Sasso National Laboratory in L'Aquila, Italy, an underground physics lab. According to the scientists' estimates, the neutrinos arrived at their destination around 60 nanoseconds quicker than the speed of light.

Experts urged caution, especially because an earlier measurement of neutrino velocity had indicated, to high precision and accuracy, that neutrinos do respect the cosmic speed limit. In a terse paper posted online on September 29, Andrew Cohen and Sheldon Glashow of Boston University calculated that any neutrinos traveling faster than light would lose energy after emitting, and leaving behind, a trail of slower particles that would be absorbed by the earth's crust. This trace would be analogous to a sonic boom left behind a supersonic fighter jet.

Yet the neutrinos detected at Gran Sasso were just as energetic as when they left Switzerland, Cohen and Glashow point out, casting doubt on the veracity of the speed measurements. "When all particles have the same maximal attainable velocity, it is not possible for one particle to lose energy by emitting another," Cohen explains. "But if the maximal

velocities of the particles involved are not all the same, then it can happen".

An effect of this type is well known in cases where electrons have the higher speed limit (light speed), and light itself has the lower one because it is slowed down by traveling in a medium, such as water or air. Electrons, then, can move in the medium at a speed higher than the maximum speed of photons in the same medium and can lose energy by emitting protons. This transfer of energy between particles with different speed limits is called Cherenkov radiation, and it makes the reactor pools of nuclear power stations glow with a bluish light.

In the neutrinos' case, Cohen and Glashow calculate that the wake would mostly consist of electrons paired with their antimatter twins, positrons. Crucially, the rate of production of these electron-position pairs is such that a typical superluminal neutrino emitted at CERN would lose most of its energy before reaching Gran Sasso. Then again, perhaps they were not superluminal to begin with.

"I think this seals the case," says Lawrence M.Krauss, a theoretical physicist at Arizona State University. "It is a very good paper." So was Albert Einstein right after all? Einstein's relativity superseded Isaac Newton's physics, and physicists will no doubt keep trying to find glitches in Einstein's theories, too. "We never stop testing our ideas," Cohen says. "Even those that have been established well".

From Scientific American (December 2011),

by Davide Castelvecchi.

2. Give the plural of the following nouns, which are found in scientific prose. Find their Russian equivalents.

Agenda, analysis, antenna, apparatus, automaton, axis, bacillus, bacterium, basis, crisis, criterion, curriculum, datum, formula, helix, hypothesis, index, lamina, locus, maximum, medium, memorandum,

minimum, nebula, nucleus, phenomenon, radius, stimulus, stratum, terminus, thesis, vertebra, vertex.

3. Engineers and scientists have produced a code of standard symbols for convenient representation of physical quantities. Write down and memorize the symbols (abbreviations) which are used as equivalents to the following terms:

length, mass, time, volume, velocity, work, power, temperature, foot, pound, second, gallon, horsepower, ampere, metre, gram, kilogram, litre, watt, volt, kilocalorie.

- ✓ *Note the English and American spelling of the following words:*

England	**USA**
metre	meter
litre	liter

4. Choose one of the words given in brackets to fill in the gaps according to the context.

1. Unit is a standard (*quantity / quality*) used for measuring something. 2. Pound is a unit for measuring (*length / area / weight*), used in several countries including the US and the UK, containing 16 ounces and equal to 0.454 kilograms. 3. 1 yard is (*more / less*) than 1 foot. 4. Velocity is the (*mass / speed / volume*) that something moves at in one direction. 5. (*Electron / Neutron / Proton*) is a part of an atom that moves around the nucleus and has a negative electrical charge. 6. The scientific study of sight and light is called (*acoustics, optics, mechanics*). 7. Magnetic tape is a long narrow flat piece of (*plastic, timber, metal*) covered with a magnetic substance and used for recording sounds, images, or computer information.

5. Make up a Glossary of 30 terms used in physics.

Unit 4

Mathematics

1. Read, translate and give the summary of the text "The Resolution of Singularities".

The Resolution of Singularities

Virtually all important mathematical structures come with a notion of equivalence. For instance, we regard two groups as equivalent if they are isomorphic, and we regard two topological spaces as equivalent if there is a continuous map from one to the other with a continuous inverse (in which case we say that they are *homeomorphic*). In general, a notion of equivalence is useful if properties that we are interested in are unaffected when we replace an object by an equivalent one: for example, if G is a finitely generated Abelian group and H is isomorphic to G, then H is a finitely generated Abelian group.

A useful notion of equivalence for algebraic varieties is that of *birational* equivalence. Roughly speaking, two varieties V and W are said to be birationally equivalent if there is a rational map from V to W with a rational inverse. If V and W are presented as solution sets of equations in some coordinate system, then these rational maps are just rational functions in the coordinates that send points of V to points of W. However, it is important to understand that a rational map from V to W is not literally a function from V to W, because it is allowed to be undefined at certain points of V.

Consider, for example, how we might map the infinite cylinder $\{(x, y, z): x^2+y^2 = 1\}$ to the cone $\{(x, y, z): x^2+y^2 = z^2\}$. An obvious map would be the function $f(x, y, z) = (zx, zy, z)$, which we could try to invert using the map $g(x, y, z) = (x/z, y/z, z)$. However, g is not defined at the point (0, 0, 0). Nevertheless, the cylinder and the cone are birationally equivalent, and algebraic geometers would say that g "blows up" the point (0, 0, 0) to the circle $\{(x, y, z): x^2 + y^2 = 1, z = 0\}$.

The main property of a variety *V* that is preserved by birational equivalence is the so-called *function field* of *V*, which consists of all rational functions defined on *V*. (What precisely this means is not completely obvious: in some contexts, *V* is a subset of a larger space such as C^n in which we can talk about ratios of polynomials, and then one possible definition of a rational function on *V* is that it is an equivalence class of such ratios, where two of them are counted as equivalent if they take the same values on *V*).

A famous theorem of Hironaka, proved in 1964, states that every algebraic variety (over a field of characteristic 0) is birationally equivalent to an algebraic variety without singularities, with some technical conditions on the birational equivalence that are needed for the theorem to be interesting and useful. The example given earlier is a simple illustration: the cone has a singularity at (0, 0, 0) but the cylinder is smooth everywhere. Hironaka's proof was well over two hundred pages long, but his argument has since been substantially simplified by several authors.

From "The Princeton Companion to Mathematics" (2008),
edited by Timothy Gowers.

2. Nota bene!

Numbers from one to a million

1	one
23	twenty-three
87	eighty-seven
100	a/one hundred
300	three hundred
582	*Br E* five hundred and eighty-two *Am E* five hundred eighty-two
1,000	a/one thousand
1,001	a/one thousand and one
1,100	one thousand one hundred / eleven hundred
3,000	three thousand
4,857	*Br E* four thousand eight hundred and fifty-seven *Am E* four thousand eight hundred fifty-seven

5,100	five thousand one hundred *Am E also* fifty-one hundred
100,000	a/one hundred thousand
1,000,000	a/one million

Saying **a** instead of **one**: you can say *a hundred and thirty* (130) but NOT ~~*three thousand a hundred and thirty*~~ (3,130): say *three thousand one hundred and thirty*. People often use **a** instead of **one** in conversation, but it is better to use **one** in technical contexts.

Saying the number 0 *in mathematics, science and technical contexts*:

Br E: Say **nought** or **zero**.

Am E: Say **zero**.

In temperatures:

Br E: Say **zero** to refer to freezing point (0° Celsius or -32° Fahrenheit).

Am E: Say **zero** to refer to 0° Fahrenheit.

Fractions and decimals

Fractions		*Decimals*	
½	a half	0.5	*Br E* nought point five *Am E* zero point five
2 ½	two and a half	2.5	two point five
¼	a quarter	0.25	*Br E* nought point two five *Am E* zero point two five
¾	three quarters *Am E* also three fourths	0.75	*Br E* nought point seven five *Am E* zero point seven five

Writing full stops and commas in numbers

Use a full stop (.) to separate the main part of a number from the decimal part (the part that is less than 1). 5.074 means "*five point nought seven four".*

Say **point** to refer to the full stop. You can use a comma (,) in large numbers to separate the hundreds, thousands, and millions. 5,074

means “five thousand and seventy-four”. In British English, spaces are sometimes used instead of commas (5 074).

3. a) Write down the word combinations denoting the arithmetic signs:

«+»; «–»; «:»; «x»; «=».

b) Read in English:

78 + 54 = 132; 86 – 27 = 59; 23 x 6 = 138; 156 : 3 = 52; $\frac{56}{8} = \frac{35}{5}$

$(a + b)^2 = a^2 + 2ab + b^2$; $(a – b)^2 = a^2 - 2ab + b^2$

4. Find English equivalents to the following Russian eponymic terms and define the sphere of their usage:

a) Теорема Пифагора, формулы Виета, теорема Гаусса; закон Ома, эффект Холла, законы Ньютона; синдром Дауна, болезнь Паркинсона, реакция Манту, проба Аветисова; таблица Менделеева.

b) ватт, ампер, джоуль, кельвин, паскаль, сэбин, эрстед, тесла, этвеш; ломоносовит, гагаринит; кюрий, эйнштейний, менделевий.

5. Make up a Glossary of 30 mathematical terms.

Unit 5

Electronics

1. Read, translate and give the summary of the text “Big Progress on the Little Things”.

Big Progress on the Little Things

Let’s take a step back and praise three unsung trends in consumer electronics

In the trenches of consumer technology, there’s plenty to complain about. Today’s cell-phone contacts are exorbitant and illogical (why has

the price of a text message doubled in three years?). Those 15-second voicemail instructions still seem to last forever and use up our expensive airtime (“When you have finished recording, you may hang up” – oh, really?). And laptop batteries still can’t last the whole day.

But here and there, in unsung but important corners of consumer tech, some long-standing annoyances have quietly been extinguished. These developments deserve a lot more praise than they’ve received.

Take the megapixel race. For years the camera industry brainwashed us into believing that a camera’s megapixel measurement somehow indicates the quality of its photographs.

It doesn’t. A lousy photo still looks lousy – even at 45 megapixels. In fact, more megapixels can mean *worse* images because the more photo sites (light-sensing pixels) you cram onto a sensor, the smaller they get, the less light they collect and more heat they produce, resulting in “noise” (random speckles).

The megapixel myth was a convenient psychological cop-out for consumers, who longed for a single, comparative statistic like miles per gallon for a car or gigabytes for an iPod. The camera companies played right along because it meant that they didn’t have to work on the factors that really do produce better pictures: the lens, the software and, above all, the sensor size.

In the past two years, though, a quiet revolution has taken place. The megapixel race essentially shut itself down. The megapixel count came to rest at 10 or 12 megapixels for pocket cameras, maybe 16 or 18 for professional ones – and the camera companies began putting their development efforts into bigger sensors. Cameras such as the Canon S95, the Sony NEX-C3 and Micro Four Thirds models pack larger sensors into smaller bodies.

Another example: power cords. We’ve all griped at one time or another about our drawers full of ugly, mutually incompatible chargers. Every

new cell-phone model, even from the same manufacturer, used to require a different cord (and car and plane adapters), racking up another $50 per phone sale per customer.

And then, one great morning, electronics executives must have confronted themselves in the mirror, filled with shame, and decided to shut down that extortionist, environmentally disastrous profit center.

In Europe, for example, all the major cell-phone makers agreed to standardize their cords. Today every phone model uses exactly the same interchangeable USB power cord.

Similarly, the micro USB's cousin, the mini USB, has been making its own conquests. Now you can charge up most Black-Berries, Bluetooth headsets, e-book readers, music players and GPS receivers by connecting a USB cable to either a power plug or your laptop. You can also use the same 30-pin charging cord on every one of the 200 million iPhones, iPads and iPods touches ever made.

Finally, it's time to give thanks for the most important revolution of all: the simplicity movement.

For decades the rule in consumer tech was that whoever packs in more features wins. Our gadgets quickly became complex, cluttered and intimidating.

But then came the iPod, a music player with *fewer* features than its rivals (no radio, no voice recorder); it became the 800-pound gorilla of music players. Then the Flip camcorder – so simple, it didn't even have a zoom – snapped up 40 percent of the camcorder market (until Cisco bought and, inexplicably, killed it). And the Wii, a game console whose controller has half as many buttons as the Xbox's or the PlayStation's and whose graphics look Fisher-Price crude, became a towering success, outselling its rivals year after year.

Simplicity works because it brings you happiness. You feel a sense of immediate mastery. Simplicity as a design goal makes life harder for the

gadget makers, of course, because designing next year's model is no longer as easy as piling on new features. But simplicity is a goal worth sweating for.

In other words, some trends demonstrate maturity, brains and good taste on the part of the manufacturers; it's worth taking a moment to celebrate them.

Okay, that's enough. Now let's go back to complaining.

From "Scientific American" (October 2011),
by David Pogue.

2. Expand the abbreviations given below and translate them into Russian:

CD-ROM, IT, DVD, HTML, WAP, GPS, GPRS, LAN, wysiwyg, RAM, MS-DOS.

3. Find the Russian equivalents of the words and put them into the appropriate column in the table below.

character, command, computer, device, drive, error message, file, floppy disk, hard diskette, display, key, keyboard, modem, mouse, printer, program, root directory, scanner, screen

Hardware	**Software**
computer	*character*

4. Translate the following instructions into the English language. Compare you variant of translation with the original instruction. It should be provided by your lecturer.

Использование телевизора в качестве экрана компьютера

Настройка программного обеспечения компьютера (на основе Windows XP)

В зависимости от установленной версии Windows и видеокарты изображение на экране компьютера может варьироваться, однако основные параметры почти всегда совпадают. (В противном случае, обратитесь к производителю компьютера или торговому представителю компании N).

1. Выберите «Панель управления» в меню «Пуск» Windows.
2. Выберите «Оформление и темы» в открывшемся окне «Панель управления», чтобы открыть диалоговое окно экрана.
3. Выберите «Экран», чтобы открыть диалоговое окно экрана.
4. В диалоговом окне «Экран» перейдите на вкладку «Настройка».

- Оптимальная настройка размера (разрешения): 1920 X 1080 пикселей.
- Если в диалоговом окне параметров экрана есть параметр частоты вертикальной развертки, то правильным значением будет «60» или «60 Гц». Если нет, закройте диалоговое окно, нажав кнопку ОК.

5. Make up a Glossary of 30 terms of electronics.

Unit 6

Ecology and Chemistry

1. Read, translate and give the summary of the text "How Cars Make Smoke".

How Cars Make Smoke

In the 1940s, residents of Southern California began to notice an atmospheric condition that obscured their vision, irritated their eyes, and hindered their breathing. It was dubbed "smog", an etymological mixture of "smoke" and "fog", although its actual constitution was far more complicated. A major contributor to air pollution in Southern California

was the exhaust from cars and trucks, a fact vehemently denied by the automobile industry until it was irrefutably proven by Arie Haagen-Smit at the California Institute of Technology in the early 1950s. Today, cars and light trucks account for about 60 percent of smog-creating emissions in the region, so any successful effort to reduce air pollution has to take full account of the emissions produced by the region's large vehicle population.

Motor vehicle emissions are converted to smog through a series of chemical reactions that occur in the presence of sunlight. Uncontrolled vehicles produce the constituents of smog in a number of ways: through the venting of vaporized gasoline, the emission of gases from the engine's crankcase, and most important through the combustion process that converts gasoline into the power that propels them. When a charge of air and vaporized fuel is compressed and then ignited in an engine's combustion chamber, not all of the fuel is completely combusted; some unburned hydrocarbons are emitted. At the same time, high temperatures and pressures within the combustion chamber convert atmospheric nitrogen into various oxides of nitrogen (NO_x for short). The exhaust gases are then released into the atmosphere, where the ultraviolet portion of sunlight breaks down NO_2, one of the oxides of nitrogen, into NO. The liberated oxygen atoms then combine with atmospheric oxygen (O_2) to produce one of the major constituents of photochemical smog: ozone (O_3), a major irritant to the respiratory system. At the same time, other oxides of nitrogen are converted into a variety of compounds, notably the peroxyacyl nitrates that contribute to the eye-burning effects of smog. Residual NO_2 adds to the general nastiness by obscuring vision with a brown haze.

Combustion of gasoline in an engine also produces carbon monoxide (CO), carbon dioxide (CO_2), water vapor, sulfur dioxide, and particulates.

Strictly speaking, these are not constituents of photochemical smog. They are still a significant problem, however. Recent years have been a growing concern about the emission of CO_2 into the atmosphere because it may contribute to a "greenhouse effect" and consequent global warming. Solid proof of this phenomenon remains elusive, but the increasing likelihood that today's car and trucks are contributing to global warming may necessitate the eventual supplantation of fossil-fuel burning internal-combustion engines by other sources of power; no matter how clean it is in other respects, an internal-combustion engine powered by a carbon-based fuel will always produce CO_2.

From "Inventing for the Environment" (2003),
edited by Arthur Molella and Joyce Bedi.

2. Write down the terms denoting the following chemical substances in English and Russian:

SO_2, SO_3, H_2SO_4, H_2SO_3, CO_2, CO, H_2CO_3, HNO_3, P_2O_5, H_3PO_4, HCl, H_2O.

3. Match the ecological terms with their definitions and find their Russian equivalents.

acid rain, carbon emissions, deforestation, ecosystem, global warming, greenhouse effect, organism, pesticide, toxic waste

a. the process in which heat is unable to escape from the atmosphere and causes the temperature of the earth to rise;
b. the process of removing the trees from an area of land;
c. the slow increase in the temperature of the Earth caused partly by the greenhouse effect increasing the amount of carbon dioxide;
d. a chemical used for killing insects, especially those that damage crops;

e. a living thing such as a person, animal, or plant, especially an extremely small living thing;
f. industrial or chemical waste products that are harmful to the environment;
g. carbon dioxide and carbon monoxide in the atmosphere, produced by vehicles and industrial processes;
h. rain containing a high level of acid that can damage the environment;
i. all the plants and animals in a particular area, considered as a system with parts that depend on one another.

4. Match the words in the left-hand column with those in the right to make terminological word-combinations.

carbon	matter
molecular	acid
atomic	compounds
ozone	cycle
living	structure
sulphuric	depletion
water	rearrangement

5. Make up a Glossary of 30 ecological or chemical terms.

Unit 7

Economics and Finance

1. Read, translate and give the summary of the text "The Elements of a Stabilization Program".

The Elements of a Stabilization Program

What needs to be done to end hyperinflation follows from our analysis of the causes of hyperinflation:

- There must be a fiscal reform and a credible reduction of the government's budget deficit. This reform must take place on both the expenditure side and the revenue side of the budget.

On the expenditure side, reform typically implies reducing the government subsides that have often mushroomed during the hyperinflation. Obtaining a temporary suspension of interest payments on foreign debt also helps to decrease expenditures. An important component of stabilization in Germany in 1923 was the reduction in its "reparation payments" – precisely those payments that had triggered the hyperinflation in the first place.

On the revenue side, what is required is not so much an increase in overall taxation but rather a change in the composition of taxation. This is an important point: As you saw, during a hyperinflation, people are in the effect paying a tax – the inflation tax. Stabilization involves replacing the inflation tax with other taxes. This cannot be done overnight, but it is essential that people become convinced that it will be done and that the budget deficit will be reduced.

- The central bank must make a credible commitment that it will no longer automatically monetize the government debt. This credibility can be achieved in a number of ways. The central bank can be prohibited, by decree, from buying any government debt, so that no monetization of the debt is possible. Or the central bank can peg the exchange rate to the currency of a country with low inflation. An even more drastic step is to officially adopt dollarization – that is, making a foreign currency the country's official currency. This step is drastic because it implies giving up seignorage altogether, and it is often perceived as a decrease in the country's independence.
- Are other measures needed as well? Some economists argue that **incomes policies** – that is, wage and/or price guidelines or controls – should be used, in addition to fiscal and monetary measures, to help the economy reach a new lower rate of inflation. Incomes policies, they argue, help coordinate expectations around a new lower rate of inflation. If firms know wages will not increase, they will not increase

their prices. If workers know prices will not increase, they will not ask for wage increases, and inflation will be eliminated more easily. Others argue that a credible deficit reduction and central bank independence are all that is required. They argue that the appropriate policy changes, if credible, can lead to dramatic changes in expectations and therefore lead to the elimination of expected and actual inflation nearly overnight. They point to the potential dangers of wage and price controls. The government might end up relying on the controls, and not take the painful but needed fiscal and policy measures to end the hyperinflation. Also, if the structure of relative prices is distorted to begin with, price controls run the risk of maintaining these distortions.

Stabilization programs that do not include incomes policies are called *orthodox*; those that do are called *heterodox* (because they rely on both monetary-fiscal changes and incomes policies).

From "Macroeconomics" (2009),
by Oliver Blanchard.

2. Match the terms used in economics with their definitions and find their Russian equivalents.

cooperation, **credit card**, **currency**, **debit, devaluation**, **recession**, **trust**, **trade**

a. a company whose business is investing the money it receives from its customers;

b. the activities of buying and selling goods or services;

c. a situation in which people or organizations work together to achieve a result that will benefit all of them;

d. an amount of money taken from a bank account or an amount of money that you owe, especially when it is recorded in a company's accounts or on a bank statement;

e. a small plastic card that you use to buy things now and pay for them later;

f. a system of money used in a particular country;

g. an official reduction in the value of a country's money;

h. a period when trade and industry are not successful and there is a lot of unemployment.

3. Match the words in the left-hand column with those in the right to make terminological word-combinations. Find their Russian equivalents.

agency	due
balance	limit
cash	trade
debt	book
deluxe	bank
demand	clerk
foreign	estate
loan	charge
price	date
real	sheet
receding	price
receiving	items
tender	system

4. Complete the sentences using English equivalents of Russian economical terms given in brackets.

Many items that are exchanged on (*мировые рынки*), however, could be produced in a number of locations. (*Сравнение стоимости*) dictate that some countries (*производят и экспортируют*) computers or steel or textiles to other countries that find it advantageous to concentrate on (*товары сельского хозяйства или полезные ископаемые*). Countries

differ from each other in their technologies, climates, and skill levels, as well as in their relative supplies of primary factors such as (*земля и рабочая сила*); these differences all bear upon (*себестоимость продукции / затраты на производство*) and (*структура торговли*). Some (*производственная деятельность*) require a large scale of (*продукция*) to bring costs down, so these occur in relatively large countries. Historical experience has conditioned (*трудоспособное население*) in different countries to acquire different skills, thus imparting an advantage in the production of particular (*предметы потребления*) and not in others.

5. Make up a Glossary of 30 economical terms.

Unit 8

Power Engineering

1. Read, translate and give the summary of the text "Renewable Energy".

Renewable Energy

To put our energy use in context it is interesting to realize that the energy incident on the Earth from the Sun amounts to about 180 thousand million million watts (or 180 000 terawatts, 1 TW = 10^{12} W). This is about 14 000 times the world's average energy use of about 13 million million watts (13 TW). As much energy arrives at the Earth from the Sun in forty minutes as we use in a whole year. So, providing we can harness it satisfactorily and economically, there is plenty of renewable energy coming in from the Sun to provide for all the demands human society can conceivably make.

There are many ways in which solar energy is converted into forms that we can use; it is interesting to look at the efficiencies of these conversions. If the solar energy is concentrated, by mirrors for instance, almost all of it can be made available as heat energy. Between one and

two percent of solar energy is converted through atmospheric circulation into wind energy, which although concentrated in windy places is still distributed through the whole atmosphere. About twenty per cent of solar energy is used in evaporating water from the Earth's surface which eventually falls as precipitation, giving the possibility of hydropower. Living material turns sunlight into energy through photosynthesis with an efficiency of around one per cent for the best crops. Finally, photovoltaic (PV) cells convert sunlight into electricity with an efficiency that for the best modern cells can be over twenty per cent.

Around the year 1900, very early in the production of commercial electricity, water power was an obvious source and from the beginning made an important contribution. Hydroelectric schemes now supply about six per cent of the world's commercial energy. Other renewable sources of commercial energy, however, have been dependent on recent technology for their implementation. In 1990, only about two percent of the world's commercial energy came from renewable sources other than large hydro (these are often collectively known as 'new renewables'). Of this two per cent (Table 11.5), about three-quarters was from 'modern' biomass (called 'modern' when it contributes to commercial energy to distinguish it from traditional biomass), the other 0.5% being shared between solar, wind energy, geothermal and small hydro sources.

Returning to commercial energy generation, in order to put renewable sources into context, it is useful to inspect the detailed projection of the WEC (Table 11.5) for the contributions from different 'new renewable' sources which make up the twelve per cent of total energy supply in the year 2020 assumed for the WEC scenario C. The main growth expected is in energy from 'modern' biomass and from solar and wind energy sources. Table 11.6 provides detailed summary information about the status and cost of different renewable energy sources.

In the following paragraphs, the main renewable sources are described in turn and their possibilities for growth considered. Most of them are employed for the production of electricity through mechanical means (for hydro and wind power), through heat engines (for biomass and solar thermal) and through direct conversion from sunlight (solar PV). In the case of biomass, liquid or gaseous fuels can also be produced.

Table 11.5 *Contributions to world energy supply (in millions of tonnes of oil equivalent) from renewable sources in 1990 and as assumed under the WEC scenario C in 2020*

	1990		2020	
	Mtoe	% of world energy	Mtoe	% of world energy
'Modern biomass'	121	1.4	561	5.0
Solar	12	0.1	355	3.1
Wind	1	0.0	215	1.9
Geothermal	12	0.1	91	0.8
'Small' hydro	18	0.2	69	0.6
Tides, waves and tidal streams	0	0.0	54	0.5
Total (new renewable sources)	164	1.8	1345	11.9
'Large' hydro	465	5.3	661	5.8
'Traditional' biomass	930	10.6	1060	9.3
Total (all renewables)	1559	17.7	3066	27.0

From "Global warming: the complete briefing" (2009),
by John Houghton

2. Match the terms used in power engineering with their definitions and find their Russian equivalents.

battery, **charge**, **generator, light bulb**, **(nuclear) reactor**, **resistor, solar panel**

a. a glass object that you put in an electric light to produce light;
b. a piece of wire or other material that controls the flow of electricity;
c. the amount of electricity that something holds or carries;
d. an object that fits into something such as a radio, clock, or car and supplies it with electricity;
e. a machine used for producing nuclear energy, usually in the form of electricity;
f. a piece of equipment that uses energy from the sun to create power for a building;
g. machine that produces electricity.

3. Match the words in the left-hand column with those in the right to make terminological word-combinations. Find their Russian equivalents.

subtransmission	loop
feedback	power
power	line
coal	gas
natural	technologies
renewable	transmission
nuclear	company

4. Complete the sentences using English equivalents of Russian economical terms given in brackets.

Sugar cane as biomass

A sugar cane factory produces many different (*побочные продукты*) that can be efficiently employed as (*источники энергии*) of energy – either for (*биотоплива*) or for (*электроэнергия*) production.

Sugar cane production yields two kinds of (*топливо, полученное из биомассы*) suitable for (*газификация*), known as bagasse and barbojo. Bagasse is the residue from crushing the cane and is thus available

during the milling season; barbojo consists of the tops and leaves of the cane plant, which could be stored for use after the milling season. It has been estimated that, using these sugar cane (*ресурсы*), within thirty years ago or so, the eighty sugar-cane-producing countries in the developing world could generate two-thirds of their (*электрический ток*) needs at a price competitive with (*энергоресурсы ископаемого топлива*).

5. Make up a Glossary of 30 terms used in the sphere of power engineering.

Unit 9

Architecture and Building Construction

1. Read, translate and give the summary of the text "Armani Hotel Dubai: A World Within a World".

Armani Hotel Dubai: A World Within a World

As one more sign of the decline of the West and its dominance in things ultra-chic, Milanese fashion designer Giorgio Armani chose the Burj Khalifa tower in Dubai for the setting of his touted debut in the hotel business. New York and Milan just have to wait – albeit they are on the list for forthcoming Armani hotels. Armani could not have chosen a more dramatic venue than this desert city on the Persian Gulf for displaying his "minimalist opulence", as the Armani literature puts it. For one thing, there is the deep contrast between his and other luxe-level Dubaian caravansaries. These hotels seriously strive for over-the-top-dom marked by panoply and panache. You can get an ocular migraine visiting the self-proclaimed "seven star" Burj Al-Arab Hotel (designed by Tom Wright of WS Atkins in 1999), where 22-karat-gold leaf is the default interior finish.

In relation to the gimme-gilt syndrome, the cerebrally elegant Armani Hotel Dubai, a joint project with Emaar Properties, the Burj's developer, appears amazingly discreet.

Stepping into the hotel through one of the three glass pavilions nestled between the lobes of the tower, the visitor enters a cool, shadowy lobby dominated by a tubular arch construction, rather like an abstracted version of a spider sculpture by Louise Bourgeois. The hotel's materials contrast textures – such as Eramosa limestone floors with the sheen of fabric wall coverings. Its color scheme is Full Armani Jacket, veering confidently from beige to tan to gray to charcoal. The public spaces and 160 guest rooms and suites are located mostly on the first eight floors of the tower, plus floors 38 and 39, with 144 Armani-designed short-stay apartments on floors 9 through 16. Elsewhere in the Burj, residences designed by Skidmore, Owings & Merill (SOM) – for Armani – fill out floors 19 to 39, with more SOM-designed condos on 43 to 72, and luxury ones on floors 76 to 108 – not to mention the offices on floors 112 to 154. In addition, Adam Tihany is designing a restaurant appropriately named Atmosphere on the 122nd floor, slated to open at the end of the year.

The halls of the Armani Hotel's guest-room floors, paneled in zebrawood and trimmed with LED cove lighting at the base and fluorescent lighting at the ceiling, impart the sleek look of a sci-fi catwalk to a calmer world. They lead to solemnly lush guest rooms where Armani partitioned spaces with serpentine walls to echo the curves of the tower's exterior. Since most of the furnishings and fabrics belong to the designer's home furnishings line, Armani Casa, the *gesamtkunstwerk* idea never stops. The rooms' plush look is calming and soothing. For a bit of oomph, many rooms overlook the Dubai Fountain's Busby-Berkeley-goes-to-Arabia floor show designed by WET in the lake next to the Dubai Mall.

Restaurants, cafés, and lounges in the hotel religiously adhere to the Armani aesthetic, along with boutiques, a nightclub, and a spa. The Italian-oriented Ristotante most serenely imparts the soigné Armani imprimatur, where tan, curvilinear banquettes and floor lamps arcing over circular tables echo the tower's formal thematic. The Japanese restaurant, Hashi, presents a coolly casual look (with disco music thumping in the background), but Peck, a gourmet deli with Milanese-Viennese early Modern overtones, might appeal more to architects: It looks as if Adolf Loos were hovering over the hand of the designer. An Indian restaurant, Amal, on the other hand, comes out looking anorexic, owing to the bleak lighting and attenuated scale of the fittings (more arches!). Oddly, this seems to be the only place where touches of color made it through the door, but that alone simply doesn't provide the heat. Fortunately, these drawbacks can be fixed.

Although Giorgio Armani meticulously supervised the entire design of the hotel, down to the room controls and the soap, he was backed up by Wilson Associates, the interior design firm headquartered in Dallas. Because of its past experience in designing hotels and resorts, including the Ritz-Carlton, Four Seasons, Kempinksi, Disney, and Emaar Properties, it stands to reason that Wilson's advice would be useful. But make no mistake about the person at the controls: as Bernard Himel, managing director of Wilson Associates says, "Giorgio Armani had the vision and intense attention to detail – he was personally involved in almost every decision". Not surprisingly, you sense that when you go there. It will be interesting to watch how the company, Armani Hotels & Resorts, formed in 2005 with Emaar Properties, retains this aesthetic for the series of hotels it is planning in the years to come.

From "Architectural Record" (August 2010)

by Suzanne Stephens.

2. Match the terms used in architecture and building construction with their definitions and find their Russian equivalents.

attic, canopy, carving, concrete, frieze, grid, moulding, mural, pediment, stucco, transom, vault

a. an object, pattern, or piece of writing made by cutting stone or wood;
b. a small decorated area of stone or wood at the edge of a wall or around a door, picture frame etc.;
c. a bar of wood or stone across a window that divides the window into two parts, or a bar of wood or stone across the top of a door that separates the door from the window above it;
d. a curved structure that supports or forms a roof, especially in a church;
e. the room in a house under the roof;
f. a hard substance used in building made by mixing cement, sand, small stones, and water;
g. a curved roof over part of a building;
h. a decoration shaped like a triangle build over the top of a door, window etc.;
i. a line of decoration around the walls of a room or building;
j. a large painting done on a wall;
k. metal bars arranged in a pattern of straight lines;
l. a substance used for covering walls, usually on the outside of a building, to give them a rough surface.

3. Match the words in the left-hand column with those in the right to make terminological word-combination. Find their Russian equivalents.

central	concrete
decorative	outline
architectural	element
baroque	grid
stucco	brick
metal	design

carved	ceiling
reinforced	section
supporting	doors
red	transom

4. Complete the sentences with properties:

a good conductor of heat, **a poor conductor of heat**, **corrosion resistant**, **opaque**, **impermeable**, **hard**, **heavy**, **non-combustible**

a. The polythene membrane can prevent moisture from rising into the concrete floor. This means that polythene is _____.
b. The T-shaped aluminium section can resist chemical action, i.e. aluminium is _____.
c. The stone block cannot be lifted without using a crane. This means that stone is _____.
d. The corrugated iron roof cannot prevent the sun from heating up the house, i.e. iron is _____.
e. Glass wool can help to keep a house warm in the winter and cool in the summer, i.e. glass wool is _____.
f. The ceramic tiles on the floor cannot be scratched easily by people walking on them. This means that ceramic tiles are _____.
g. Asbestos sheeting can be used to fireproof doors. In other words asbestos is _____.
h. Black cloth blinds can be used to keep the light out of a room, i.e. cloth is _____.

5. Make up a Glossary of 30 terms used in the spheres of architecture and building construction.

Unit 10

Biology

1. Read, translate and give the summary of the text "Advantages of Ultrarapid and High-Pressure Freezing Methods".

Advantages of Ultrarapid and High-Pressure Freezing Methods

Ultrarapid and high-pressure freezing methods offer a multitude of advantages as preparation methods in cell biology. By avoiding the need for chemical fixation, these cryofixation techniques potentially permit the study of cell structure in a condition close to that existing in life. Because one particular instant in a biological process can be captured, the accumulation of intermediate stages, which may occur during slow death in aldehyde fixatives, is avoided. Living specimens can thus be frozen for ultrastructural examination at known intervals after application of a biological stimulus. This has made it possible to use the electron microscope for studies of transient biological events that are completed within a few seconds or even, in favorable instances, within a few milliseconds. The ability to undertake such direct kinetic studies was a significant breakthrough in cell biology, as previously, sequences of such rapid events could only be guessed at indirectly from images of chemically fixed specimens. Metal block impact freezing, spray freezing, plunge freezing, and jet freezing methods have all been adopted to permit time-resolved analysis of rapid events (for review, see Knoll, 1995).

Another important advantage is that ultrarapid-frozen specimens can be subjected to *deep etching* or freeze drying, a technique in which water molecules are allowed to sublime from the frozen surface of a fractured (or, in some cases, unfractured) specimen before replication (see article by Shotton). Glycerol cannot be sublimed, but by directly freezing specimens in dilute aqueous solutions, the outer surfaces of membranes, extracellular matrix components, and intracellular cytoskeletal elements

can be exposed by deep etching or freeze drying. For deep-etch observations of the cytoskeleton and internal membrane surfaces of cells, a compromise has to be made in order to obtain clean views unobscured by cytoplasmic components. Typical procedures for cultured cells attached to a substrate involve lysing them with Triton X-100 or physically tearing them open by peeling off a strip of nitrocellulose membrane that has been allowed to adhere to their dorsal surfaces. This is followed by rinsing in dilute buffer to remove cytoplasmic components, light fixation with aldehydes, and then immersion in 10–15% methanol immediately prior to freezing. The methanol acts as a cryoprotectant, increasing the depth of adequate freezing, and also has the advantage of being volatile under vacuum at –100°C, thus facilitating the etching process. This application is thus quite distinct from studies aiming to preserve structure in the native state, but it is a fundamentally important one, as it provides access to structural information that cannot be obtained by other electron microscopical methods (Heuser, 1981). Deep etching has also been adopted to study macromolecules absorbed to microscopic mica flakes and other substances (Heuser, 1989).

In addition to freeze fracture, deep etching, and cryoelectron microscopy, other key routes to the examination of ultrarapid-frozen specimens are freeze substitution and cryoultramicrotomy. Here the ability to preserve epitopes is of prime importance for immunocytochemical studies (see article by Roos *et al.*). The complementary application of these approaches, together with freeze-fracture cytochemistry (Severs, 1995; Fujimoto, 1997), has wide application in cell biology today.

From “Cell Biology” (2006),
by Nickolas J.Severs and David M.Shotten,
edited by Julio E. Celis.

2. Match the terms used in biology with their definitions and find their Russian equivalents.

biotechnology, **carbohydrate**, **gene**, **hybrid**, **mammal**, **metabolism**, **molecule**, **mutagen**, **natural selection**, **photosynthesis**, **protein**

a. a pattern of chemicals within a cell that carries information about the qualities passed on to a living thing from its patterns;
b. a very small group of atoms that form a particular substance;
c. the use of bacteria and plant and animal cells for industrial and scientific purposes;
d. the chemical processes that take place in your body that change food and drink into energy;
e. a substance in food such as meet, eggs, and milk that people need in order to grow and be healthy;
f. a substance found in foods such as sugar, bread, and potatoes that supply your body with heat and energy;
g. the process in which green plants use energy from light to produce their food;
h. a substance that produces a genetic mutation;
i. an animal or plant that has been produced from two different types of animal or plant;
j. the way in which living things continue to exist as a group or die, according to qualities they have or are able to develop;
k. an animal that is born from its mother's body, not from an egg, and drinks its mother's milk as a baby.

3. Complete these sentences with the words denoting fields of biology.

1. The study of how cells grow and change, especially cells that cause cancer, is called _____.
2. The scientific study of plants is called _____.
3. The scientific study of animals is called _____.

4. The scientific study of the physical structure of an animal or plant is called _____.
5. The science that deals with the way that bodies of living things operate is called _____.
6. The study of mushrooms and other fungi is called _____.
7. The science that deals with very small living things is called _____.
8. The scientific study of insects is called _____.
9. The study of how the individual features and behaviour of living things are passed on through their genes is called _____.

4. Complete the sentences using English equivalents of Russian terms given in brackets.

(*Глюкозные сенсоры*) are probably the most well known (*биодатчики / биосенсоры*) on the market today, since thousands of people with diabetes must be able to monitor their (*уровень глюкозы*) throughout the day. Glucose can be tested by using the enzyme (*глюкооксидаза*), which combines glucose and (*кислород*) to form (*глюконовая кислота*) and (*перекись водорода*). The sensor detects the amount of (*перекись водорода*) formed and current changes that are measured by an (*электрод*).

(*Бионаносенсоры*) allow researchers to make use of and test for (*биомолекулы*). They are reaching a point where (*бионаносенсоры*) and (*наномедицина*) will augment biology. Clinicians want to create nanomachines that can carry out and analyze cellular processes normally done by (*биомолекулы*) or entire groups of cells. Some people call this (*клеточная инженерия*); others call it healthcare of the future.

5. Make up a Glossary of 30 biological terms.

APPENDIX

Brief Russian-English Glossary of Special Translation Terms

Краткий русско-английский глоссарий терминов по переводу профессионально-ориентированных текстов

автоматический / машинный перевод – automatic translation, machine translation (MT)
автоматическое аннотирование / реферирование – automated abstracting
анализ исходного текста, ориентированный на входной язык – SL-oriented analysis
язык оригинала / язык-источник / исходный язык, входной язык *(в машинном переводе)* – source language (SL)
язык перевода, выходной язык *(в машинном переводе)* – target language (TL)
машинный перевод с участием человека – human-assisted machine translation (HAMT), machine-aided human translation (MAHT)
научный текст – scientific text
номенклатура – nomenclature
перевод / процесс перевода – translation, translating, interpretation, interpreting
переводчик – translator, interpreter
подъязык – sublanguage
полностью автоматизированный высококачественный машинный перевод – Fully Automatic High Quality Machine Translation (FAHQMT)
профессионализм – professionalism
профессиональное арго / профессиональный жаргон / профессиональный подъязык / специальный подъязык – slang, technical language
регистр – register
синхронный перевод – simultaneous interpretation
система машинного перевода – machine translation system
специализация / спецификация (значения) – specialization (of meaning)
тезаурус – thesaurus
теория перевода – translation theory
термин – term
терминологизация – terminologisation, terminologization
терминологический словарь – dictionary of technical terms, terminological dictionary
терминология – terminology
транскрипция – transcription
транслитерация – transliteration

Brief Glossary of Russian Special Translation Terms

Краткий словарь русских терминов по переводу профессионально-ориентированных текстов[3]

Банк терминов – совокупность терминологической базы и соответствующих лингвистических и программных средств, обеспечивающих формирование, ведение и эксплуатацию этой базы.

Двуязычный отраслевой словарь – книга, содержащая перечень терминов, относящихся к данной отрасли как узкоспециальных, так и общетехнических, с алфавитным, гнездовым или смешанным их расположением, с эквивалентным переводом на другой язык; может быть снабжен алфавитным указателем эквивалентов, отсылающих читателя к иностранному термину в основной части словаря, и набором иллюстраций с названием деталей на обоих языках.

Информационно-коммуникативный перевод – см. *специальный перевод*.

Информационно-поисковый тезаурус – модель систем понятий взятой области науки и техники, служащая для нейтрализации синонимии выражений внутри языка. В тезаурус входят термины, номинативные словосочетания, целые семантические поля, отдельные лексические значения слов естественного языка.

Лингво-инженерная деятельность – такой вид информационно-интеллектуального труда, как перевод организационно-распорядительной, научно-технической, экономико-статистической документации и другой специальной и информационно-коммуникативной литературы с одного языка на другой с помощью компьютера.

Научно-техническая информация – информация, подразделяющаяся на три потока: (1) патентную литературу, являющуюся основой формой обмена, т.к. все новое в области науки и техники официально оформляется в виде патента и его производных форм; (2) периодику, специально предназначенную для обмена научно-технической информацией, например: отраслевые бюллетени, содержащие рефераты, аннотации и названия; отраслевые научно-технические журналы, содержащие дискуссионные, проблематичные и отчетные статьи специального характера; библиографические указатели с названием тем, изобретений и предметов промышленной продукции, также иногда содержащие аннотации и тематические обзоры работ по данной

[3] Термины семантизированы в соответствии с Толковым переводоведческим словарём Нелюбина Л.Л. (2003). Составитель настоящего пособия оставляет за собой право изменения формулировок определений переводоведческих терминов.

отрасли; (3) различные периодические и непериодические издания и другие источники информации, не предназначенные специально для научно-технического обмена, но могущие использоваться для этой цели, например: специальные журналы и книги, рекламные материалы, инструкции и другие подобные источники специальной информации.

Научно-технический перевод – 1. Вид перевода, отличительной чертой которого является большая терминологичность и предельно точное, чёткое изложение материала при относительном отсутствии образно-эмоциональных выразительных средств. Насыщенность научных и технических материалов терминологией требует от переводчика не только отличного знания терминологии взаимодействующих в двуязычной ситуации языков, но и умения правильно ею пользоваться. Особое значение имеет знание переводческих приёмов и методов при отсутствии соответствующих реалий и терминологических эквивалентов в одном из конфронтируемых языков. См. *технический перевод*. 2. Один из жанров специального перевода, обслуживающий сферы общения на научные и технические темы. 3. Перевод специальных текстов (документов) научно-технического характера, осуществляемый специфическими методами, отличными от перевода художественного произведения, с соблюдением таких требований, как точность, сжатость, ясность и т.п. Часто применяемый термин *научный перевод*, как правило, по своему значению совпадает с термином *научно-технический перевод*. Такое же примерно значение имеет и словосочетание *перевод технических текстов*.

Научный перевод – перевод специальных научных текстов. См. также *научно-технический перевод*.

Нетермированная лексика – слова и словосочетания, которые выступают в специальных текстах в своем обычном качестве (а не в качестве терминов). Круг такой лексики относительно невелик и может быть быстро усвоен, чтобы не доставлять дополнительных трудностей при переводе специальных текстов.

Номенклатура – 1. Совокупность специальных терминов-названий, употребляющихся в данной научной области. 2. Названия типичных объектов данной науки (в отличие от терминологии, включающей обозначение отвлеченных понятий и категорий). 3. Подробный перечень отдельных элементов наблюдения совокупности.

Отраслевой словарь – словарь по какой-либо отрасли науки и техники.

Подъязык – 1. Минимальный набор лексических категорий, входящих в систему данного языка и необходимых для описания данной предметной области, т.е. определённой сферы деятельности. 2. Язык какой-либо области знания, предметной

области (язык математики, физики, военный язык, дипломатический язык и т.п.). 3. Совокупность языковых единиц, репрезентативных в ограниченном по какому-либо признаку массиве текстов. 4. Набор языковых элементов и их отношений в текстах с однородной тематикой. 5. Малая лингвостилистическая подсистема. 6. Подъязык данного языка, рассматриваемый как совокупность всех единиц всех уровней строения языковой системы, которые используются в данной сфере общения на данные темы. 7. Частная замкнутая языковая микросистема, или малая лингвистическая подсистема, содержащая набор языковых структур и единиц, заданных тематически однородной областью социального или профессионального функционирования языка. 8. Корпус статистико-тематических текстов одинаковой предметной области и функционально-стилистической направленности, обслуживающий сферу общения на определённые темы (например: подъязык электроники, подъязык химии, подъязык сводок погоды и т.д.).

Профессионализм – слово или выражение, свойственное речи той или иной профессиональной группы.

Профессиональная лексика – лексика, свойственная данной профессиональной группе, используемая в речи людей, объединенных одной профессией.

Профессиональный язык – 1. Разновидности языка, порождаемые принадлежностью к одной профессии. В настоящее время представлены различными жаргонизированными системами общения (речь моряков, военных, студентов и т.п.). 2. Социальный диалект данного языка, бытующий среди лиц, принадлежащих к одной и той же профессии.

Регистр – устная разновидность социальной / профессиональной речи, обслуживающей определенную сферу общения на заданные темы с использованием набора лексических средств и грамматических структур. Регистр обычно объединяет разговорную речь людей общей профессии или общих социальных интересов. Устные формы иногда называют *подъязыками*.

Специализированные искусственные языки – символические языки науки, математики, логики, химии, лингвистики и пр., или языки человеко-машинного общения (языки программирования, информационные, управления базами данных и пр.). Это языки с формальным методом описания, правилами образования и преобразования выражений и формул, своей семантикой и пр. Они не являются закрытыми системами и поэтому количество порождаемых текстов бесконечно.

Специальные источники информации – специальные словари, специальные энциклопедии, справочники по различным отраслям науки и техники, специальная литература и прочие источники информации.

Специальные подъязыки – малые лингвистические подсистемы как набор языковых элементов и их отношений в текстах с однородной тематикой. Каждый специальный подъязык образует иерархическую структуру, выступая как микроподъязык по отношению к входящим в него подъязыкам или малым подъязыкам, в свою очередь включающим микроподъязыки, характеризующиеся наибольшей полнотой, конечностью и являющиеся наиболее формально ограниченными, однако здесь можно говорить лишь о степени относительности, но не абсолютности этих признаков.

Специальные политехнические двуязычные словари – словари, фиксирующие эквиваленты общетехнических и общенаучных терминов, а также и многих обычных слов, используемых в языке науки и техники.

Специальные энциклопедии – энциклопедии, построенные по типу общих энциклопедий и отличающиеся от них только содержанием; например, в медицинской энциклопедии все статьи относятся только к области медицины, в химической – к химии.

Специальный перевод – 1. Перевод материалов, относящихся к какой-либо отрасли знаний со своей терминологической номенклатурой. 2. Информационно-коммуникативный (лингвистический) перевод, который обслуживает определённые отрасли знаний со своей терминологической номенклатурой; функционирует в сферах общения на общественно-политические, научные, технические, военные, административно-хозяйственные, юридические, дипломатические, коммерческие, деловые, финансовые, публицистические и другие специальные темы и предметные отрасли, включая темы повседневного речеязыкового общения. Теоретической базой специального перевода является лингвистическая теория перевода.

Специальный сленг – узкая сфера сленга, включающая различные жаргоны и профессиональную лексику.

Специальный частотный словарь – словарь, содержащий лексику того функционального стиля или подъязыка, к которому относятся использованные для его составления тексты.

Термин – 1. Слово или словосочетание специального (научного, технического, военного и т.п.) языка, создаваемое (принимаемое, заимствуемое и т.п.) для точного выражения специальных понятий и обозначения специальных предметов. 2. Слово, не допускающее модуляции. Ср. номенклатура. 3. Слово или словосочетание, являющееся точным обозначением определённого понятия в области науки, техники, искусства, общественной жизни. 4. Слово, наделённое качеством обозначать научное понятие, составляющее вместе с другими понятиями данной отрасли науки или техники одну семантическую систему. В тексте, предназначенном для перевода,

термин всегда требует отдельного решения на перевод, т.е. выступает как единица перевода.

Терминологическая насыщенность – доля (в %) терминологических словоупотреблений среди знаменательных. Для её исчисления берём минимальную выборку в 400 знаменательных словоупотреблений.

Терминологическая частотность – доля (в %) терминологических словоупотреблений среди всех словоупотреблений текста или частоты «встречаемости» терминологических словоупотреблений в тексте.

Терминологический словарь – словарь, содержащий перечень терминов и их дефиниций.

Терминологическое словоупотребление – словоупотребление, являющееся частью терминологического словосочетания (формулы независимо от их сложности считаются за одно терминологическое словоупотребление).

Терминология – совокупность терминов данной области знания, производства, деятельности.

Техницизм – узкоспециальный термин в области техники.

Технический перевод 1. Перевод, используемый для обмена специальной научно-технической информацией между людьми, говорящими на разных языках. 2. Преобразование информации в двуязычной ситуации; один из жанров специального перевода, обслуживающий сферы общения на технические темы.

Эквивалентный термин – термин, выраженный на одном естественном языке и соответствующий по объему понятии термину на другом естественном языке.

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