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PREFACE

Данное пособие предназначено для студентов технологических специальностей первого года обучения. По своей практической направленности и методическим основам оно соответствует требованиям Программы по английскому языку. Цель пособия – формирование навыков чтения и перевода текстов по специальности, повторение грамматики, усвоение новой лексики, расширение кругозора будущих специалистов. Послетекстовые задания и лексико-грамматические упражнения рассчитаны на реализацию практических целей и задач 1 года обучения. С их помощью проверяется понимание содержания, усвоение новой лексики, умение узнавать, переводить, анализировать изучаемые грамматические явления.

Пособие включает также тексты для дополнительного чтения, критериям отбора которых служила информационная ценность.

UNIT 1

1.1. Прочитайте и переведите текст, обращая внимание на слова и выражения после текста

TEXT 1. CONCRETE

It is difficult to imagine modern structure without concrete. Concrete is the very building material which led to great structural innovations. The most important quality is its property to be formed into large and strong monolithic units. The basic materials for making concrete are cement, aggregate and water. Cement is the most essential material and the most important one for making concrete of high quality. Cement is made of limestone and clay. It is burnt at high temperature and ground up into powder. During the grinding a small percentage of raw gypsum is added otherwise it would set too quickly. Depending on the kind and composition of the raw materials different types of cement are obtained: Portland cement, blast furnace cement, rapid-hardening cement and many others.

Concrete is made by binding together particles of sand and gravel, stone or broken brick. The binding agent used is a paste of Portland cement and water, in suitable proportions. When water is added to the cement, hydration takes place. This causes the whole mixture to set and harden, forming a solid mass. Cement starts hardening one hour after the water has been added and the process of hardening lasts for about twenty-eight days. The process is called concrete curing. The strength of concrete under favourable conditions increases with age. The strength of concrete is very rapid in the early stages, but continues more slowly for an indefinite period amounting to years. The sand, gravel (or broken stone) are termed "aggregate"; sand is known as "fine aggregate", and gravel as "coarse aggregate". Concrete can be made on a building site and poured into position as a wet mix, or it may be used as the materials for making prefabricated units in a plant.

The characteristics of concrete depend upon the quality of the materials used, grading of the aggregates, proportioning and amount of water. The most important requirements for concrete are: it should be hard, strong, durable, fire-resistant and economical. To get the best of concrete the following considerations should be kept in mind (помнить):

1. The most suitable proportions of cement and aggregate are: 1 part cement, 2 parts sand and 4 parts of gravel.

2. The water used for mixing cements, limes and plasters must be reasonably clean. Pond, river and canal water often contain different impurities and should not be used without examination. Water fit for drinking can be assumed to be free from harmful ingredients. Excess of water is detrimental to the ultimate strength of the concrete.

3. The sand should be clean. Therefore, if impurities are present, the binding is affected.

Concrete can be divided into two classes: mass or plain concrete and reinforced concrete (ferro-concrete) where it is necessary to introduce steel. Plain

or mass concrete can be used for almost all building purposes. Ferro-concrete is used in building bridges and arches, dams and dock-walls, for structures underwater, for foundations, columns and beams. The use of concrete and ferro-concrete is almost universal.

Imagine	Представить
lead (led, led)	привести
burn (burnt, burnt)	сжигать
grind	измельчать, дробить
add	добавлять
rapid	быстрый
(in)definite	определенный (неопределенный)
amount	количество, доходить до
pour	заливать
obtain (get)	получать
depend on	зависеть
kind	вид
particle	частица
set (harden)	схватываться, твердеть, застывать
last	длиться
favourable	благоприятный
increase	увеличиваться
age	возраст, срок службы
call	называть(ся)
cause	вызывать, являться причиной
continue	продолжаться
slow(ly)	медленный (медленно)
grade	качество сорт; сортировать
require(ment)	требовать (требование)
reasonable	разумный, умеренный
clean	чистый
impurity	примесь, загрязнение, засорение
contain	содержать, вмещать
assume	предполагать, считать
harmful	вредный
sufficient	достаточный
excess	излишек
detrimental	приносящий убыток, вредный
ultimate	окончательный, предельный
introduce	внедрять, вводить
dam	плотина, подпорная стена
beam	балка

1.2 УПРАЖНЕНИЯ К ТЕКСТУ “CONCRETE”

I. К каждой данной паре слов вспомните русское слово с тем же корнем, что и английское:

Composition	Состав, соединение, смесь
monolithic	монолитный
mix	смесь, смешивать
form	вид, тип, форма; принимать форму, образовывать, составлять
start	начинать
position	место, положение
proportion	соотношение, часть, доля
plaster	штукатурка
examination	исследование
ingredient	составная часть
structural innovations	нововведения (технические новшества) в строительстве
agent	средство, вещество
clay	глина
arch	арка
universal	универсальный, всеобщий

II. Вспомните значение следующих английских слов и подберите к ним синонимы из правого столбца. Дайте перевод данных синонимов.

1. grind	1. modern building
2. rapidly	2. broken brick
3. put into position	3. plain concrete
4. ingredient	4. right amount
5. set	5. place
6. suitable proportions	6. hard artificial stone
7. essential material	7. quickly
8. broken stone	8. ground up into powder
9. mass concrete	9. component
10. reinforced concrete	10. harden
11. modern structure	11. important material
12. solid mass	12. ferro-concrete

III. Вспомните значение следующих английских слов и подберите к ним эквиваленты из правого столбца.

- | | |
|----------------------------|----------------------------|
| 1. modern structure | 1. вяжущее |
| 2. raw materials | 2. быстротвердеющий цемент |
| 3. ground up into powder | 3. мелкий заполнитель |
| 4. blast furnace cement | 4. щебень |
| 5. rapid-hardening cement | 5. строительная площадка |
| 6. concrete curing | 6. современное здание |
| 7. broken stone | 7. сборные конструкции |
| 8. binding agent | 8. происходить, случаться |
| 9. fine aggregate | 9. питьевая вода |
| 10. coarse aggregate | 10. сырье |
| 11. building site | 11. выдержка бетона |
| 12. wet mix | 12. крупный заполнитель |
| 13. prefabricated units | 13. мокрая (сырая) смесь |
| 14. water fit for drinking | 14. шлакопортландцемент |
| 15. take place | 15. измельчать в порошок |

1.3 IV. Закончите следующие предложения, используя английские эквиваленты из текста. Предложения переведите.

1. (Самым важным качеством) of concrete is its property to be formed into large and strong monolithic units. 2. Concrete is made by mixing cement, sand, gravel and water (в нужных количествах). 3. The characteristics of concrete depend (от качества используемых материалов). 4. Cement is (самый важный и необходимый материал) for making concrete of good quality. 5. Cement is made of (известняка и глины). 6. Concrete is made by binding together particles of (песка, гравия или щебня). 7. The water used for mixing cements must be (умеренно чистой), excess is detrimental to (окончательной прочности бетона). 8. Sand should be clean and free from (вредных веществ). 9. Concrete can be divided into (обычный или железобетон) или where it is necessary (ввести сталь). 10. Concrete and ferro-concrete is used (почти для всех строительных целей).

V. Укажите, какие предложения относятся к бетону, а какие к цементу. Предложения переведите на русский язык.

1. It is the basic material for making concrete. 2. It is burnt and ground up into powder. 3. It can be formed into large and monolithic units. 4. It is a very hard artificial stone. 5. It is durable, fire-resistant and economical. 6. It can be rapid-hardening. 7. It starts hardening one hour after the water has been added. 8. Its strength is increased with age. 9. It can be used for underwater structures. 10. The process of its curing lasts for about 28 days. 11. It is made of limestone and clay. 12. It can be used as the material for making prefabricated units in a plant.

VI. Используя слова и выражения из текста, письменно переведите следующие предложения на русский язык.

1. Бетон применяется в строительстве с давних времен. 2. В древности (ancient times) в качестве вяжущих использовали гипс, глину и гипс. 3. Егор Челиев впервые (was the first to use) применил цемент в начале XIX века. 4. Изготовление цементов в Англии и Германии началось на несколько лет позже (some years later). 5. С XIX столетия (century) после изобретения (invention) портландцемента бетон стал широко применяться для различных интересных конструкций. 6. Бетон – это искусственный материал. Его получают в результате формирования и затвердевания правильно подобранной смеси (вяжущего, заполнителей и воды). Вяжущее в бетоне используют вместе в мелкими и крупными заполнителями. 7. Все конструкции из бетона могут быть монолитными, сборными и сборно-монолитными. Сборные конструкции выпускают (are produced) на специальных заводах. Монолитные конструкции бетонируют на месте строительства.

UNIT 2

Прочитайте и переведите текст, обращая внимание на слова и выражения после текста

TEXT 2. 1 REINFORCED CONCRETE .TYPES OF CONCRETE.

Reinforced concrete is a combination of two of the strongest structural materials, concrete and steel.

This term is applied to a construction in which steel bars or heavy steel mesh are properly embedded in concrete. The steel is put in position and concrete is poured around and over it, and then tamped in place so that the steel is completely embedded. When the concrete hardens and sets, the resulting material gains great strength. This new structural concrete came into practical application at the turn of the 19th century.

The reinforcing of concrete was first introduced in France in 1861 by Joseph Monier, who constructed flower pots, tubs and tanks, and Francois Coignet, who published theories of reinforcing for beams, arches, and large pipes. Very little was accomplished in building construction until twenty-five years later when German and Austrian engineers developed formulas for design, and Hennebique in France began the use of bent-up bars. Between 1880 and 1890 several reinforced concrete buildings were erected in the United States, and since 1896 the development of reinforced concrete work has made great progress. And the reasons of this progress are quite evident. Concrete has poor elastic and tensional properties, but it is rigid, strong in compression, durable under and above ground and in the presence or absence of air and water, it increases its strength with age, it is fireproof.

Steel has great tensional, compressive and elastic properties, but it is not durable being exposed to moisture, it loses its strength with age, or being subjected to high temperature. So, what is the effect of the addition of steel reinforcement to concrete?

Steel does not undergo shrinkage or drying but concrete does and therefore steel acts as a restraining medium in a reinforced concrete member. Shrinkage causes tensile stresses in the concrete, which are balanced by compressive stresses in the steel.

First there was a tendency among architects to consider reinforced concrete as a method of construction suited only to heavy and massive structures. Much study and experience have led to vast improvements in the manufacture of this concrete. The potentialities of a substance which can be poured into any form or shape from delicate ornament to huge cantilevers and parabolic arches and which is monolithic throughout its mass appear to be in the hands of the creators of concrete buildings.

Indeed, steel constructions with reinforced concrete have become the most important building materials invented in centuries and they have given modern architecture its peculiar features.

Term	Термин
apply	применять, использовать
properly	должным образом; как следует; правильно
embed	вставлять, врезать, вделывать (in)
pour	заливать
tamp	трамбовать; уплотнять
publish	публиковать
reason	причина
evident	явный, очевидный
rigid	жесткий, твердый
presence	наличие
absence	отсутствие
cause	причина; являться причиной, вызывать
consideration	анализ, разбор, рассмотрение
keep in mind	помнить
suitable	подходящий, соответствующий
allow	позволять, разрешать
homogeneity	однородность, равномерность
requirement	требование
invent	изобретать
peculiar	особенный, своеобразный, особый,
feature	особенность, характерная черта

2.2 УПРАЖНЕНИЯ К ТЕКСТУ “REINFORCED CONCRETE”

I. К каждой данной паре слов вспомните русское слово с тем же корнем, что и английское:

combination	Соединение, сочетание, комбинация
construction	строительство, конструкция, здание, сооружение
progress	развитие, достижение, успехи
position	местоположение; место; расположение
result	происходить в результате, иметь результатом
compression	сжатие, сокращение, уплотнение
compressive	сжимающий
elastic	гибкий, упругий
effect	результат; влияние; воздействие
stress	напряжение; усилие; нагрузка
balance	уравновешивать (что-л.; что-л. чем-л.)
proportion	количественное соотношение
architecture	архитектура

II. Вспомните значение следующих английских слов и подберите к ним эквиваленты из правого столбца.

1. steel bars	1. стальные конструкции
2. steel mesh	2. прекрасные свойства на растяжение
3. put in position	3. подвергаться усадке, сокращению, сжатию
4. gain great strength	4. подвергаться воздействию высокой температуры
5. come into practical application	5. стальная арматура
6. at the turn of the century	6. стал практически применяться
7. reinforced concrete beams	7. пресная вода
8. poor elastic properties	8. приобретать большую прочность
9. great tensional properties	9. прочный на сжатие
10. strong in compression	10. вызывать растягивающие усилия
11. increase (lose) strength with age	11. плохие свойства на упругость (гибкость)
12. cause tensile stresses	12. арматурные стержни
13. be exposed to moisture	13. железобетонные балки
14. be subjected to high temperature	14. подвергаться воздействию влажности (влаги)
15. undergo shrinkage	15. укладывать на место
16. fresh water	16. начало столетия
17. steel constructions	17. увеличивать, уменьшать прочность

2.3. Переведите цепочки слов, обращая внимание на словообразовательные суффиксы:

Complete-completely; add-addition; structure-structural; hard-hardenhardness; set-setting; reinforce-reinforcement-reinforced concrete; compress-compression-compressive; develop-development; apply-application; construct-construction; strong-strength-strengthen; durable-durability; tension-tensional-tensile; shrink-shrinkage; require-requirement.

2.4. Закончите следующие предложения, используя английские эквиваленты из текста. Предложения переведите.

1. Reinforced concrete is a combination of two самых (прочных строительных материалов) concrete and steel. 2. When the concrete hardens and sets, (получающийся в результате материал) gains great strength. 3. At the turn of the 19th century new structural material (стал применяться). 4. Concrete has poor elastic and tensional properties but it (увеличивает прочность со временем). 5. Steel has great tensional, compressive and elastic properties but (со временем теряет прочность). 6. Steel does not undergo shrinkage and therefore it acts (как сдерживающая среда). 7. Shrinkage causes tensile stresses in concrete, which are balanced (сжимающими усилиями в стали).

2.5. Укажите, какие предложения относятся к бетону, а какие к стали. Предложения переведите на русский язык.

1. It has poor elastic and tensional properties.
2. It has great tensional and compressive properties.
3. It is rigid and strong in compression.
4. It does not undergo shrinkage and drying.
5. Its strength is increased with age.
6. It is not durable being exposed to moisture (in the presence of water).
7. It is durable in the presence or absence of air and water.
8. It acts as restraining medium in a reinforced concrete member.

2.6. Используя слова и выражения из текста, письменно переведите следующие предложения на русский язык.

1. Официальной датой появления железобетона считают 1867 год, когда французский садовник Ж. Монье получил (take out a patent) первый патент на железобетон как строительный материал. 2. Монье делал из бетона цветочные горшки и кадки, небольшие бассейны для воды и другие изделия. 3. Первый железобетонный мост (bridge) был построен в 1875 году. 4. Русские инженеры оказали большое влияние (greatly influence) на развитие железобетонного строительства. Они использовали железобетон как прекрасный строительный материал в Санкт-Петербурге, Новороссийске и

других городах. 5. В 1904 году недалеко от Николаева был построен первый в мире (first in the world) железобетонный маяк (lighthouse). 6. С конца 19 века в строительстве стали широко применяться бетонные конструкции из портландцемента, который стал изготавливаться на заводах. 7. В железобетонных конструкциях стала успешно использоваться стальная арматура. 8. Дерево, пластмасса металл боятся воды, а бетон, набирая прочность, способен твердеть под водой. Это свойство делает бетон очень хорошим строительным материалом, пригодным для возведения множества гидротехнических (hydraulic) сооружений. 9. На железобетонные конструкции расходуют примерно в два раза (twice as little) меньше стали, чем на металлические. В то же время железобетонные конструкции более огнестойки и долговечны.

FOR TEST
TEXT 3. CONCRETE

Master the key terms and head words.

concrete – бетон	quality – качество
aggregate – заполнитель (бетона)	tensile – растяжимый, вязкий
coarse – крупный, необработанный	to crush – дробить
fine – тонкий, мелкозернистый	accordingly – соответственно
precast – готовый, заранее отлитый	the very – именно тот, тот самый

1. Define parts of speech. Translate the words.

the very, slab, tensile, coarse, crush, gravel, member, cast, quality

2. Combine the given attributes a) with the given nouns; b) follow the Russian combinations.

Model: дробленый гравий - crushed gravel

a) crushed, coarse, fine

b) sand, gravel, aggregate

дробленый песок – крупный гравий – мелкозернистый заполнитель –

3. Read the terminological combinations. Translate them from Russian.

concrete slab – бетонная плита

slab roof – кровля из плит

tensile strength – прочность на растяжение

site of foundation – пласт под фундаментом

slab covering – настил из плит

4. Translate the following combinations into Russian.

the very site of construction proportionally divided amounts

carefully mixed aggregates the very site of production

5. Choose the correct variant and put it down.

1. Concrete as a building material possesses *{only advantages, both advantages and disadvantages}*.

2. Concrete is considered to be a *{universally used material, rarely used material}*.

3. One of the qualities of concrete is that *{it does not possess tensile strength, possesses tensile strength}*.

4. Ferro-concrete is *{rather popular, not popular}* in the modern construction.

5. Gravel is classified as *{coarse, fine}* aggregate.

6. One of the good qualities of concrete is its *{high, low}* cost.

7. Concrete *{decays and burns, does not decay and burn}* .

6. Translate the following questions into Russian. Find answers in the article below.

1. What properties make concrete a highly used construction material?

2. What two types of aggregate are used for producing concrete?

3. Is sand a coarse or fine aggregate?

4. What ingredients does the quality of concrete depend upon?

5. How long does the process of hardening the mixed components last?

6. What is the difference between the so-called in-situ and precast concrete?
7. What quality is considered to be the main disadvantage of concrete?
8. For what reason is tensile strength considered to be an important quality?
9. For what purpose are metals introduced into the structure of concrete?
10. What metals is concrete frequently combined with?
11. When did the use of ferro-concrete start?
12. Would you like to live in a wooden or concrete building? Why?

7. Read and translate the article.

Concrete is considered to be a universal material for construction. Different kinds of concrete can be used practically for every building purpose. The raw materials for producing concrete can be found in every part of the world. The main property that makes concrete so popular is that it can be formed into strong monolithic slabs. Another good quality is its relatively low cost. Besides, concrete is known to be fire- and decay-resistant.

Concrete is produced by combining coarse and fine aggregates, Portland cement, and water. Coarse aggregate is generally gravel or crushed stone, while fine aggregate is sand. Cement, sand, gravel, and water are taken in proportional amounts and mixed. The quality of concrete depends mostly on the quality of the cement used. The process of production consists in pouring the mixed components into forms and holding them there until they harden. The process of hardening generally lasts for about 28 days. There exist different ways of producing concrete. It can be produced by mixing the ingredients and pouring the mixture into position on the very site of building. Concrete can also be produced in a factory, and used as a material for manufacturing prefabricated blocks. Accordingly, there exist the so-called in-situ (cast-in-place) concrete and precast concrete.

Concrete, as any other building material, has not only advantages but also disadvantages. Its main disadvantage is that it has no form of its own. Also, it does not possess useful tensile strength. Because of these qualities, in modern times construction concrete is very frequently combined with different metals. Most common of them are iron and steel.

The introduction of metal into the structure of concrete is highly advantageous. It strengthens the material and helps to realize its limitless construction and architectural potential. It should be noted that the use of ferro-concrete started only in the nineteenth century and is still gaining popularity.

TEXT 3. CONCRETE (*continued*)

Master the key terms and head words.

bridge – мост	dam – дамба, плотина
cell – ячейка, клетка, канал	foam – пена
в пустотном кирпиче	foamy – пустотелый,
cellular concrete – ячеистый	пенный
газобетон	pile – свая
	to emit – испускать,
	выделять

1. State parts of speech. Translate the words.

plain, cellular, foamy, foam, bridge, emission, emit, cell, pile, pipe

2. Translate the combinations into Russian.

constant use foamy structure powerful emission

3. Translate the sentences into Russian. Mind the Nominative Absolute Construction.

1. Concrete having no form of its own, it is frequently combined with metals.
2. Prestressed concrete is very popular, its good qualities being high strength and durability.
3. Concrete with foamy and cellular structure being light, it is considerably decreased in strength.

4. Connect the given English combinations a) with the corresponding Russian ones b).

Model: 1-2

- | | |
|-----------------------|------------------------------|
| a) 1. bridge beam | b) 1. плоская черепица |
| 2. foamy structure | 2. мостовая балка |
| 3. flat tile | 3. укладка труб |
| 4. pipe laying | 4. плоская черепица (плитка) |
| 5. bridge pile | 5. пустотелая балка |
| 6. cellular girder | 6. ячеистая структура |
| 7. cellular structure | 7. мостовая свая |

5. Read the combinations. Translate them from Russian.

bridge girder — мостовая балка pipe man — водопроводчик

bridge joint — мостовой стык pipe work — трубопровод

bridge member — звено (деталь) моста

6. Translate the questions into Russian. Answer the questions consulting the text of the article.

1. What factors does the quality of concrete depend upon?
2. What is the main difference between plain and ferro-concrete?
3. What constructions is ferro-concrete used for?
4. What materials is concrete with cellular structure made up of?
5. What qualities does concrete with foamy structure possess?
6. What is its main disadvantage?

7. Read and translate the article.

The quality of concrete is known to depend on the properties of materials it consists of. The amount of constructing materials is also of great importance. Among the kinds of concrete used in modern construction are plain concrete and reinforced, or ferro-concrete. The usage of plain concrete is practically limitless. As to ferro-concrete, it is mostly used for construction of foundations, columns, girders and beams. This kind of concrete is also rather popular for constructing bridges, dams, and clock walls.

Concrete being a universally used material, its new kinds are being constantly produced. Among others there exists concrete with cells. Its main quality is that it is made up of materials that emit gas and foam during the process of mixing the aggregates with water. It should be taken into account that concrete of this type possesses relatively light weight. It is mostly used for producing slabs, wall panels, and frame constructions. As we know, decrease in weight leads to a considerable decrease in strength. This quality is classified as a great disadvantage of cellular concrete.

UNIT 3
Types of Concrete
TEXT 4. PRECAST CONCRETE

Master the key terms and head words.

beam – балка, бимс **storage** – хранение, запас
compression – сжатие **tank** – бак, резервуар
decade – десятилетие **tower** – башня, вышка, опора
pipe – труба

3.1 Read the combinations. Translate them from Russian.

beam system – балочная конструкция
compression stress – напряжение на сжатие
storage tank – питательный резервуар
pipe installation – укладка труб
pipe joint – стык труб
tank tower – водонапорная башня

3.2. Put down the corresponding verbs. Translate the words.

Model: joint – to join — присоединяться к

compression – to _____
installation – to _____
relation – to _____
combination – to _____
storage – to _____
usage – to _____
service – to _____
production – to _____
pre-pref. — заранее, предварительно **pre-examine** – исследовать заранее

3.3. Read the examples. Translate them from Russian.

(prestressing – предварительное напряжение
prestressed reinforcement – предварительно напряженная арматура
compressive stress – напряжение при сжатии

3.4 Read and translate the article.

Prestressed concrete is a relatively young product. It started to be widely used only during the last few decades, and is still gaining popularity. The reason of its popularity is its usefulness. The main good qualities of prestressed concrete are its high strength and durability. In prestressed concrete, concrete is combined with steel. This combination is highly advantageous and serves the purpose of producing a compressed stress in the concrete as a building material. For this reason any member of beam is under constant compression and as a result has no cracks. In modern times this type of concrete serves as construction material for beams, for pipes, for columns, storage tanks, water towers and the like.

3.5 Answer the following questions.

1. What good qualities does prestressed concrete possess?
2. What metal is it combined with?
3. What purpose does this combination serve?
4. What constructions is prestressed concrete mostly used for?

We know concrete to be a universally used construction material, various, most popular kinds of concrete and their main properties are listed below. Read the tables. Translate the examples a) from English into Russian; b) from Russian into English.

TABLE 1. Types of Concrete

architectural concrete	архитектурный бетон
asphalt c	Асфальтобетон
gas c.	Газобетон
gypsum c	гипсовый б.
gravel c	бетон из гравия
precast c	заранее отлитый б.
plain c	неармированный б.
prestressed reinforced c	напряженно армированный б.

TABLE 2. Properties of Concrete

high-strength concrete	высокопрочный бетон
waterproof c	водонепроницаемый б.
nailable c	гвоздимый б.
lightweight c	легкий б., теплый б.
cast-in-situ c	монолитный б.
poor quality c	б. низкого качества

3.6 Put down the combinations with the opposite meaning.

Model: poor quality concrete - high-grade concrete

high-strength concrete — _____

cast-in-situ — _____

lightweight concrete — _____

plain concrete — _____

3.6 Answer the following questions.

1. What kind of concrete has practically universal usage?
2. What kind of concrete is produced in factories?
3. What are the main qualities of precast concrete?
4. Why is concrete combined with metals?
5. What kind of concrete serves as construction material for beams, pipes, storage tanks, water towers and the like?

3.7 Read the examples. Translate them from Russian.

concreter — бетонщик

concrete mixer — бетономешалка
 concrete frame — бетонный каркас, бетонная конструкция
 concrete workability — пригодность бетона для обработки

3.8 Read and translate the article.

Silica Concrete

Among the aggregates concrete is composed of, there are heavy and light ones. Silica belongs to comparatively new types of concrete. Its structure is rather special. It does not contain cement and is relatively light in weight. Besides, it is highly fire-resistant. Because of these and some other properties silica concrete is widely used in aviation and in building underwater constructions. But its disadvantages should be also taken into account: because of its light weight its strength is considerably decreased.

3.9 Answer the following questions.

1. Which of the two kinds of concrete possesses greater strength — cellular or asphalt concrete?
2. What is the name of concrete having glass in its structure?
3. What is the meaning of the term 'nailable'?
4. What kind (kinds) of concrete has (have) practically limitless use?

3.10. TEXT 5. IS ADDITIONAL WATER A FRIEND OR AN ENEMY?

Master the key terms and head words.

achievement – достижение layer — слой
 hydration – гидратация, присоединение воды –
liquid – жидкость ratio — отношение
 specification – технические условия
 to cure – сохранять, исправлять, выдерживать
 vapour – испарение, пар

3.11. Put down the corresponding verbs a) nouns b); translate the words.

Model: foundation - to found (a) to enrich - enrichment (b)

a) corrosion	-to	b) to enrich -
Hydration	-to	to require —
Invention	-to	to achieve —
Penetration	-to	to attach -
Evaporatio	-to	to adjust —
Evaporatio	-to	to adjust —
Relat specificatio	-	to

3.12. Read the combinations. Translate them from Russian.

covering material — материал покрытия

rover of roof — кровля

water/cement ratio — пропорция воды в растворе

concrete curing - выдержка бетона

compressive strength — сопротивление на сжатие

vapour pipe — паровой патрубок

vapour heating system — система парового отопления

3.14 a) Translate the given prepositions into English.

1. _____ The cover zone is the layer (между) the steel reinforcement and concrete surface.

2. _____ The durability of cover zone depends (от) the mix design of concrete.

3. _____ (В течение) the period of concrete curing, a minimum of cement content and a maximum of water/cement ratio is included (в) the mix.

4. Water is added (к) _____ concrete (для) hydration of cement.

5. Additional amounts of water increase the pores (в, внутри) the concrete's structure.

6. _____ The process of concrete's curing lasts for (около) 28 days.

b) Translate the examples into Russian. Mind Participle II.

1. additional amount of water *poured* into the mix...

2. ... *required* strength *achieved* with minimum cement content...

3. ... durability *increased* by adding water...

... workability *provided* by the necessary amount of aggregates...

Read and translate the article.

One of the key requirements of concrete service is its durability. And the quality of cover zone (покрытие) is of primary importance for providing concrete's durability. The cover zone is the concrete layer between the steel reinforcement and concrete surface. It should be taken into account that durability of concrete zone depends upon the mix design of concrete and the properties of the concrete itself.

The process of concrete's curing, as we know, lasts for about 28 days. And the compressive strength at 28 days is considered to be the basis of concrete specification. During the period of curing, engineers frequently include a minimum of cement (content) and a maximum of water/cement ratio into the mix.

Naturally, different construction purposes require different cement content, and for many types of mixes the required strength can be achieved with the minimum cement content. Engineers add water to concrete for hydration of cement. But the minimum amount of water needed for hydration of the mix may be too little to provide the necessary workability of the mix. So, in order to increase workability of concrete, additional amounts of water can be poured into the mix. And what is the result of this operation? It turns out that additional amounts of water increase the pores within the concrete's structure, especially after evaporation. It leads, in its turn, to an increase of gas, vapour, and liquid

penetration into the structure of the mix. It is noted that especially strong this penetration is in the cover zone. So, one can see that additional water provides the potential for structural mix to decrease its durability. One more disadvantage of adding water to the concrete mix is its reinforcement corrosion and cracking. Additional corrosion and cracking provide new ways for gas, vapour, and liquids to penetrate into the cover zone. So, is additional water concrete's friend or enemy?

UNIT 4

4.1 Прочитайте и переведите текст, обращая внимание на слова и выражения после текста

TEXT 6.CEMENT: MAN'S MIRACLE MIX

One of man's oldest building materials is finding its way into a lot of new places these days. Concrete, first discovered by the Romans, is now more widely used in construction than all other materials together.

The magic ingredient that makes concrete possible is cement, about which, according to one expert, more has been learnt in the past three decades than in the preceding 2000 years. Concrete is a synthetic stone, which can be formed while soft into practically any shape the builder wants. Portland cement mixed with water is the paste that binds sand, gravel, clinker into an artificial rock that becomes harder as the years pass. Portland cement does not come from a place of that name; it was called Portland because Joseph Aspdin, the English builder who invented the first dependable, scientifically made cement about 1824, thought it resembled the rock excavated on the Isle of Portland on the Dorset Coast.

What's so new about cement after all these years? Several things. One item is "squeezed" concrete, known technically as pre-stressed concrete. By giving concrete a big squeeze after it has hardened, builders can increase its elasticity ten times, so that it will bend under a heavy load without breaking. This is important in building bridges, viaducts, and floors of large buildings.

The simplest way to pre-stress concrete is to put steel wires or bars in the concrete when it is poured.

An unusual American use of reinforced concrete is the floating highway bridge across Lake Washington. The depth of the lake made piers too expensive, so engineers built the bridge on hollow concrete pontoons anchored in place by steel cables. It is the longest pontoon bridge structure on earth.

Until recently, the aim of engineers was to make concrete with as few bubbles as possible. Now they have come up with a new concrete that has millions of microscopic bubbles per cubic foot. It is made by adding an agent, which foams to form the bubbles when the concrete is mixed. This concrete doesn't crack when freezing. The first "air bubble" roads were built many years ago. They have stood up under winter freezes so well that today this concrete is used for new road construction.

Another discovery is "soil cement". Several years ago road builders lacking funds found that they could mix cement with soil on the site of the road, wet it and compact it, then cover it with bitumen. The first road they built is still carrying traffic. There are miles of soil-cement secondary roads and streets today.

Construction goes so fast that with modern equipment a road builder can complete a mile of soil cement road in one day.

Scientists are working on research into the behavior of cement and concrete under all kinds of conditions. Collaborating with engineers they are developing new ways of using concrete. Cement is changing the face of the earth.

Precede	Предшествовать
soft	мягкий, податливый (о вещи, материале)
bind	скреплять, соединять
invent	изобретать
dependable	надежный; заслуживающий доверия
scientifically	научно; методично
resemble	походить, иметь сходство
bend	сгибать(ся); гнуть(ся), изгибать(ся)
pier	бык (моста), столб
expensive	дорогой
foam	пена, пузырьки; пениться, вспенивать
crack	трещина; давать трещину, растрескиваться
freeze	замерзать, обледеневать, покрываться льдом
collaborate	работать совместно, сотрудничать
lack	испытывать недостаток, нуждаться; не иметь
find (found)	находить, обнаруживать
wet	мокрый, влажный; смачивать, увлажнять
cover	закрывать, покрывать, защищать
complete	завершать, заканчивать, оканчивать

УПРАЖНЕНИЯ К ТЕКСТУ

"CEMENT: MAN'S MIRACLE MIX"

4.2. К каждой данной паре слов вспомните русское слово с тем же корнем, что и английское:

Ingredient	составная часть, компонент
form	внешний вид; создавать, принимать форму, вид
practically	практически, почти
paste	цементное тесто
mix	смесь; мешать, смешивать, перемешивать
rock	горная порода; камень
excavate	вынимать грунт; производить земляные работы
elasticity	эластичность; упругость
agent	вещество
fund	денежные средства, деньги
compact	соединять, перемешивать, уплотнять, спрессовывать

II. Вспомните значение следующих английских слов и подберите к ним эквиваленты из правого столбца.

magic ingredient	стальная проволока, арматура
“squeezed” concrete	цемент с грунтом (землей)
big squeeze	как можно больше....
increase elasticity	волшебное вещество
heavy load	конструкция моста
floors of large buildings	этажные перекрытия высотных
steel wire	зданий
	дорога местного значения; дорога,
pour concrete	ведущая к магистрали
floating highway bridge	сжатый бетон
	плавающий понтонный мост из
hollow concrete pontoon	пустотелых бетонных плит
bridge structure	тяжелая нагрузка
as few ... as possible	увеличить упругость
soil cement	заливать бетон
carry traffic	сильное сжатие, прессование
secondary road	плавающий автомобильный мост
	выдерживать автомобильное движение

III. Вспомните значение следующих английских слов и подберите к ним синонимы из правого столбца. Дайте перевод данных синонимов

Synthetic stone	Squeeze
building	pre-stressed concrete
steel wire	pontoon
road construction	construction
floating bridge	artificial rock
squeezed concrete	steel bars (reinforcement)
form	shape
compact	road building

4.3. Закончите следующие предложения, используя английские эквиваленты из текста. Предложения переведите.

1. Concrete is a synthetic stone, which can be formed while soft (почти в любую форму по желанию строителей). 2. Portland cement mixed with water is the paste that binds sand, gravel, clinker into an artificial rock that becomes harder (с годами). 3. By giving concrete a big squeeze after it has hardened, builders can increase its elasticity (в десять раз). 4. Engineers built the bridge on hollow concrete pontoons (надежно закрепленный стальными тросами). 6. (До недавнего времени) the aim of engineers was to make concrete with as few bubbles as possible. 7. The first roads (из пористого бетона) were built many years ago. 8. Several years ago road builders found that they could mix cement with soil (на месте строительства дороги). 9. Scientists are working on research into the behavior of cement and concrete (в любых условиях).

4.4. Ответьте на данные вопросы. Полученные предложения переведите на русский язык.

1. Why does Portland cement have such name?
2. What is new about cement all these years?
a) -? b-? c) - ? d) - ?
3. *What does the expression "to pre-stress concrete" mean?*

4.5 Прочитайте и переведите текст, обращая внимание на слова и выражения после текста

TEXT 7. BUILT-IN FURNITURE

Built-in components form a permanent, complete and integral part of the internal structure of a building. Therefore, they are considered at the planning stage so as to be directly related in size and shape to the design and purpose of each room. They remain fixed units and are left behind as part of the structure if the ownership of the dwelling changes. Movable furniture, as we know, is usually taken away.

Built-in furniture, as a rule, always saves space and materials. It is considered to be a valuable asset in small dwellings. Thus, a built-in wardrobe, planned to fit in where convenient, requires less space than a movable one of similar capacity. This does not affect its efficiency. It has the advantage of being fitted into an awkward corner, utilizing space, which might otherwise have been wasted.

Built-in furniture, especially the storage type, has always been preferred by many. But the tendency towards smaller dwellings has resulted in economy of space being achieved wherever possible. This has had an important effect on the development and use of built-in furniture.

Open planning, which has now been generally adopted, enables one room to serve the purposes of several. The most practical method of defining the various areas is built-in units. Living and dining areas, for instance, can be separated by a low cupboard arrangement, designed as a bookcase and writing desk on one side, and sideboard on the other.

Built-in furniture can also be used to take the place of dividing walls, such as built-in wardrobes backing on to each other and separating two bedrooms.

4.6. К каждой данной паре слов вспомните русское слово с тем же корнем, что и английское:

- | | |
|--------------|-------------------------------------|
| 1. component | Узел; деталь; комплектующее изделие |
| 2. integral | целый; полный, цельный |
| 3. stage | период, стадия, ступень, фаза, этап |
| 4. fixed | неподвижный, закрепленный |
| 5. furniture | мебель |
| 6. utilize | использовать, применять |
| 7. tendency | склонность, стремление |

8. result	приводить к, иметь результатом
9. generally	обычно, как правило; в целом
10. practical	практичный, удобный
11. separate	отделять, разделять; разъединять

4.7. Вспомните значение следующих английских слов и подберите к ним эквиваленты из правого столбца.

1.internal structure	1. тип кладовки
2.fixed units	2. влиять на эффективность, результативность
3.ownership of the dwelling	3. одинаковая вместимость
4.movable furniture	4. неудобный угол
5.save space	5. открытая планировка
6.valuable asset	6. расположение серванта (шкафа для посуды)
7.small dwelling	7. замещать
8.similar capacity	8. разборная мебель
9.affect efficiency	9. экономить площадь
10.awkward corner	10. неподвижные секции (конструкции)
11.storage type	11. право собственности на жилье
12.open planning	12. ценное качество; ценный вклад
13.cupboard arrangement	13. внутренняя конструкция здания
14.take place	14. небольшой жилой дом

4 8. Закончите следующие предложения, используя английские эквиваленты из текста. Предложения переведите.

1. Built-in components are related in size and shape to the design and (назначения комнаты). 2. They are left as (часть строения) if the ownership of the dwelling changes. 3. Built-in furniture (экономит площадь) and materials. 4. Built-in wardrobe requires less space (чем разборный) of similar capacity. 5. Built-in furniture, especially the storage type (предпочитают многие). 6. But the tendency towards smaller dwellings has resulted in economy of space (что выполняется, где только можно). 7. Built-in furniture can be used to divide walls such as built-in wardrobes (задними стенками друг к другу) and separating two bedrooms.

4.9 Ответьте на данные вопросы. Полученные предложения переведите на русский язык.

1. At what stage of design should built-in components be considered?
2. What is the purpose of built-in furniture?
3. Built-in furniture is usually fitted into an awkward corner, isn't it?
4. How can a room be divided by built-in units?
5. What is the idea of open planning?

UNIT 5

ADDITIONAL TEXTS

Прочитайте и переведите данный текст. Вспомните, как переводятся выделенные слова и выражения.

5.1 THE PROPERTIES OF CONCRETE

Concrete must be **hard, strong, durable, dense, non-porous, fire-resisting and economical**.

Concrete has proved to be durable when made of good materials, well mixed, and properly **cured**. Failures can be found in concrete work, but the trouble is usually caused by **poor material**, faulty foundations, and lack of knowledge of the properties or poor workmanship. For example some cements will give better results in sea water than others. This fact had to be established by experience and experiments.

It is more difficult to secure durable **reinforced concrete** than **mass concrete**. This is due to the **reinforcing steel** and the additional water required to make the concrete flow around the **steel bars**. When moisture reaches the steel, it will **rust** and expansion caused by the rust will crack the concrete, resulting in unsightly structure and necessary repairs. In all structures **exposed** to the weather the reinforcing steel must be carefully placed and well secured so that it cannot be displaced while **concreting**. Small wires will soon cause rust spots on the surface of the concrete if they are exposed.

Concrete, to be durable, must be made of good materials, uniform in quality, mixed with a minimum of water, and properly **placed** and **protected** while curing. Concrete exposed to sea water and the rise and fall of water levels, especially in cold climates where ice forms on the structures, requires special attention in the selection of the cement, aggregates, mixing, **placing and curing**.

With the use of dense aggregates the proportions which will produce the **densest** products are generally those which contain the maximum amount of **coarse aggregate** and still contain enough **fine aggregate** to produce a smooth surface. With porous aggregates used in the production of **light weight units**, the amount of material in the mix passing a 50-mesh sieve is generally limited and in addition more of the coarse aggregate is used to produce a unit of less density and lower weight. This is generally desirable for light weight units except where fire resistance or **watertightness** are important.

The strength of **plain concrete** depends upon the quality of the cement, the strength and character of the aggregate, the quantity of cement in a unit of volume, and the density of the concrete. Other things being equal the strongest concrete is that containing the largest amount of cement in a given volume of concrete, the strength of the concrete varying directly as the amount of cement. The strength of concrete also depends upon the methods used in mixing, upon the care taken in measuring the ingredients, and in the mixing and placing the concrete. Concrete exposed to the air **hardens** more rapidly than protected concrete. **The setting** of cement is a chemical change brought about by the addition of water to the cement, the strength increasing very rapidly the first few days, after which the mixture slowly hardens and **increases in strength**.

Concrete has poor **elastic and tensional properties**, but it strong in **compression**. Its tensile strength is only one-tenth of its **compressive strength**. The compressive strength of plain concrete varies between wide limits, depending upon the cement, the proportions of cement and aggregates, and the methods of mixing, and placing and the age.

**5.2. Закончите следующие предложения в соответствии с текстом.
Переведите полученные предложения.**

1. Concrete must be ...

5.3. Failure in concrete work are caused by ...

It is more difficult to protect reinforced concrete than mass concrete because:

a) it will ...

a) **the expansion caused by the rust will**

b) **the result of this is ...**

4. In all structures exposed to the weather the reinforcing steel must be ...

5. Concrete to be durable must be made ...

6. More of the coarse aggregate is used to produce ...

7. Light weight units can't be used where fire resistance and ...

8. The strength of plain concrete depends upon ...

2. Concrete exposed to the air hardens more rapidly than ...

3. Concrete has poor ... but it is strong in ...

5.4 . Переведите предложения, обращая внимание на выделенные грамматические формы.

1. **Concrete** has proved **to be durable** when made of good materials.

2. This fact **has to** be established by experience and experiments.

3. Reinforcing steel in concrete can rust **resulting in** an unsightly structure and necessary repairs.

4. Concrete **to be** durable must be protected **while curing**.

5. The densest products are **those**, which contain maximum amount of coarse aggregate and still contain **enough** fine aggregate **to produce** a smooth surface.

6. The strongest concrete is **that containing** the largest amount of cement in a given volume of concrete, **the strength of concrete varying** directly as the amount of cement.

7. The setting of cement is a chemical change, **the strength increasing** very rapidly the first few days.

8. The compressive strength of plain concrete varies **depending** upon the cement.

5.5. Прочитайте текст и выполните задания.

2. BUILT-IN FURNITURE SAVES SPACE

At present, most new houses are constructed with built-in furniture. It saves much space, and is usually not so expensive as buying separate pieces of furniture. This has an important effect on the development and use of built-in furniture.

As built-in furniture, as a rule, saves space and materials it is considered to be a valuable asset in small dwellings. In one-room apartments with only a living room and a kitchen it is convenient to use built-in units which enable one room to serve the purposes of several. The living room can be easily combined with the bedroom. Between the two parts of a room a wardrobe can be built in. One side of it can serve as a wardrobe and the other as a bookcase or a built-in writing desk. It is quite possible to plan a dining recess in the kitchen.

Furthermore, at present many kitchens and bathrooms are being built as complete units and in some cases the finished room is made entirely of the site and is just placed into position by crane.

Задание 5.6. Переведите выделенное предложение. Найдите в нем инфинитивную конструкцию “сложное подлежащее”.

Задание 5.7. Ответьте на вопросы. Полученные предложения переведите на русский язык.

1. What are the advantages of built-in furniture?
2. What is the purpose of built-in furniture?
3. How can a room be divided by built-in components?

5.8 Прочитайте текст и выполните задание после текста:

3. High-quality Housing

A comparison between typical prefabricated ferro-concrete structures: columns, beams, floor and ceiling slabs, etc., employed in this country and abroad shows that we use 20-25 per cent less concrete and steel than the builders in West Germany, Britain, the Unites States and other industrialized countries. The search (поиск) for more rational ways of building and of improving designs for houses and other structures undertaken by research and design bureaus in this country has resulted in these savings.

New pre-fabricated parts with improved heat insulation made of mineral cotton and foam plastics are being widely used in construction. The use of such materials makes it possible to reduce the weight of buildings by three to four times. There has also been a considerable rise in the output of components made from light and extra-strong concrete.

We have also started to build cheap and light structures out of steel, aluminum, plywood (фанера) asbestos-cement and plastics. The use of these and other new products and processes results in an annual saving (экономия) of thousands of tons of ferrous metals and over a million tons of cement.

Задание 5.9. Ответьте на вопросы к тексту. Полученные предложения переведите на русский язык.

1. What are typical prefabricated ferro-concrete structures?
2. Why did our research and design bureaus in this country improve designs for houses and other building structures?
3. What helps to reduce the weight of buildings?
 - a)
 - b)
4. What helps to save thousands of tons of ferrous metals and over millions of cement?

Прочитайте текст и выполните задание после текста.

THE FIRST CONCRETE SKYSCRAPER IN THE WORLD

The first reinforced concrete skyscraper in the world was built in 1902-03 in Cincinnati, Ohio. The 16-storey structure demonstrated for the first time the safety and economy of reinforced concrete frames for high-rise construction, and was a vital stimulus for using reinforced concrete in fireproof construction.

Concrete was chosen as the structural material chiefly for economics; it offered the equivalent of steel frames in load bearing capacity and other physical properties, yet somewhat lower in cost. Engineers all over the world watched with great interest as construction proceeded smoothly along its 16-storey route. **Today this building is recognized by engineers as having revolutionized building industry.**

Задание 1. Переведите выделенные предложения, обращая внимание на грамматику данной контрольной работы.

Задание 2. Закончите данные предложения в соответствии с текстом. Предложения переведите на русский язык.

1. The first reinforced concrete skyscraper was built in ...
2. It was – storey structure.
3. It demonstrated ...
 - a)
 - b)
4. Concrete was the equivalent...

Прочитайте текст и выполните задания после текста.

SAND CONCRETE

For many, many years nature has been destroying stone, **changing it into sand.** Now man **is learning** to do the opposite: he **is using** sand and cement to create materials which could compete with stone in strength and beauty.

At first the idea of making concrete **by using** sand was completely rejected. It is common knowledge that concrete is made from gravel and cement while a **mixture of sand and cement** is considered useful only **to bind bricks.** This idea

has gripped attention and minds of scientists so greatly that it is no easy task to be doubt upon this universally accepted truth.

“Sand concrete is made by putting the matrix under vibration which almost completely eliminates its weak points. Sand concrete has now become almost twice as strong as ordinary concrete with a coarse aggregate; and much cheaper as well. The sand should be clean and free from clay and vegetable matter because when it is mixed with water and cement a chemical action takes place. Therefore, if impurities are present, the binding or adhesion is affected. At present several varieties of sand concrete **are being developed**.”

Задание 1. Переведите предложения с выделенными Ving формами и предложение с инфинитивным оборотом “сложное подлежащее”.

Задание 2. Письменно ответьте на вопросы. Полученные предложения переведите.

1. What are the advantages of sand concrete?
2. What are requirements to get sand concrete of good quality?

Прочитайте текст и выполните задание после текста.

6. RECENT RESULTS IN FRENCH RESEARCH ON REINFORCED CONCRETE

Reinforced earth, invented in 1966 by the French engineer Vidal, is a material which has been often used in the civil engineering field in recent years. It is a composite material, a combination of earth and reinforcements, the latter generally consisting of metal strips arranged horizontally and able to withstand high tensile stresses.

The principle of reinforced earth is analogous to that of reinforced concrete; it is economical means of improving the mechanical properties of the basic material, earth, by reinforcing it in the directions in which it is subject to the greatest stresses. The essential phenomenon in reinforced earth is the friction between the earth and the reinforcements.

Reinforced earth has been mainly used for the construction of retaining structures and foundation rafts. The influence of the fine fraction of the fill on the friction between earth and reinforcements has been studied in laboratory tests on samples of sand and powdered clay mixtures.

Задание 1. Закончите предложения в соответствии с текстом. Полученные предложения переведите.

1. Reinforced earth was invented...
2. It is a composite material...
3. The principle of reinforced earth is ...
4. The essential disadvantage is ...
5. Reinforced earth is mainly used in ...

Прочитайте текст и ответьте на вопрос:

What method of designing concrete buildings is used now and why?

7. DESIGNING OF CONCRETE BUILDINGS

Buildings of reinforced concrete may be constructed with load-bearing walls or with a skeleton frame. According to the first method, the exterior walls are designed of sufficient strength to carry the loads of the girders, beams, floors and roofs, which rest on them. The interior supports may consist also of load-bearing walls or of columns, but this method does not utilize the full potentialities of concrete. By the second method, the floors and roofs rest directly on exterior and interior columns or are carried on beams and girders, which, in turn, rest on the columns. The walls and partitions are simple enclosures of brick or reinforced concrete supported by the beams and girders. Most concrete buildings of any size are now designed according to this second or skeleton frame method.

ТЕКСТЫ ДЛЯ ЧТЕНИЯ.

Read additional texts and give main ideas using the following expressions:

The text is about ...

At the beginning of the text the author stresses (underlines, points out) that

...

Then the author describes smth (suggests, states that) ...

After that the author passes on to (description of, statement of, analysis of

...}

At the end of the text the author comes to the conclusion (pays attention to the fact) that...

UNIT6

TEXT 1

Classification of Building Mortars

Building mortar is the name of a mixture containing a binding agent, water and fine aggregate acquiring a stone-like monolithic structure as a result of hardening. Prior to hardening a building mortar is called a building mix. Building mortars often contain different additions – dispersed (clay), hydraulic and surface-active.

By composition and properties building mortars are similar to concrete, but they contain no coarse aggregates.

Building mortars are intended for filling joints and as a binder in free-stone and brick masonry, for the preparation of decorative and protective plasters and production of small-size articles (brick, tile, etc.).

Building mortars are made with different properties and composition depending on application.

In respect to binding agents and additions there are cement, lime, lime-cement and cement-clay mortars.

In respect to the properties of the binding agent mortars are divided into air-setting, incorporating air-setting binding agents and hydraulic mortars made with hydraulic agents.

In respect to aggregates mortars are classified as heavy, incorporating ordinary sand and light, having porous aggregates (pumice, sands, etc.).

By composition mortars are classified as: simple including one binding agent (cement, lime, etc.) and combined including two or three binding agents (cement-lime, lime-gypsum, etc.).

Air-setting building mortars are used in structures serving in dry environments and hydraulic mortars – in moist environments.

TEXT 2

Placing and Curing of Concrete and Quality Checking

The placing of the concrete mix and its distribution in the form or mould is one of the most labour-consuming operations of concreting.

At present placing and distribution of concrete are mechanized and the operations are carried out with the aid of concrete placers or machines of a simpler construction-concrete distributors. Concrete placers differ from concrete distributors in that they permit the processes of both placing concrete and its distribution to be mechanized in a great measure.

The quality of placing concrete is a very important factor in building durable concrete or reinforced-concrete structures.

The concrete mix must be placed in the form in a manner that no air be entrained in the mass; corners and restrictions in the form must be filled with most care. Placement and leveling of the concrete mix are followed by compacting.

The methods of compacting concrete manually by rodding or with the aid of tampers are almost obsolete now.

Mechanized placing and compacting of the concrete mix by vibrating, vibro stamping, centrifuging, vacuum treatment, rolling and vibro rolling are widely practiced.

Vibration consists in uninterrupted positive shaking of the concrete mix by imparting frequent vibratory motion to the entire mass to ensure good compacting.

Vibro stamping. In this method of compacting the treated concrete mass is subjected to the simultaneous action of the oscillatory motion of the vibrator and the load exerted by the stamp, i.e. the method ensures vibration under pressure permitting the outlines of the stamp or dye to be reproduced on the surface of the product being treated.

TEXT 3

Brief Information of Reinforced Concrete

Reinforced concrete is a building material in which the joint functions of concrete and steel are advantageously utilized.

The idea of combining these two materials extremely differing in mechanical properties in one monolith departs from the following premise. Like any other stone material concrete offers a good resistance to compressive loads but it is brittle and poorly withstands, therefore, tensile stresses. The tensile strength of

concrete is about 10-15 times inferior to compressive strength. As a result of such anisotropy of mechanical properties concrete cannot be used in structures to be subjected to tensile stresses under load. But if steel possessing a high tensile strength is introduced into concrete, the steel will take over the tensile stresses appearing in the loaded reinforced-concrete element.

It is the most advantageous to employ reinforced concrete in structural elements subjected to bending. In service two oppositely directed stresses appear in such elements – tensile and compressive. In this case the steel reinforcement takes over the first and concrete – the second kind of stress and the entire reinforced-concrete element successfully withstands bending loads.

TEXT 4

Special Properties of Concrete

Concrete is a porous material. Pores may be formed in concrete due to incomplete evacuation of entrained air in the course of compacting the concrete mix. It is impossible to produce absolutely dense concrete even by practicing dense placement of the concrete mix by vacuum treatment and repeated vibrating. Pores are formed in concrete also as a result of evaporation of water which fails to react with the cement constitution in the course of hardening.

The density of concrete can be increased not only by vacuum treatment, repeated vibrating or by reducing the content of evaporating water which fails to react with cement.

The placement of concrete of a high density can be ensured by the following means:

1. by selecting rationally graded aggregates (with a minimum void age) permitting a reduction in the amount of the introduced cement paste and, hence, a reduction in the water content of the mix;

2. by reducing the mobility of the concrete mix and, hence, by diminishing the cement paste constituent but this requires more intensive compacting;

3. by diminishing the water-cement ratio; this results in a smaller water content, increased density of the cement stone, provided more intensive compacting is practiced;

4. by applying cements binding a great amount of water in the course of hardening such as high-strength Portland cement, alumina cement, expanding cement, etc.; by introducing plasticizers such as soap-naphtha, acidol or alkali-treated wood tar, polymers and materials producing similar effects into the concrete mix.

TEXT 5

Admixtures for Concrete

Concrete can sometimes be improved by an admixture added to the cement, aggregates and water to modify one or more of the properties of the mix. Admixtures are not magic powders that can be added indiscriminately to poor concrete mixes to make good concrete. Neither can it be assumed that they will necessarily make good concrete better. The right admixture for the job must be

used if the admixture is to do more good than harm. When a change is made to improve one property of concrete, some other properties will be affected, frequently adversely.

Principal admixtures are: air-entraining agents and water-reducing admixtures. Perhaps the most widely used admixtures are air-entraining agents. Air-entrainment is used to improve the resistance of concrete to damage from freezing and thawing. It also makes concrete slabs much more resistant to scaling where salts are used for deicing. It makes the mix more workable or at least more cohesive. It permits a substantial reduction in the water requirement and consequently the cement content in mass concrete and has helped with the temperature problem by reducing the amount of heat generated during setting of the cement. Air entrainment is generally considered to be the greatest advance in concrete technology in recent years.

Water-Reducing Admixtures

Use of water-reducing admixtures has expanded rapidly in the past few years. The name comes from the ability of these additives to reduce the mixing water required. Also they generally increase strength and they may make it possible to meet a strength requirement that could not otherwise be met with the cement and aggregate at hand.

TEXT 6

Corrosion of Concretes

Many times we know, that the concretes with a various course of corrosion are otherwise the same. They are produced from the same concrete, on the same producing equipment, by the same people, the concretes had the same treatment, static loadings and they have (from the statistical point of view) also the same physical/ mechanical parameters (of strength). Obviously it is valid, that we do not dimension the concretes correctly until now against corrosion.

The corrosion loading is not given in the concrete structures first of all by the influences of the environment and is not characterized by the present static solution. The environment is a continually changing resultant of the cumulated effect of various variables. Among them certainly belong the changing temperature and the temperature gradients, aggressive materials and further elements.

We are of the opinion, that the problems of the surface corrosion are rooted in deeper connections. We do not know, if it is possible to use various simplifications of the entrance parameters for further treatment, we do not know the laws of the parallel effect of various influences and decisively it is not possible to consider the concrete structures up to the age of 28 days.

TEXT 7

Hydration of Concretes

Concrete is a building material which originates by mixing, laying, compacting and treating the mix containing the cement (binders), aggregates, water, ingredients and admixtures. Under certain conditions this mix obtains in time mechanical properties. The set of all chemical, physical and mechanical

reactions which are effective at the same time and whose resultant is permeated, is called hydration. There exist a long term efforts to penetrate deep into the knowledge of hydration processes. There are known many theories, many a partial knowledge. It is not the purpose of this paper to give their detailed summary. However, it is possible to generalize that the prevailing part of explanations supposes that the dominant factor is that of the reaction cementing materials and water. This reaction lies in progressive dissolution of the cementing materials (we do not mean cement only, but possible active aggregates or mixes of various cementing materials, etc.) and through the complicated process of heterogeneously forming gel and metastabile (метаустойчивый) crystalloid structure.

CLICHES FOR RESUME

I. The text is about ...	Этот текст имеет дело с ...
The text tells us about...	Этот текст касается ...
The text deals with	Вначале текста автор
The text is concerned with	описывает
II. At the beginning of the text the author	касается (проблемы, вопроса)
describes smth (сущ.) that (which)...	сообщает нам о ...
dwells on (the problem, the question of)	утверждает что ...
informs us about...	подчеркивает что...
states that ...	указывает что ...
underlines that ...	выделяет что ...
points out that ...	упоминает ...
stresses that ...	комментирует ...
mentions ...	критикует...
comments upon smth (сущ.)...	предлагает ...
criticizes ...	вводит, представляет ...
suggests ...	затем автор переходит к описанию ...
introduces ...	анализу ...
III. Then the author passes on to the description of ...	характеристике ...
analysis of ...	утверждению ...
characteristics of ...	После этого (затем) автор продолжает
statement that ...	рассказывать
IV. After that (next) the author goes on to say	уделяет внимание
about ...	развивает идею ...
pays attention to smth ...	доказывает, что ...
develops the idea of ...	характеризует ...
proves that ...	дает характеристику ...
characterizes smth (сущ.)...	В конце текста автор приходит к выводу, что ...
gives the characteristics of ...	В заключение автор рекомендует ...
V. At the end of the text the author	решает
	повторяет

comes to	выражает ...
the conclusion that ...	
In conclusion the author recommends	Вводные слова и выражения
...	Необходимо (интересно) отметить,
decides ...	что ...
repeats ...	Чрезвычайно важно подчеркнуть, что
expresses
Introductory words and phrases	Неудивительно, что ...
It is necessary (interesting) to note that	Ясно, что ...
...	Это очевидный (известный) факт, что
It is extremely important to underline	...
that ...	Неудивительно, что ...
It is not surprising that ...	Сначала ... затем ...
It is clear that...	В отличие от ...
It is a well-known fact that...	Более того ...
No wonder that ...	Таким образом ...
At first ... then ...	Кроме того ...
In contrast to ...	Однако ...
Moreover ...	В результате ...
Thus ...	Что касается
Besides ...	
However...	
As a result ...	
As for ...	

CONTROL WORK N 3

Для того чтобы выполнить контрольную работу N 3, необходимо усвоить следующие разделы курса английского языка по рекомендованному учебнику.

1. Многофункциональность глаголов “to be” и “to have”
2. Многозначность английских слов “one”, “that”, “it”
3. Неличные формы глагола – герундий (Gerund), причастия настоящего времени (Participle I) и инфинитива (Infinitive): функции и перевод.

I. Многофункциональность глагола to be.

Present	Past	Future
Am, is are	was, were	will be

В предложении глагол to be может быть:

1) смысловым глаголом со значением быть, находиться. В настоящем времени “to be” в этом случае часто не переводится.

2) Связкой в составном именном сказуемом со значением быть, являться, состоять, заключаться, когда за ним следует существительное с предлогом of, прилагательное, числительное.

1. Physics is a natural science. Физика – естественная наука

1. The calculations will be very complicated. Расчеты *будут* очень сложными.

2. This problem was of great interest for us. Эта проблема *представляла* для нас очень большой интерес

После слов aim, purpose (цель), task (задача) и др. инфинитив смыслового глагола употребляется с частицей «to»

Our task is to finish the test by 7 o'clock.

Наша задача заключается *в том*, чтобы закончить испытание к 7 часам.

3) модальным со значением должен. В этом случае за ним следует инфинитив смыслового глагола (глагол с частицей «to»)

We are to prepare everything for the experiment.

Мы *должны* все подготовить к опыту.

He was to get the data yesterday.

Он *должен был* получить эти данные вчера.

4) вспомогательным для образования:

а) времен группы Continuous в сочетании с Participle I. (Все глаголы переводятся на русский язык глаголами несовершенного вида.

She is working now. Она *работает* сейчас.

She was working all the day yesterday. Она *работала* весь день вчера

б) страдательного залога в сочетании Participle II.

He is (was, will be) asked to make a report. Его *просят* (*просили, попросят*) сделать доклад

The house is being built now. Дом *строится* (*строят*) сейчас.

Note: глагол “to be” может входить в состав оборота “there be” и употребляться во всех временах. Оборот переводится: *быть, находиться, иметься, существовать*, причем начинать перевод следует с обстоятельства места или времени. В **настоящем времени** глагол-сказуемое часто **не переводится**.

There are different kinds of barometers and thermometers.

Имеются (существуют) различные виды барометров и термометров.

There are a lot of research institutes in our city.

В нашем городе – (*есть*) много научно-исследовательских институтов.

There were many reactions which helped us to solve the problem.

Происходило (было) много реакций, которые помогли нам решить проблему.

Exercise I.

Назовите номера предложения, где глагол **to be** является **смысловым, вспомогательным, модальным, глаголом сказуемым**, входящим в состав оборота “**there be**”, **связкой**. Предложения переведите на русский язык.

1. The plans are usually discussed at the beginning of the year.
2. The discussion was before the lecture.
3. There was no chance of getting tickets for this concert.
4. I was watching TV while my sister was having her dinner.
5. The team of experts is to study the present situation in the country.
6. These important problems are being worked at in many research institutes.
7. This experiment is very important.

Exercise II.

Найдите правильный перевод выделенного сказуемого. Предложения переведите.

1. Good progress **was made** in his studies.
а) делают б) будет сделан в) был сделан
2. The growth of heavy industry **is** always **paid** great attention to.
а) уделяли большое внимание б) уделяют в) будут уделять
3. I’**ll be taught** to drive a car.
а) научат б) учили в) буду учить
3. The laboratory **was to** make important scientific experiments in a very short time.
а) провела б) проводит в) должна была провести
4. The scientist’s work **are often referred to**.
а) часто ссылаются б) часто ссылается в) часто ссылались

Exercise III.

Укажите номер предложения, где глагол “to be” входит в состав сказуемого в страдательном залоге. Предложения переведите.

1. Our group is working at this problem now.
2. Modern houses are well built.

3. We are to meet at 5 o'clock.
4. The new equipment will be tested on Monday.
5. They were to finish the work in September
6. Our building construction is being modernized.
7. This building method is successfully (успешно) applied in different towns of our country.
8. At our academy the students are taught many different subjects.

Exercise IV.

Переведите предложения, обращая внимание на функции глагола "to be".

1. The new materials which are to be used in the construction will be tested next week.
2. We were shown the new construction site.
3. The role of science in the development of present day (сегодняшний) production is continuing to grow.
4. Many power stations are being built in the northern and eastern parts of our country.
5. New scientific centers were to be built in Western Siberia.
6. There are several sources of electrical energy.
7. The new installation was of small size but of great efficiency (эффективности).
8. Some students will be invited to take part (принимать участие) in the next scientific conference.
9. The equipment which will be used at the plant must be quite modern.
10. There were many theories to explain the nature of gravitation before Newton.

II. Многофункциональность глагола to have

Present

have, has

Past

had

Future

will have

В предложении глагол to have может быть:

1) **смысловым** со значением **иметь обладать, есть** (в настоящем времени)

This material **has** many valuable qualities. Этот материал *имеет* много ценных свойств.

2) **модальным** со значением **должен, приходится**. В этом случае за ним следует инфинитив смыслового глагола с частицей to.

They **have to** make this experiment once more.

Мы *должны* (нам *придется*) сделать этот опыт еще раз.

We **had to** use a computer to make calculations.

Мы *должны были*

пользоваться компьютером, чтобы сделать эти вычисления.

3) **вспомогательным** для образования времен группы

Perfect. В этом случае глагол to have не переводится на русский язык, но служит показателем времени, числа и лица смыслового глагола, который переводится чаще всего глаголами совершенного вида прошедшего времени (Present и Past Perfect).

He **has made** an interesting report at the conference.

Он *сделал* интересный доклад на конференции.

The construction of this plant **has already been finished**.

Строительство этого завода *было уже закончено* (уже закончили).

Итак, глагол **to have** многозначен. В предложении он может быть:

1) смысловым глаголом

2) вспомогательным глаголом

3) модальным глаголом

TEST

на многозначность глагола “to have”

I. Выберите соответствующую форму глагола

- | | |
|--|--------------|
| 1. He (имел) much time to work over the report. | 1. have |
| 2. Building materials (имеют) different good properties. | 2. has |
| 3. I think he (будет иметь) a good mark. | 3. had |
| 4. This method (имеет) many advantages. | 4. will have |

II. Укажите номера предложений, в которых глагол “to have” смысловой глагол.

1. An electron has a very small mass.
2. New methods and technologies have been developed at our plant.
3. The laboratory will have new equipment next month.
4. The engineer will have to change this design.

III. Укажите номера предложений, в которых глагол “to have” вспомогательный.

1. Scientists have discovered different properties of metals.
2. Our laboratory will have to help engineers in their research work.
3. New materials have been created by our scientists.
4. Our laboratory has to complete the experiment by end of the month.

IV. Укажите номера предложений, в которых глагол “to have” – модальный глагол.

1. They have to describe new facts.
2. They have described new fact.
3. You will have to explain this accident on the road.
4. They will have explained the results of the experiment by 3 o'clock tomorrow.

V. Выберите вариант перевода, соответствующий английскому предложению

1. The design will have to be completed by the end of the week.

- а) Проект закончат к концу следующей недели.
- б) Проект должны закончить к концу следующей недели.
- в) Проект должны были закончить к концу недели.

2. The delegation has been shown new types of computers

- а) Делегация показала новые типы компьютеров.
- б) Делегации показали новые типы компьютеров.
- в) Делегации показывают новые типы компьютеров.

Exercise I.

Переведите предложения, определив значение глагола to have.

1. Our academy has several well-equipped laboratories.
2. They haven't received any good results.
3. You will have to repeat the material of the lecture before the examination.
4. Man has used solar energy as one of the sources of heat and power.
5. The new apparatus had been installed when the delegation arrived.
6. He has been offered a very interesting job at the academy.
7. Our country had no automobile industry before the revolution.
8. When you see him next, he will have completed his design.
9. He had to repeat this experiment.

Exercise II.

Укажите, чем являются глаголы to be и to have:

а) смысловым, б) вспомогательным в) модальным

1. These calculations are very complex.
2. They are to be done by electronic machines.
3. The electronic machines are worked out by our engineers.
4. Our designing bureau has to develop new equipment for our lab.
5. Our laboratory has old and ineffective equipment.
6. The head engineer has paid great attention to this problem.
7. He had to take part in this work himself.

Exercise III. Выберите перевод сказуемого.

1. The flood defense system **is being built** near Leningrad.
2. The hydro-engineering project **is to be built** in some years.
3. The main task of the workers **is to build** it in time.
4. Leningraders **are also building** the 150 km ring road around Leningrad.
а) строят; б) должны построить; в) строится; г) состоит в том, чтобы построить; д) строили
5. These engineers **have to work out** different flexible lines
6. Some new flexible lines **have been worked out** at our plant lately.
7. The designers **had to work out** a special flexible line for their shop.

8. Our specialists **have worked out** a new experimental line.

- а) разработали; б) должны были разработать; в) были разработаны
г) должны разработать

III. Значение слов **it, that/those, one.**

а) значение слова **one**

Слово **one** может быть:

1) числительное **один**

One of the most important task now. Одной из самых важных задач сейчас is transportation of these goods. является транспортировка этих товаров.

2) **заместителем** ранее упомянутого существительного. В этом случае **one** **не переводится** или «восстанавливается» **существительное, которое one** **заменяет.**

I don't like this method, let's use another one. Мне не нравится этот метод, давайте используем другой (метод).

3) **формальным подлежащим**, если оно стоит перед глаголом в личной форме в начале предложения. В этом случае слово **one** **не переводится.**

One economizes by buying large amounts of goods. Экономят, покупая большие количества товара.

Как формальное подлежащее слово **one** широко употребляется с модальными глаголами, где переводится или каждый, все или переводится следующим способом:

One must (has to, is to) – нужно, необходимо

One should (ought to) - нужно, следует

One can (may) можно

One should know the difference between these systems of marketing. Следует знать (Всем следует знать) разницу между этими системами сбыта.

4) словосочетание **one thing** переводится, словом **одно.**

Exercise. Переведите предложения, обращая внимание на разные значения слова one

1. One can hardly (едва ли) find a sphere where power is not required. 2. One of the most useful applications (полезные применения) of Ohm's law is measuring (измерение) of resistance. 3. Scientists develop new processes and improve (улучшают) old ones to produce better kinds of steel.

б) значение слова **it.**

Местоимение **it** может иметь разные значения и выполнять различные функции в предложении. Оно может быть:

1) **личным местоимением** (подлежащее, дополнение). В этом случае на русский язык оно переводится **он, она, оно** (подлежащее) или поставить в **нужный падеж** (дополнение)

Repeat the experiment. It is very important. Повторите опыт. Он очень важен.

important.

Your solution is correct. Explain it, please.

Ваше решение правильно. Объясните его, пожалуйста.

2) указательным местоимением со значением это

It is the best auto fuel.

Это лучшее автомобильное топливо.

3) формальным подлежащим в безличных предложениях; на

русский язык **не переводится.**

It is cold.

Холодно.

It is necessary to research this market.

Необходимо исследовать этот

рынок.

It is said that he is an experienced engineer.

Говорят, что он опытный инженер.

5) частью усилительной конструкции it ... that (who, which), перевод которой начинается словом именно.

It is this method of analysis that yields

Именно этот метод дает

наилучшие

best results

результаты.

Exercise I. Переведите предложения, обращая внимание на разные значения функции слова it.

1. It is easy to discuss this question. It is very simple. 2. It is said that the lecture on physics was very interesting today. The professor illustrated it with many experiments. 3. It is heat that causes (вызывает) chemical changes. 4. It is very interesting to watch this device (прибор) in action. It is quite a new device. It is used for measuring of high pressure. 5. It was Alexander Popov who invented the radio. Now it is a widely used means of mass media (средство массовой информации)

в) значение слов that/those

Слова **that/those** могут употребляться:

1) Как указательное местоимение в значении тот, те.

That method is more reliable than the old one.

Тот метод надежнее, чем

old one.

2) Как заместители ранее упомянутых существительных. В этом случае они часто употребляются с предлогом of и на русский язык переводятся теми существительными, которые that/those заменяют.

The goods sold in the market are of lower quality than those of our company.

Товары, продаваемые на рынке, имеют более низкое качество, чем товары нашей компании.

3) That употребляется для присоединения придаточных

предложений и переводится союзными словами **что** и **который**.

4) **That** употребляется в предложениях типа **It is necessary... that** и переводится союзом **чтобы**

It is necessary that all data be prepared in time.

Необходимо, чтобы все данные были подготовлены вовремя.

Exercise I. Переведите предложения, обращая внимание на разные функции слов that/those.

1. The number of discoveries and inventions of the last 25 years equals those made through the history of civilization. 2. The speed of light molecules is greater than that of heavier ones. 3. If we take some water that was used in the first experiment and pour it into the flask with the experimental solid, we shall find that the water becomes quite white. 4. Atomic energy can serve people but one should never forget that that energy can also destroy the world.

IV. Инфинитив. Функции и перевод.

Инфинитив (глагол с частицей “to”), являясь неличной формой глагола, имеет **свойства**, как **существительного**, так и **глагола**.

Инфинитив может выполнять функции подлежащего, дополнения, обстоятельства, определения, а также может быть частью составного сказуемого.

Exercise I. Переведите предложения, где инфинитив является:

а) подлежащим (признак обозначения– инфинитив стоит на первом месте и другого подлежащего в предложении нет).

Герундий перед глаголом	Причастие перед подлежащим
Testing the motor was necessary. <i>Испытать</i> мотор было необходимо. <i>Испытание</i> мотора было необходимо.	Testing the motor , he saw ... <i>Испытывая</i> мотор, он увидел...

Exercise IV. Определите, каким членом предложения является Ving форма в предложении (подлежащим или обстоятельством).

1. Applying the method will give the results desired. Applying the method the technologists will get the results desired.
2. Producing power is dependent on the fuel and machinery available. Producing electricity by means of generators we get low efficiency.
3. Making use of radioactive isotopes biologists can... Making use of radioactive isotopes opens up...

Exercise IV. Переведите фразы и предложения, обращая внимание на функции герундия и причастия и способы их перевода.

1. Making an experiment with a new substance showed...
Making an experiment with a new substance, the student...

2. Carrying out observations will give ...
Carrying out observations, the astronomers...
3. He is producing new tools for ...
Our aim is producing new tools for ...
4. The scientist is completing a series of experiments in ...
The task is completing a series of experiments in ...
5. (While) describing the process the researcher ... In describing the process researcher ...
6. Our scientists are investigating new kinds of ... The purpose of this research is investigating new kinds of ...
7. Having investigated the phenomenon, the scientists ... After having investigated the phenomenon the scientists ...

Exercise V. Выберите правильный перевод выделенной глагольной формы.

1. **Increasing** pressure we decrease gas volume.
2. **Increasing** pressure leads to the decrease of gas volume.
3. The **increasing** pressure was measured precisely.
а) увеличение; б) увеличивающееся в) увеличивая
4. When **discussing** the design the engineers suggested a few improvements.
5. **Discussing** the design will take much time.
6. The engineers **discussing** the design suggested a few improvements.
а) обсуждающие; б) обсуждая (при обсуждении) в) обсуждение
7. **Testing** engines should be carried out on a special stand. 8. The mechanic was **testing** the engine for a few hours. 8. The designers found serious defects in **testing** the engine.
а) при испытании; б) испытывал; в) испытание

GRAMMAR EXERCISES
(control work N 3)

I. Переведите предложения, обращая внимание на разные функции глагола “to be”

1. Pores are formed in concrete also as a result of evaporation of water.
2. The light cellular concrete is produced from a binding agent, water and foam-forming (foam concrete) or gas-forming (gas concrete) substances.
3. Brookline (part of New-York) at that time was a young city. It was growing fast. It was becoming an important business centre.
4. It is prefabrication that speeds up the construction work.
5. Hundreds of thousands of new apartment's homes are to be built for the population.
6. Glass is unaffected by gases and most acids.

7. One of the greatest advantages of artificial materials is their low cost compared to the cost of natural ones.

8. Air-entrainment (вовлечение воздуха в бетон) was generally considered as the greatest advance (успех) in concrete technology.

II. Переведите предложения, обращая внимание на функции глагола “to have”

1. Air-entrainment has helped to reduce the amount of heat generated during setting of the cement.

2. Scientists had to overcome many disadvantages in the development of decorative laminates.

3. Pure aluminum has excellent engineering properties.

4. With the introduction of steel and reinforced concrete new possibilities have been introduced into construction.

5. Use of water-reducing admixtures has expanded rapidly in the past few years.

6. The workers have to remove some of this rock in order to make a good base for the towers.

III. Переведите предложения, обращая внимание на функции инфинитива.

1. Foundations serve to keep the walls and floors from contact with soil.

2. To make the walls stronger the bricks must overlap each other.

3. The aggregates are graded in size from fine to coarse in order to reduce the amount of void space to be filled by cement.

4. To do this work properly and safely, walls, roofs and other parts of the construction must be correctly designed.

5. The live load to be used in computations depends upon the use of the building.

6. Steel is used in reinforcement units to undergo high tensile loads.

7. Enough water should be used to produce a placeable mix.

8. Elements to be employed in a heat-insulating capacity undergo (подвергаться) special treatment.

IV. Переведите предложения, обращая внимание на разные функции “V-ing”.

1. The crystals forming in the process of making concrete stick together in a very hard artificial stone.

2. There are “cellular” concretes made by using materials which foam or form gas during the mixing of the concrete.

3. Using new kinds of prefab ferro-concrete frames builders have erected some buildings which can stand earthquakes.

4. Changing the time at which the admixture is added can significantly vary its degree of effectiveness.

5. A group of specialists has developed piles without using building materials.

6. Drawers and shelves can often be concealed behind walls, freeing valuable floor space.

7. Being a brittle concrete cannot withstand tensile stresses.

8. The civil engineer must consider many factors when selecting the materials for construction.

9. This process is accomplished by covering the concrete without damaging the surface with damp cloths, wet sand or the concrete can be kept wet by sprinkling, or by immersing in water.

10. High alumina cement is a material containing alumina.

КОНТРОЛЬНАЯ РАБОТА N 3 TEST

1. Cement is the most essential material and the most important **one for making** concrete of high quality.
2. Cement **is made** of limestone and clay. **It is burnt** at high temperature and ground up into powder.
3. **Depending** on the kind and composition of the raw materials different types of cement **are obtained**.
4. Concrete is made **by binding** together particles of sand and gravel, stone or broken brick.
5. Cement starts hardening **one** hour after the water **has been added**.
6. Concrete can **be made** on a building site, or **it may be used** as the materials for **making** prefabricated units in a plant.
7. **To get** the best of concrete the **following** considerations should be kept in mind (ПОМНИТЬ).
8. When the concrete hardens and sets, the **resulting** material gains great strength.
9. The **reinforcing** of concrete was first introduced in France in 1861 by Joseph Monier, who constructed flower pots, tubs and tanks
10. Since 1896 the development of reinforced concrete work **has made** great progress.
11. Steel **does not undergo** shrinkage or drying.
12. Steel constructions with reinforced concrete **have become** the most important building materials **that** were invented in centuries.
13. **By giving** concrete a big squeeze after it has hardened, builders can increase its elasticity ten times so that **it** will bend under a heavy load **without breaking**.
14. This is important **in building** bridges, viaducts, and floors of large buildings.
15. The simplest way **to pre-stress** concrete is **to put** steel wires or rods in the concrete when **it** is poured.
16. Until recently, the aim of engineers was **to make** concrete with as few bubbles as possible.
17. This concrete is made **by adding** an agent, which foams to form the bubbles when the concrete is mixed.
18. Scientists **are working** on research into the behaviour of cement and concrete under all kinds of conditions.
19. The principle of reinforced earth is analogous to **that** of reinforced concrete.
20. Buildings of reinforced concrete may be constructed with **load-bearing** walls or with a skeleton frame.
21. The principle of reinforced earth is analogous to **that** of reinforced concrete
22. A built-in wardrobe requires less space than a movable **one** of similar capacity.

CONTROL WORK N 4

I. ИНФИНИТИВНЫЕ КОНСТРУКЦИИ

Инфинитивная конструкция «сложное подлежащее»

Эта конструкция строится по следующей модели:

Подлежащее	+	Сказуемое	+	Инфинитив
Существительное или местоимение в именительном падеже		глагол в форме страдательного залога		

This firm is said to receive high profits.

1. Эта фирма, *как говорят*, получает большие прибыли.

2. *Говорят, что* эта фирма получает высокие прибыли

The results of the test were considered to be satisfactory.

1. Результаты этого испытания, как и полагали, оказались удовлетворительные.

2. Считали, что результаты этого испытания были удовлетворительные

Следовательно, инфинитив в данной конструкции надо перевести сказуемым в том времени, в котором стоит форма глагола **to be**, а сказуемое – либо вводными словами (*как известно, как считают*), либо неопределенно-личным предложением с последующим союзом *что* (*известно, что...; считают, что... и т.д.* Глаголы: **to believe**-полагать; **to consider**-считать, полагать, рассматривать; **to expect**-ожидать, предполагать; **to suppose** – предполагать; **to think (is thought)** – думать, считать.

Инфинитивная конструкция «сложное подлежащее» при сказуемом в действительном залоге

Конструкция «сложное подлежащее» употребляется с рядом глаголов и выражений, включающих глагол в действительном залоге, а именно: **to seem, to appear**- казаться (их можно также переводить вводным словом *по-видимому*); **to prove, to turn out** - *оказаться*; **to happen** - *случаться*; **to be likely** - *вероятно*, **to be unlikely**-*маловероятно, вряд ли*; **to be certain, to be sure**-*несомненно, наверняка, безусловно*. Например:

The application of this device is likely to give the better results.

Вероятно, что применение этого устройства даст лучшие результаты.

Exercise I. Переведите следующие предложения, обращая внимание на инфинитивную конструкцию «сложное подлежащее».

1. The lecture was said to be very interesting.

2. Lake Baikal is considered to be deepest and the cleanest in the world.

3. These two scientists appears to work on the same problem.

4. The motor proved to be quite efficient.

5. He seemed to be quite tired (уставать) after a whole day of hard work.

6. Many various types of airplanes are reported to have been produced in this country during the last decade.

7. Mini-computers are known to be used as part of the robots and different programme control technological equipment.

Инфинитивная конструкция «сложное дополнение»

Предложение в этой конструкции строится по следующей модели:

Подлежащее + Сказуемое + Сложное дополнение
Глагол в форме существительное или
действительного залога местоимение в объектном
падеже + инфинитив

We wanted **him to take part** in the conference.

Мы хотели, чтобы он принял участие в этой конференции.

На русский язык «сложное дополнение» переводится **придаточным предложением с союзами что, чтобы**, при этом инфинитив английского предложения передается сказуемым русского предложения, а подлежащее, если оно выражено местоимением в объектном падеже, на русский язык переводится местоимением в именительном падеже.

Конструкция «сложное дополнение» употребляется после сказуемого, выраженного глаголами: **would like, to want- хотеть; to think-думать; to know-знать; to believe-считать, полагать; to consider-считать; to suppose-полагать, считать; to expect-ожидать, предполагать**. После глаголов: **to make, to cause-заставлять, to allow, to permit-разрешать, to enable-давать возможность** при переводе сохраняется порядок слов английского предложения (*нет союзов что, чтобы*)

Heat **causes most materials to become** slightly bigger.

Тепло **заставляет большинство материалов расширяться**.

Exercise I. Переведите предложения, обращая внимание на форму инфинитива, входящего в инфинитивную конструкцию «сложное дополнение».

- | | |
|--|---|
| 1. The engineer wants his student (them) to use new methods in their work. | The engineer wants the new the new methods (them) to be used in the production process. |
| 2. We expect this scientist to be working at this scientific problem. | We know this scientist to have worked at this problem for some years. |
| 3. We know this young man to work in the field of quantum generators. | We know him to have worked out a new method of applying quantum generators in medicine. |

II. НЕЗАВИСИМЫЙ И ЗАВИСИМЫЙ ПРИЧАСТНЫЕ ОБОРОТЫ

Независимый причастный оборот в отличие от зависимого причастного оборота имеет собственное подлежащее, выраженного существительным в общем падеже или местоимением в именительном падеже.

Зависимый причастный оборот – это причастие с зависимыми словами.

Посмотрите таблицу и вспомните, какие формы имеет причастие и как они переводятся.

PARTICIPLE

<u>Функция</u>	Participle I (прич. наст.вр.) Ving от глагола	Participle II (прич.прош.вр.) Ved или 3 форма нестандартных глаголов
Часть сказуемого (после форм глаголов to be и to have)	Входит в состав сказуемого времени гр. Continuous (to be +Participle I) The builders are applying ... Строители <i>применяют</i> ... The builders were applying ... Строители <i>применяли</i> ...	Входит в состав сказуемого в Passive Voice (to be +Participle II) I was told ... – Мне <i>сказали</i> ... и was Perfect Tense (to have + Participle II) He has changed ... Он <i>изменил</i> ...
Обстоятельство (причастие стоит в начале или в конце предложения или с союзами)	(When, while)changing <i>изменяя</i> <i>при изменении</i> <i>когда изменяют</i> being changed <i>будучи измененным</i> having changed <i>изменив</i> having been changed <i>когда (так как, если, после того как) изменили</i>	С союзами when-когда, if-если, unless-если не, as- как переводится придаточным предложением, а иногда – <i>при + существительное</i> <i>Unless tested</i> the machine must not be put into operation. –Если машина не прошла испытаний, ее нельзя эксплуатировать. <i>When heated</i> the polymer changed... – Когда полимер нагрели, он изменил... При нагревании полимер изменил
Определение (причастие стоит перед определяемым словом или после него и можно задать вопрос какой?)	Changing <i>conditions-</i> изменяющиеся <i>условия</i> changing- условия изменяющие being changed – <i>изменяющийся,</i> <i>изменяемый, который</i> <i>изменяется</i>	changed – <i>изменяемый, измененный</i>

Exercise I.

Сравните, как переводятся **Participle I Passive** и **Perfect Participle** в функции обстоятельства в следующих предложениях.

Функция обстоятельства

- | | |
|-----------------------|--------------------------------|
| 1. Being subjected | to high pressure metals become |
| Having been subjected | highly conductive. |
| 2. When subjecting | the metal to high pressure, |
| Having subjected | the scientists saw... |
| 3. Comparing | the forces acting on the body |
| Having compared | the engineer will determine... |

Функция определения (только **Participle I Passive**)

The installation being utilized (now) is very efficient. The machinery being installed in our shop (цех) will be put into operation (пускать в действие) next week.

Итак, причастие I, входящее в состав **зависимого причастного оборота** переводится на русский язык:

1) **придаточным предложением** с союзами **так как, когда, если, после того как** и др.

2) **деепричастием** с окончанием **-а, я** или **ав, ив** (изменяя, изменив)

3) **при + существительное**

4) **причастием** с суффиксами **-ущ, -ющ, -ащ, -ящ, -вш, -ш** или **придаточным предложением** с союзом **«который»**

Упражнение II. Переведите предложения, обращая внимание на разные формы и функции причастия I.

1. When **translating** some new texts he usually wrote out all new words. 2.

The text **being translated** by the students is not very difficult. 3. **Having been written** the letter he had to post it in the evening. 4. **Having passed** the examination he joined a group of students who were standing in the corridor. 5. **Having solved** this important problem, the scientists made a report. 6. **Being told** about his arrival, I went to see him. 7. **Being sent** to Moscow he visited some museums. 8. This machine will be sent to the plant **being constructed** in this region. 9. **Having been advised** by the doctor to go the south, she decided to spend her leave (отпуск) in Sochi.

Независимый причастный оборот

Независимый причастный оборот – это причастный оборот, имеющий свое «подлежащее». Он распознается в предложении по следующим признакам:

1) причастие стоит на месте сказуемого и имеет свое «подлежащее»;

2) от основной части предложения отделяется запятой.

На русский язык независимый причастный оборот переводится:

1) **придаточным предложением** с союзами **когда, после то как, так как, если** и др., когда стоит в начале предложения.

It being late, we decided to stop working.

Так как было поздно, мы решили прекратить работу.

2) самостоятельным предложением бессоюзным или с союзами **причем, а, и, но**, если причастный оборот стоит в конце предложения.

The students wrote their English test paper, **each doing his variant**.

Студенты писали контрольную работу по английскому языку, **причем каждый делал свой вариант**.

Exercise I. Переведите предложения, содержащие независимый причастный оборот, обращая внимание на его место в предложении.

a) 1. Two object having the same temperature, the average energy of motion of their molecules is the same. 2. Part of the energy being changed into heat, not all the chemical energy of the battery is transformed into electric energy. 3. Average temperature between 200 and 250 C having been maintained for several hours, a new artificial synthetic fibre was obtained.

b) 1. Different molecules have different speeds, the average speed of all molecules remaining the same, as long (пока) the temperature is constant. 2. One scientist after another have tried cooling some gas to absolute zero, their attempts coming to nothing.

III. УСЛОВНЫЕ ПРЕДЛОЖЕНИЯ

Условные предложения в английском языке вводятся союзами **if - если, provided-если, при условии что, unless-если не, in case - если**

1. Если в **главном предложении** употребляются вспомогательный глагол **will**, то в **условном придаточном предложении** сказуемое употребляется в **настоящем времени**

На русский язык сказуемое в главном и придаточном предложениях переводится будущим временем.

If the temperature is low,
the reaction **will** proceed slowly.

Если температура будет низкой,
реакция будет проходить медленно.

2. Сложное предложение относится к настоящему или будущему времени.

В **главном предложении** употребляются глаголы **should, would** или **could + простой инфинитив (глагол без частицы to)**.

В **условном придаточном предложении** сказуемое употребляется в **простом прошедшем времени (Ved или V2f)**.

На русский язык сказуемое в **главном и придаточном предложениях** переводится глаголом в **прошедшем времени с частицей бы**.

We **should** test the device
if we got it.

Мы **бы проверили** этот прибор
если **бы получили** его.

He **could** complete the test
if he had time (today, tomorrow).

Он **бы мог закончить** проверку
если **бы у него было** время.

2. Сложное предложение относится к прошедшему времени.

В **главном предложении** после глаголов **should, would** и **could** стоит **перфектный инфинитив (have+Ved или V3f)**

в условном предложении сказуемое употребляется в **Past Perfect (had+Ved или V3f)**.

На русский язык сказуемое в главном и придаточном предложениях переводится с частицей **бы**.

He **would have used** the device, Он **бы использовал** этот прибор,
if it **had been** order. если **бы он был** в порядке.

I **could have come** to the conference, Я **бы мог прийти** на конференцию,
provided I had been in town. (last week). если **бы был** в городе.

Exercise I. Определите к какому времени относятся данные условные предложения. Переведите их на русский язык.

1. I **would have prepared** the report in case I **had got** all the necessary materials. 2. If you **intensify** the process by heating the materials, you **will save** much time. 3. If you **prepared** well, the discussion **would be** interesting. 4. If a solid body or a liquid **is heated**, it **will** usually **expand**. 5. Provided mercury **did not expand** when heated, it **would not be used** for taking temperatures. 6. Provided the operator's cabin **had been equipped** with electronic control, he **would have been able** to work faster and with greater precision. 7. We **could have used** this method, if we **had known** about it before. 8. Unless the temperature **rises**, the speed of the motion of the molecules **will not increase**. 9. If the temperature **increased**, the velocity of the molecular motion **would also be increased**.

GRAMMAR EXERCISES

Control work N 4

I. Переведите предложения, обращая внимание на инфинитивные конструкции: сложное подлежащее и сложное дополнение.

1. Motor cars are considered to be the main source of air pollution in any town.

2. Until recent years some architects consider reinforced concrete to be used only in stucco.

3. Cement is known to be the most important compound of concrete.

4. When the water is added to the cement, this causes the whole mixture to set and harden, forming a solid mass.

5. The white exterior of houses in this district appeared to be free of ceramic materials.

6. The dust content of Moscow's air is reported to have gone down in recent years.

7. There are designs which provide for service centers to be connected with the dwelling houses by roofed passages.

8. The most important building materials are now considered to be structural steel and concrete.

9. The increase in strength permits the cement cost to be reduced with a resultant cost savings.

10. Every civil engineers considers the effect of entrained air (вовлеченный воздух) to be important for the resistance of concrete.

11. The secret of brick-making seems to have been forgotten with the end of the Roman Empire in the 5-th century.

12. Nowadays a building's framework is likely to be made of reinforced concrete and structural steel.

13. When the water is added to the cement, this causes the whole mixture to set and harden, forming a solid mass.

II. Переведите предложения, обращая внимание на зависимый и независимый причастные обороты.

1. The tower cranes are employed for lifting building materials onto the building being erected.

2. This plant has two canteens, the largest one being designed for use as a lecture or dance hall and a cinema.

3. When considering the design of a town the architects must always remember that it should be free from dust and smog.

4. Having enlarged the site of the building elements the designer decreased labour costs and time of construction.

5. The body being subjected to external loads, deformations occurs in it.

6. A number of cements are in use, the most common being ordinary Portland cement.

7. Water is one of the main constituents of concrete; it reacts with the cement powder, so causing it to set and hardened.

8. Being re-mixed (перемешать еще раз) this cement paste becomes plastic and does not suffer any loss of strength.

9. Portland cement having been introduced, the lime was not used in stucco.

10. Reinforced earth is a composite material, a combination of earth and reinforcements, the latter generally consisting of metal strips(полоса) (which are able to withstand high tensile stresses).

11. Great attention being paid to prefabrication in this country, an auxiliary industry for fabrication of precast reinforced concrete units has been created.

III. Переведите условные предложения, обращая внимание на время употребления.

1. If the amount of water had increased above that necessary, it would have produced a more porous structure.

2. If the aggregates were dry when placed in the mixer, they would absorb water and leave less available for mixing with the cement.

3. The concrete will lose its plasticity provided it is used dry.

4. If the concrete paste had been allowed to dry out, then considerable change would have occurred.

5. If the load were maintained for some time and then removed the concrete would not return its original size.

6. If the concrete had been completely dried the shrinkage would have been the greatest.

ДОПОЛНИТЕЛЬНЫЕ УПРАЖНЕНИЯ ПО ГРАММАТИКЕ FUNCTIONS OF VERBS “to be”, “to have”

variant I

1. From the earliest days the mankind has erected structures of great size and beauty.
2. Since the need for buildings of all kinds is great different methods for speeding up construction are developed.
3. The influence of various factors on the strength of concrete has to be taken into account (to take into account - принимать во внимание) in the successful proportioning of the compounds of a mix to achieve the desired properties.
4. The students were trying to devise a production of a very durable, cementless binding material.
5. Asphalt slabs are not affected by water.
6. The concrete roof of the new 4-storey store was cast as soon as the steel frame had been erected.
7. According to the plan there were to be two towers. These towers had to be very strong, they were of granite.
8. Hydraulic lime has the property of setting under water.
9. Masonry domes have been constructed for centuries.

FUNCTIONS OF THE VERBS “to be”, “to have”

variant II

1. The new plastic can be easily cleaned and are unaffected by high temperature.
2. A new development is that the building from the top to downwards and from the bottom to upwards is taking place simultaneously.
3. In order to attain one property a compromise has to be made in the other properties.
4. Other forms of test have been carried out, but the simplest is the tensile test on a concrete cylinder.
5. For interior use plastics is recommended for surface finish of walls.
6. These steel cables were to hold the bridge.
7. Proper compaction of concrete is essential for the development of its full strength.
8. Dry mixes of low workability if adequately compacted by vibration, have higher strengths than more workable mixes with the same water-cement ratio.

INFINITIVE

variant I

1. Walls are built to carry the weight of floors and roofs.
2. In order to save time, the builder prefers to use prefabricated concrete units.
3. Building regulations define the type of mortar to be used with bricks of varying strength to carry varying loads.

4. As the building began to lean over, the builders altered the design of the upper stories to balance it.

5. The knowledge of concrete seems to have been lost during the Middle Ages.

6. Pure aluminum is very plastic, which allows it to be readily formed into different shapes.

7. There are designs which provide the service centers to be connected with the dwelling houses by roofed passages.

8. The white exteriors of the tower block (жилой дом) appeared to be free of some ceramic materials.

INFINITIVE

variant II

1. The members to be connected by welding must be held rigidly in position during the welding process.

2. The exterior walls are designed of sufficient strength to carry the loads of the floors and roofs.

3. To make concrete resistant to bending, engineers reinforce it.

4. In order to replace hand-ramming, mechanical vibrators are now used for compacting of concrete.

5. Water fit for drinking is assumed to be free from harmful ingredients.

6. Many building codes require brick basement walls to be 4 in. thicker than the walls above.

7. It is convenient to use built-in units which enable one room to serve the purposes of several.

8. Built-in furniture is considered to be valuable asset in small building.

9. Lime is produced from limestone and chalk which is burnt in a kiln for 3 or 4 days when it is ready to be made into mortar.

INFINITIVE

variant III

A sanitary engineer protects the quality of water by treating and purifying this water to be used for domestic purposes.

1. The plumber lays the pipes to carry clean water into the house and to carry waste water away to the sewers.

2. In construction of a house the first step is to examine the soil in order to find its bearing power.

3. To transport water for populated districts the builders also construct aqueducts.

4. Green plants are considered to be very important because they clean the air, reduce contamination and so improve living conditions.

5. The internal combustion engine is known to cause more pollution than the factories.

6. The building regulations require external walls to be adequate to prevent heat loss from the building.

7. Many people consider the motor cars to be the main source of air pollution.

8. Concrete has a low tensile strength and needs to be reinforced with steel to form a structural member.

9. In order to understand what civil engineering is you must consider the development of different branches of engineering.

INFINITIVE

variant IV

1. The aggregates are graded in size from fine to coarse in order to reduce the amount of void space to be filled by cement.

2. Elements to be employed for heat-insulation undergo supplementary treatment.

3. Before calculating the required sizes of beams or columns it is necessary first to determine the loads carried by the structure.

4. To make a house quite a lot of people all work together.

5. Cement is known to be the most important component of concrete.

6. When the water is added to the cement, this causes the whole mixture to set and hardening, forming a solid mass.

7. Water-reducing admixtures are found to facilitate placing of concrete under difficult conditions.

8. If alumina is not correctly proportioned it will cause the bricks to crack when being burnt.

9. Excessive amounts of air-entrainment are found to reduce the strength of concrete.

V-ing FORMS

variant I

1. Besides having a low strength due to a high water-cement ratio concrete has even a lower strength because of poor compaction.

2. Having rather small strength, aluminum cannot be used for building structures.

3. Concrete is made by binding together particle of sand and gravel, stone or broken brick.

4. When choosing the building materials a building engineer must consider the conditions under which the chosen material is to operate in a built structure.

5. The value of this property is apparent in forming composite structures, laminate and the like.

6. The tower cranes are employed for lifting building materials onto the building being erected.

7. Cement is a binding material which hardens on drying and is used with a suitable aggregate to form a concrete.

8. Bricks serve only as a load-bearing material.

9. Being cured under pressure in autoclaves, concrete attains its great strength in 4 or 6 hours.

10. Suitable concrete aggregates may differ widely in their properties, the differences being as great as those between various cements.

V-ing Forms variant II

1. Having been introduced in construction Portland cement quickly replaced lime for making concrete.
2. "Non-fines" concrete is a concrete having fairly large voids.
3. Cutting became possible with the invention of tools.
4. Binding materials are used for making artificial stones and joining together different materials.
5. At first the idea of making concrete by using sand was completely rejected.
6. The ancient Egyptians often erected their huge buildings without thinking of their usefulness.
7. Strains or deformations occur in any body being subjected to external loads.
8. By enlarging the size of building elements labour costs and time were decreased.
9. From the earliest times, architects and engineers have been aware of the problems involved in laying a building's foundation.
10. Various materials may be used as aggregate, the most common being naturally occurring sand and gravel.

Переведите предложения, обращая внимание на различные значения глагола to be.

1. Automation today is an important factor of Russian chemical industrial production. It is being introduced (внедряться) on a wide scale in all branches of industry and agriculture as well as (также) in medicine and everyday life. 2. In close cooperation with industry Russian scientists are developing many new types of electronic and cybernetic devices. They are to become the basis for the solution of a great number of economic and scientific problems. They will be reliable helpers of engineers and scientists. 3. Chemical materials and products are of great importance for all branches of the national economy in our country. 4. There are a lot of test-tubes of different sizes in any chemical laboratory.

Переведите текст, обращая внимание на различные значения глагола to be.

Physics is the science studying various phenomena in nature. Its object is to determine exact relations between physical phenomena. Physics is divided very naturally into two great branches, experimental and theoretical physics. The task of the former is to make observations and carryout experiments. On the basis of the experimental facts theoretical physics is to formulate laws and predict the behaviour of natural phenomena. Every law is based on experiment; therefore it is important that experiments be done very accurately. It was the study of natural phenomena that made it possible to formulate various laws. There are still a lot of problems to be solved. Scientists all over the world are doing their best (прилагают все усилия) to find answers to numerous yet unknown phenomena.

КОНТРОЛЬНАЯ РАБОТА N 4

TEST

1. This causes **the whole mixture to set and harden, forming a solid mass.**
2. The strength of concrete is very rapid in the early stages, but continues more slowly for an indefinite period **amounting to years**
3. **Water fit for drinking** can be assumed **to be free from harmful ingredients.**
4. Steel has great tensional, compressive and elastic properties, but it is no durable **being exposed to moisture.**
5. Concrete loses its strength with age, or **being subjected** to high temperature.
6. Architects considered **reinforced concrete to be suited** only to heavy and massive structures.
7. **Great potentialities of reinforced concrete** appear **to be in the hands** of the creators of concrete buildings.
8. This concrete doesn't crack **when freezing.**
9. **Collaborating with engineers** they are developing new ways of using concrete.
10. Built-in furniture **is considered** to be a valuable asset **in small dwellings.**
11. Built-in furniture has the advantage of being fitted into an awkward corner, **utilizing free floor space.**
12. Reinforced earth is a composite material, a combination of earth and reinforcements, **the latter generally consisting of metal strips, which withstand high tensile stresses.**
13. **Built-in furniture providing a considerable saving of space and materials,** it is preferred by many.
14. The built-in **units being widely used in our modern houses,** saves space and materials.
15. The built-in units **being widely used in our modern houses,** prove their advantage over conventional furniture.

Active
(действительный)

Passive
(страдательный)

Образование	Пример	Перевод	Время	Образование	Пример	Перевод
I. INDEFINITE						
V(s)	He writes	Он пишет	1. Present	To be +V(ed) (PII)	He is written	Ему пишут (в настоящем)
V(ed)	He wrote	Он писал	2. Past	To be +V(ed) (PII)	He was written	Ему написали (в прошлом)
Shall/will V	He will write	Он будет писать	3. Future	Shall/will + be +V(ed) (PII)	He will be written	Ему напишут
II. CONTINUOUS						
To be +V(ing) P.I.	He is writing	Он пишет (сейчас)	1. Present	To be + being +V (ed) (P.II.)	He is being written	Ему пишут (сейчас, в данный момент)
To be + V(ing) P.I.	He was writing	Он писал (в определенный момент в прошлом)	2. Past	To be + being + V(ed) (P.II.)	He was being written	Ему писали (в определенный момент в прошлом)
Shall/will be + V(ing) P.I.	He will be writing	Он будет писать (в определенный момент в будущем)	3. Future	Не употребляется		
III. PERFECT						
Have (has)+ V(ed) (P.II.)	He has written	Он написал (к настоящему времени)	1. Present	Have (has) +been + V(ed) (P.II.)	He has been written.	Ему написали (к настоящему моменту)
Had + V(ed) (P.II.)	He had written	Он написал (к моменту в прошлом)	2. Past	Had + been + V (ed) (P.II.)	He had been written.	Ему написали (к моменту в прошлом)
Shall/will + have + V(ed) (P.II.)	He will have written	Он напишет (к моменту в будущем)	3. Future	Shall/will + have + been + V(ed) (P.II.)	He will have been written.	Ему напишут (к моменту в будущем)

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