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Окончание табл. П3.10

1	*2*	*3*	*4*
to see	saw	seen	видеть
to sell	sold	sold	продавать
to send	sent	sent	посылать
to set	set	set	ставить, устанавливать
to show	showed	shown	показывать
to sit	sat	sat	сидеть
to speak	spoke	spoken	говорить
to spend	spent	spent	тратить, проводить
to spread	spread	spread	распространять(ся)
to stand	stood	stood	стоять
to swim	swam	swum	плавать
to take	took	taken	брать
to teach	taught	taught	учить, обучать
to tell	told	told	рассказывать
to think	thought	thought	думать
to understand	understood	understood	понимать
to wear	wore	worn	носить
to win	won	won	выигрывать
to write	wrote	written	писать

Министерство образования и науки Российской Федерации

Федеральное государственное бюджетное образовательное учреждение
высшего профессионального образования
«Комсомольский-на-Амуре государственный технический университет»

О. В. Кохан

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Утверждено в качестве учебного пособия
Учёным советом Федерального государственного бюджетного
образовательного учреждения высшего профессионального образования
«Комсомольский-на-Амуре государственный технический университет»

Комсомольск-на-Амуре
2012

Учебное издание

Кохан Ольга Владимировна

**АНГЛИЙСКИЙ ЯЗЫК ДЛЯ СТУДЕНТОВ-ЗАОЧНИКОВ:
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КОНТРОЛЬНЫЕ ЗАДАНИЯ**

Учебное пособие

Научный редактор Е. Ю. Першина

Редактор Е. О. Колесникова

Подписано в печать 06.02.2012
Формат 60 × 84 1/16. Бумага 80 г/м^2. Ризограф FR3950EP-α
Усл. печ. л. 10,92. Уч.-изд. л. 10,58. Тираж 150 экз. Заказ 24580.

Редакционно-издательский отдел
Федерального государственного бюджетного образовательного
учреждения высшего профессионального образования
«Комсомольский-на-Амуре государственный технический университет»
681013, Комсомольск-на-Амуре, пр. Ленина, 27.

Полиграфическая лаборатория
Федерального государственного бюджетного образовательного
учреждения высшего профессионального образования
«Комсомольский-на-Амуре государственный технический университет»
681013, г. Комсомольск-на-Амуре, пр. Ленина, 27.

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Рецензенты:

Кафедра «Первый иностранный язык и переводоведение»
ФГОУ ВПО «Амурский гуманитарно-педагогический государственный
университет», зав. кафедрой кандидат филологических наук,
доцент К. В. Боровикова;
И. Б. Косульина, кандидат филологических наук, доцент кафедры
«Иностранные языки» ФГОУ ВПО «Амурский гуманитарно-
педагогический государственный университет»

УДК 81:378(410)(07)
ББК 81.2Англ9
К75

Кохан, О. В.

К75 Английский язык для студентов-заочников: практика, грамматика, тексты, контрольные задания : учеб. пособие / О. В. Кохан. – Комсомольск-на-Амуре : ФГБОУ ВПО «КнАГТУ», 2012. – 181 с.
ISBN 978-5-7765-0992-6

Пособие состоит из 16 тематических разделов, в которых систематизирован и в краткой форме представлен грамматический и лексический материал. Разделы «Контрольные задания» содержит методические указания по выполнению контрольных заданий и оформлению контрольных работ и варианты четырех контрольных заданий.

В приложениях представлены итоговый грамматический тест, общетехнические и профессионально-ориентированные тексты для самостоятельного чтения и грамматические таблицы, включая список неправильных глаголов.

В пособии использованы материалы популярных сайтов, научных отраслевых журналов, зарубежных изданий.

Учебное пособие может быть использовано как для аудиторной, так и для самостоятельной работы студентов заочной формы обучения специальности «Самолето- и вертолетостроение» и направлений бакалавриата «Технология машиностроения», «Электропривод и автоматика», «Промышленное и гражданское строительство», «Промышленная электроника».

УДК 81:378(410)(07)
ББК 81.2Англ9

ISBN 978-5-7765-0992-6

With 10 faculties, 15 graduate schools and 11 research institutes (including the Research Centre for Advanced Science and Technology), it has been a guiding force in research and education.

It offers courses in essentially all academic disciplines at both undergraduate and graduate levels, and provides research facilities. The University has a faculty of approximately 2,800 professors, associate professors and lecturers, and a total student enrollment of about 28,000.

As of 2003, approximately 2,100 international students and 2,200 foreign researchers come annually to the University for short and extended visits.

Princeton University. British North America's fourth college was known as the College of New Jersey until 1896. Located in Elizabeth for one year and in Newark for nine, the College of New Jersey moved to Princeton in 1756. It was housed in Nassau Hall, which was built on land donated by Nathaniel Fitzrandolph.

In 1896, expanded programmes won the college university status, and the College of New Jersey was officially renamed Princeton University in honour of its host community, Princeton.

In 2002-2003, Princeton enrolled 6,632 students: 4,635 undergraduates and 1,997 graduate students.

The University plays a major role in the educational, cultural and economic life of the region. Some famous Princeton alumni include Woodrow Wilson and James Madison, former presidents of the United States.

California Institute of Technology. You may have run into the work of past Caltech scientists without even knowing it. If your mom ever told you to take Vitamin C to fend off a cold, you can thank Linus Pauling, the Caltech chemist who discovered the nature of the chemical bond in 1930 (his ideas about vitamins came later). Pauling won the Nobel Prize for chemistry in 1954 and the Nobel Peace Prize in 1962.

After an earthquake, news anchors can tell us how relatively shaken up we were, courtesy of the formula geophysicist Charles Richter devised in the 1920s for measuring the size of Southern California earthquakes.

And if anyone's ever told you to stop acting so 'left brain', it's because of the pioneering brain hemisphere research done by Caltech psychobiologist Roger Sperry (another Nobelist).

Caltech was established thanks to Pasadena philanthropist Amos Throop.

In September 1891, he rented the Wooster Block building for the purpose of establishing Throop University, the forerunner to Caltech.

Throop might have remained just a good local school had it not been for the arrival in Pasadena of astronomer George Ellery Hale. The first director of the Mount Wilson Observatory, Hale became a member of Throop's board of trustees in 1907, and envisioned moulding it into a first-class institution for en

Таблица П3.7

Значение и функции глагола TO DO

Функция	Значение	Пример	Перевод
Смысловой глагол **do** со значением «делать»	Делать	I **do** (he **does**) my (his) morning exercises regularly	Я **делаю** (он **делает**) утреннюю зарядку регулярно.
Вспомогательный глагол **do** для образования вопросительной и отрицательной форм в Present и Past Simple	Самостоятельного значения не имеет	**Do** you go to the Institute every day? Yes, I **do**. No, I **don't** **Does** he study English? Yes, he **does**. No, he **doesn't** **Did** they work at the plant last year? Yes, they **did**. No, they **didn't.**	Вы ходите в институт каждый день? Да. Нет. Он изучает английский? Да. Нет. Они работали на заводе в прошлом году? Да. Нет.
Глагол-усилитель **do** для усиления значения действия (просьбы), выраженного смысловым глаголом	Передается частицами ***но, же, ведь*** или словами ***действительно, несомненно***	This device **does** help them a lot in their work. Why **didn't** you translate this article? – But I **did** translate it.	Этот прибор ***действительно*** очень помогает им в их работе. Почему вы не перевели эту статью? Да, я ***же*** перевел ее.
Глагол-заместитель для замены смыслового глагола во избежание его повторения	Имеет значение того глагола, который заменяет или совсем не переводится	Metals conduct electricity better than semiconduc-tors **do**.	Металлы лучше проводят электричество, чем полупроводники.

Продолжение табл. П3.10

1	*2*	*3*	*4*
to deal (with)	dealt (with)	dealt (with)	иметь дело с
to do	did	done	делать
to draw	drew	drawn	рисовать, чертить
to drink	drank	drunk	пить
to drive	drove	driven	вести, управлять
to eat	ate	eaten	есть (принимать пищу)
to fall	fell	fallen	падать
to feel	felt	felt	чувствовать
to find	found	found	находить
to fly	flew	flown	летать
to foresee	foresaw	foreseen	предвидеть
to forget	forgot	forgotten	забывать
to get	got	got	получать, становиться
to give	gave	given	давать
to go	went	gone	идти, ехать
to grow	grew	grown	расти, становиться
to hang	hung	hung	висеть, вешать
to have	had	had	иметь
to hear	heard	heard	слышать
to hold	held	held	держать, владеть
to keep	kept	kept	держать, хранить
to know	knew	known	знать
to lay	laid	laid	класть
to lead	led	led	вести
to learn	learnt; ~-ed	learnt; ~-ed	учиться, узнавать
to leave	left	left	оставлять, уезжать
to let	let	let	позволять, пускать
to lose	lost	lost	терять
to make	made	made	делать
to mean	meant	meant	значить, предполагать
to meet	met	met	встречать
to pay	paid	paid	платить
to put	put	put	класть
to read	read	read	читать
to ring	rang	rung	звонить, звенеть
to rise	rose	risen	вставать
to run	ran	run	бежать
to say	said	said	говорить, сказать

ВВЕДЕНИЕ

Учебное пособие «Английский язык для студентов-заочников. Практика, грамматика, тексты, контрольные задания» предназначено для студентов заочной формы обучения специальности «Самолето- и вертолетостроение» и направлений бакалавриата «Промышленное и гражданское строение» и «Промышленная электроника», «Технология машиностроения», «Электропривод и автоматика».

Цель пособия – развить навыки различных видов чтения общетехнической и специальной литературы на английском языке, помочь студентам овладеть необходимым лексическим и грамматическим минимумом, необходимым для активизации монологической и диалогической речи в рамках представленных разговорных тем.

Пособие состоит из 16 тематических разделов, в которых систематизирован и в краткой форме представлен грамматический и лексический материал необходимый для развития навыков чтения, получения нужной информации, умения подеседовать по прочитанному тексту и делать сообщения на английском языке.

Пособие также содержит разделы «Контрольные задания» с методическими указаниями по выполнению контрольных заданий и оформлению контрольных работ. Раздел содержит четыре контрольных задания, каждое контрольное задание включает пять вариантов. Контрольное задание 4 предоставлено по специальности (направлению) обучения студента: «Промышленное и гражданское строительство», «Промышленная электроника», «Самолето- и вертолетостроение», «Технология машиностроения», «Электропривод и автоматика».

В приложении 1 представлен итоговый грамматический тест для контроля изученных грамматических тем, в приложение 2 включены обшетехнические и профессионально-ориентированные тексты для дополнительного (самостоятельного чтения), в приложении 3 приведены грамматические таблицы, включая список неправильных глаголов.

В пособии использованы материалы популярных сайтов, научных отраслевых журналов.

Учебное пособие может быть использовано как для аудиторной, так и для самостоятельной работы студентов очной и заочной форм обучения.

Раздел 1. ЛЕКСИЧЕСКИЕ ТЕМЫ

Тема 1. ОБРАЗОВАНИЕ В РОССИИ И ЗА РУБЕЖОМ

Текст 1. THE WORLD'S TOP 10 UNIVERSITIES

Britain's University of *Cambridge* has topped the list, making it the best university in the world for science. In 2009, the university celebrated its 800th anniversary, making it one of the world's oldest universities.

Cambridge is the largest university in the United Kingdom (over 100 departments, faculties and schools). Its contribution to the world has ranged from the discovery of the mechanism of blood circulation to the structure of DNA, from the great philosophers of the early 15th century to the groundbreaking work of its many Nobel Prize winners (more than 60 distinguished names feature on the list).

Oxford is on the second place and is first in the UK and fourth in the world in the Times Higher Education Supplement's World University Rankings 2011-2012.

Oxford University is the oldest English speaking university in the world, dating back to 1249. The oldest college is disputed it depends on the definition of a college. The first 3 were University College, Merton and Balliol.

There is no building in Oxford called Oxford University. It is a conglomerate of 39 colleges and related buildings. Locals get great amusement when visiting American tourists ask where the University is.

Harvard University. Refusing to be left behind, the Americans follow with a vengeance. Harvard University is ranked No 3.

Harvard College was established in 1636 and was named for its first benefactor, John Harvard of Charlestown. Harvard was a young minister who, on his death in 1638, left his library and half his estate to the newly established institution. It is the oldest institution of higher learning in the United States.

Seven presidents of the United States (John Adams, John Quincy Adams, Theodore and Franklin Delano Roosevelt, Rutherford B Hayes, John Fitzgerald Kennedy and George W Bush) were graduates of Harvard. Its faculty has produced 40 Nobel laureates.

The US News & World Report ranks Harvard at No 1 in its rating for America's best universities for the year 2005.

University of California, Berkeley. The roots of the University of California go back to the gold rush days of 1849, when the drafters of the state's constitution required the legislature to encourage by all suitable means the promotion of intellectual, scientific, moral and agricultural improvement of the people of California.

The university that was born more than 20 years later - on March 23, 1868 - was the product of a merger between the College of California (a private institution) and the Agricultural, Mining, and Mechanical Arts College.

Among other things, the university is credited with the isolation of the human polio virus and the discovery of all artificial elements heavier than uranium.

Eighteen members of the Berkeley faculty have been awarded Nobel Prizes for these and subsequent discoveries, as well as in literature and economics.

Massachusetts Institute of Technology. It's probably one of the most famous universities in the world. But did you know its founder, William Barton Rogers, apparently never received a degree? In 1853, he moved to Boston, where he enlisted the support of the scientific community to create an institution for technical and scientific education. It was largely through his efforts that the Massachusetts Institute of Technology was born in 1861.

Today, the Institute has more than 900 faculty and 10,000 undergraduate and graduate students. It is organized into five Schools - Architecture and Planning, Engineering, Humanities, Arts, and Social Sciences, Management, and Science - and the Whitaker College of Health Sciences and Technology.

Fifty-nine current or former members of the MIT community have won the Nobel Prize.

The US News & World Report ranks MIT along with Stanford University and Duke University at No 5 in its rating for America's best universities for the year 2005.

Stanford University. Stanford University was dedicated by Leland Stanford and Jane Eliza to their son, Leland Junior.

Leland Junior was in Italy with his family when he was struck by typhoid. He later succumbed to the illness. He was 15. When they returned to the US, the Stanfords decided to set up a university. After six years of planning and building, the Stanford University opened on October 1, 1891.

Stanford, like Johns Hopkins and Cornell Universities, followed the German model of providing graduate as well as undergraduate instruction and stressing on research along with teaching.

Stanford's current community of scholars includes 17 Nobel laureates and four Pulitzer Prize winners.

Famous Stanford alumni include:

- Vinton Cerf, the "father of the Internet";
- Steve Ballmer, CEO, Microsoft;
- William Hewlett and David Packard (both deceased), founders, Hewlett-Packard Co;
- Philip Knight, chairman and CEO, Nike, Inc;
- Chih-Yuan 'Jerry' Yang and David Filo, founders of Yahoo!;
- Sergey Brin and Lawrence Page, founders of Google.

University of Tokyo. It is the only Asian university to figure in the top 10 list. Established in 1877, the University of Tokyo is Japan's oldest university.

Таблица П3.8

Порядок слов в вопросительном предложении

	Пример
1	The chief engineer took part in the testing last month.
2	The chief engineer took part in the testing last month, **didn't he**?
3	**Who** took part in the testing last month?
4	**What** engineer took part in the testing last month?
5	**Did** the chief engineer take part in the testing last month?
6	**Did** the chief engineer take part in the testing **or** in the party last month?
7	**What did** the chief engineer take part last month in?
8	**When did** the chief engineer take part in the testing ?
Тип вопроса	1 – повествовательное предложение 2 – разделительный вопрос 3 – вопрос к подлежащему 4 – вопрос к определению подлежащего 5 – общий вопрос 6 – альтернативный вопрос 7 – специальный вопрос (к обстоятельству места) 8 – специальный вопрос (к обстоятельству времени)

Таблица П3.9

Основные префиксы (приставки)

Префиксы с отрицательным значением			
un-	*не-* *без(с)-* *раз(с)-*	important – важный limited – ограниченный	**un**important – неважный **un**limited – безграничный
im- **in-** **il-** **ir-**	*не-* *без(с)-*	accuracy – точность possible – возможный legal – легальный responsible – ответственный	**in**accuracy – неточность **im**possible – невозможный **il**legal – нелегальный **ir**responsible – безответственный
non-	*не-* *без-*	conductor – проводник	**non**-conductor – непроводник (изолятор)
dis-	*раз(с)-* *без(с)-* *не-*	to close – закрыть to connect – соединить	to **dis**close – раскрыть to **dis**connect – разъединить
mis-	означает *неверно*	to understand – понимать	to **mis**understand – неверно понять

Продолжение табл. П3.9

Префиксы с разными значениями			
re-	*снова* *еще раз*	write – писать use – использовать	**re**write – переписать **re**use – снова использовать
super-	*сверх-* *над-*	conductive – проводимый	**superconductive** – сверхпроводимый
sub-	*ниже-* *под-* и др.	way – путь, дорога system – система	**sub**way – подземная дорога **sub**system – подсистема
over-	*сверх-* *пере-* *над-*	to load – нагрузить	to **over**load – перегрузить
semi-	*полу-*	conductor – проводник	**semi**conductor – полупроводник
inter-	*между-* *среди-* *взаимо-*	action – действие	**inter**action – взаимодействие
en-	(для образования глагола)	large – большой	to **en**large – увеличить
pre-	*до-* *заранее*	to heat – нагреть	to **pre**heat – предварительно нагреть
post-	*после-*	war – война	**post**-war – послевоенный

Таблица П3.10

Список неправильных глаголов

Infinitive	Past Indefinite	Participle II	Перевод
1	*2*	*3*	*4*
to be	was, were	been	быть
to become	became	become	становиться
to begin	began	begun	начинать(ся)
to blow	blew	blown	дуть
to break	broke	broken	ломать, разбивать
to bring	brought	brought	приносить
to broadcast	broadcast; -ed	broadcast; -ed	передавать по радио
to build	built	built	строить
to buy	bought	bought	покупать
to choose	chose	chosen	выбирать
to come	came	come	приходить, приезжать
to cost	cost	cost	стоить
to cut	cut	cut	резать

Продолжение табл. П3.5

1	*2*	*3*	*4*
Вспомогательный глагол: Progressive Tense (**be**+ Participle I) Passive Voice (**be** + Participle II)	Самостоятельного значения не имеет	He **is writing** a new article now. The article **is written** by our professor.	Сейчас он **пишет** новую статью. Статья **написана** нашим профессором.
Модальный глагол (**be** + инфинитив с частицей **to**)	Долженствование, необходимость как результат договоренности	He **is to** come to the lab at 10 o'clock	Он **должен** прийти в лабораторию в 10 часов.

Таблица П3.6

Значения и функции глагола TO HAVE

Функция	Значение	Пример	Перевод
Смысловой глагол (**have** + предлог + существительное)	Иметь, владеть, обладать	These laboratories **have** modern equipment.	Эти лаборатории **имеют** современное оборудование.
Вспомогательный Глагол: (**have** + Participle II)	Самостоятельного значения не имеет	These laboratories **have** bought modern equipment.	Эти лаборатории закупили современное оборудование.
Модальный глагол (**have** + инфинитив с частицей to)	Необходимость в силу (ввиду) обстоятельств	These laboratories **have to** buy modern equipment.	Эти лаборатории **должны** закупить современное оборудование.

gineering and scientific research and education. Under his leadership Throop's transformation began.

By 1921, Hale had been joined by chemist Arthur A Noyes and physicist Robert A Millikan. These three men set the school, which by then had been renamed the California Institute of Technology, firmly on its new course.

Today, 30 of the Institute's alumni are Nobel Prize recipients.

Imperial College of London. The Imperial College of Science, Technology and Medicine was established in 1907. Set in London's scientific and cultural heartland, South Kensington, it was created though a merger between the Royal College of Science, the City and Guilds College and the Royal School of Mines.

Various colleges have merged with the College since. These include St. Mary's Hospital Medical School in 1988 and the National Heart and Lung Institute in 1995.

In 1997, Charing Cross, Westminster Medical School and the Royal Postgraduate Medical School merged with the College to form the Imperial College School of Medicine.

And, in 2000, Wye College and the Kennedy Institute of Rheumatology merged with the College. The College boasts of 14 Nobel Prize winners.

Упражнения

1. Закончите предложения:

1) In 2009 Cambridge university celebrated its 800th……..

2) Cambridge is……..university in the United Kingdom.

3) Oxford University is the oldest English……university in the world, dating …….to 1249.

4) Harvard College was…….in 1636.

5) Seven presidents of the United States were….of Harvard.

6) Eighteen members of the Berkeley faculty have been…….Nobel Prizes.

7) The founder of Massachusetts Institute of Technology, William Barton Rogers, apparently never received a……

8) Stanford followed the German model of providing graduate as well as undergraduate……..

9) The College of New Jersey was officially……Princeton University in…….of its host community, Princeton.

10) Linus Pauling, the Caltech chemist…….. the nature of the chemical bond in 1930.

2. Ответьте на вопросы:

1) What universities are in the world's top list?

2) What each university is famous for?

3) What have you known about history of these universities?

Its current rector is Viktor Sadovnichiy. In 1940, the university was renamed in honor of its founder, Mikhail Lomonosov. Currently the university employs more than 4,000 academic staff and 15,000 other staff members. There are about 5,000 researchers engaged in various research activities in its various institutes and departments. More than 40,000 undergraduates and 7,000 postgraduates are currently enrolled in the university and more than 5,000 specialists are participating in their refresher courses for career enhancement purposes. There are around 2,000 overseas students in the university.

The main library in university is one of the largest in Russia with its 9,000,000 books and the average number of readers 55,000, using 5,500,000 books per year.

Since 1953, most of the university's faculties have been situated on Sparrow Hills, in the southwest of Moscow. Considered to be the outskirts of Moscow at the time of its building, the location of the main building is about halfway between the center of Moscow at the Kremlin and the city's current limits.

The university includes a number of faculty buildings located near Manege Square in the center of Moscow and a number of campuses abroad in Ukraine, Kazakhstan, and Uzbekistan.

A few narrowly specialized Moscow colleges, including the Moscow Institute of Physics and Technology and the Moscow State Institute of International Relations were split off from MSU at one time or another and have since established strong reputations of their own, arguably even surpassing their parent in terms of prestige and quality of education.

The university has well-established contacts with the most distinguished universities in the world, exchanging students and lecturers with the leading universities overseas. It houses the UNESCO International Demography Courses, the UNESCO Hydrology Courses, the International Biotechnology Center, the International LASER Center, courses or seminars on Russian as a foreign language. In 1991 the French University College, the Russian-American University, the Institute of German Science and Culture were opened. The university has awarded honorary degrees to more than 60 scientists, statesmen as well as politicians from abroad. Many prominent university scholars and scientists in return hold honorary degrees from foreign academies and universities.

As of September 2009, the university has 39 faculties and 15 research centers. A number of small faculties have been opened recently, such as Faculty of Physics and Chemistry and Higher School of Television. Evening classes are conducted by the Faculties of Economics, History, Journalism, Philology, Psychology and Sociology while the Faculty of Journalism offers a correspondence degree programme.

The university is commonly regarded as one of Russia's most prestigious universities and has high entry requirements for its prospective students. However, Moscow State University performs inconsistently in international and na-

ПРИЛОЖЕНИЕ 3

ГРАММАТИЧЕСКИЕ ТАБЛИЦЫ

Таблица П3.1

Сравнение падежных отношений в русском и английском языках

Падеж	В русском языке	В английском языке	Собственное лексическое значение предлогов
И. п.	(кто? что?) *друг*	Нет предлога. Место перед сказуемым.	–
Р. п.	(кого? чего?) *друга*	***of*** The book of friend.	***of*** – *из* One of them – один *из* них is made of glass – сделан *из* стекла
Д. п.	(кому? чему?) *другу*	***to*** I often write to my friend.	***to*** – указывает направление to the plant – *на* завод to Moscow – *в* Москву
В. п.	(кого? что?) *друга*	Нет предлога. Место – после сказуемого.	–
Т. п.	(кем? чем?) *другом*	***by*** The work is done by my friend. ***with*** (с неодушевленным предметами) I write with a pen.	***by*** – *у, к, посредством* by the window – у окна by summer – *к* лету by radio – *посредством (по)* радио ***with*** – *с* with my friend – *с* моим другом
П. п.	(о ком? о чем?) *о друге*	***about*** – *о*, ***of*** – *о* I often think about (of) my friend.	***about*** – *около, приблизительно* About 45 students are present at the lecture. – На лекции присутствует *около* 45 студентов.

Текст 2. SOME INTERESTING FACTS ABOUT CAMBRIDGE

What is the name of the river that runs through Cambridge?

The Cam. The River Cam, or the Granta, as it was known in Saxon Times (around the 9th century AD) has had a bridge running over it since at least 875 AD, hence the name. In Saxon times the city was known as 'Grantebrycge.' The Ouse is York's prominent river and the Isis is the part of the Thames that runs in 'that other city' as people in Cambridge like to call it, known to us as Oxford.

Cambridge University is made up of 31 colleges. Who founded the first?

Bishop of Ely. The first college was Peterhouse, founded by the Bishop of Ely in 1284. In 1209 there were riots in Oxford, forcing many students and teachers to flee for their lives. Some came to Cambridge and seventeen years later they established with a chancellor. In 1318 they were officially recognized by the Pope as a "Studium Generale". Despite having a University, Cambridge were not granted city status until 1951.

What is the name of Cambridge's second university?

The Anglia Ruskin University. The Anglia Ruskin University was first opened as a School of Art in 1858 by John Ruskin. In 1889 the Institute for Technical Education opened. In 1909 the Cambridge and County School of Arts, Crafts and Technology opened. The Cambridgeshire Technical College and School of Art became the Cambridgeshire College of Arts and Technology in 1960. In 1991 it was granted Polytechnic status and became Anglia Polytechnic. A year later it was awarded University status and became Anglia University. In 2005 the name was changed to Anglia Ruskin University to honour the heritage.

What does the Round Church in Sidney Street commemorate?

The Church of the Holy Sepulchre. The Round Church was built in about 1130, five years before King Stephen died and over one hundred years before the first Cambridge college was founded. The Church of the Holy Sepulchre is in Jerusalem, where knights were aiming to get to during the Crusades.

Which former Cambridge University student discovered the circulation of blood in the 17th century?

William Harvey. William Harvey (1578-1657) was an English doctor who discovered the circulation of blood in the body. He studied at Caius College, Cambridge and then at the University of Padua, as it was the centre for western European medicine. Harvey was recognized as the medical leader of his day. Thomas Hardy was a 19th century author; Florence Nightingale was a 19th Century female nurse. It was not till the 20th century women could study at Cambridge. Robert Kock was a German doctor who did not study at Cambridge.

In which museum in Cambridge can you see a renowned collection of Egyptian, Greek and Roman artifacts, as well as paintings by Titian, Rembrandt, Gainsborough, Hogarth and Turner?

The Fitzwilliam Museum. The Fitzwilliam Museum was built in 1848 to house the art collections of Viscount Fitzwilliam which he gave to Cambridge University. The Museum of Classical Archaeology has casts of over 500 Greek and Roman statues such as the Venus Di Milo. The University Museum of Archaeology and Anthropology displays prehistoric finds from all over the world. The Sedgwick Museum of Earth Science displays a huge variety of fossils and other geological artifacts.

Situated in Cambridge, what is the name of the oldest University Playhouse?

ADC Theatre. The ADC Theatre or Amateur Dramatics Club was founded in 1855 and is the largest dramatic society in Cambridge. The Cambridge Arts Theatre is a traditional theatre and offers a wide variety of shows from both amateur and professional groups. The Corpus Playroom stages performances during the university term time. The Cambridge Corn Exchange is the largest venue in Cambridge.

What is the name of the garden situated in Cambridge which contains over 8,000 different plant species?

Cambridge University Botanic Garden. Cambridge University Botanic Garden was established as a University teaching resource in 1831 by John Stevens Henslow, who is best remembered for inspiring Charles Darwin. In 1846 it was opened to the public. The Garden contains a variety of plants in different sub gardens, such as the Rock Garden, the Winter Garden and the Dry Garden.

How do you pronounce "Magdalene" as in Magdalene College Cambridge?

Maudlin. The College of St. Mary Magdalene was founded in 1428. It is home to Samuel Pepys famous diary, which has been carefully preserved in a library named after him. Magdalene College did not accept women students until 1988.

Ответьте на вопросы:

1) What facts do you consider to be the most interesting?
2) What facts about Cambridge would you like to share your friends with?

Текст 3. LOMONOSOV MOSCOW STATE UNIVERSITY

Lomonosov Moscow State University is the largest university in Russia. Founded in 1755, it also claims to be one of the oldest universities in Russia (the oldest after St. Petersburg State University founded in 1724) and to have the tallest educational building in the world. The establishment of the university was instigated by Ivan Shuvalov and Mikhail Lomonosov, and the decree ordering its creation was issued by Russian Empress Elizabeth on January 25 (January 12 old style), 1755. The first lectures were held on April 26. January 25 is still celebrated as Students' Day in Russia.

Таблица П3.4

Наречия

Прилагательные	Наречия без суффикса	Наречия с суффиксом
long – длинный, долгий	long – давно	
very – самый, тот самый	very – очень	
only – единственный	only – только	
far – далекий	far – далеко; намного	
direct – прямой		directly – сразу, непосредственно
ready – готовый		readily – быстро, легко
large – большой		largely – в основном, очень, главным образом
real – настоящий	real – настоящий	really – действительно
hard – трудный	hard – упорно	hardly –едва
high – высокий	high – высоко	highly – весьма, очень, чрезвычайно
wide – широкий	wide – широко	widely – очень, значительно
near – близкий	near – близко	nearly – почти
late – поздний	late – поздно	lately – за последнее время, недавно
close – близкий	close – близко, рядом	closely – тщательно, тесно, внимательно

Таблица П3.5

Значения и функции глагола TO BE

Функция	Значение	Пример	Перевод
1	*2*	*3*	*4*
Смысловой глагол (**be** + предлог + существительное)	Быть, находиться	The book **is** on the table. This problem **is** of great importance.	Книга **находится** на столе. Эта проблема **имеет** огромное значение.
Глагол-связка (**be** + существительное или прилагательное)	Самостоятельного значения не имеет	He **is** a student. The speed of an electric car **was** not high. The speed of an Electric car **is** about 60 km/h.	Он – студент. Скорость электромобиля невысокая. Скорость электромобиля – 60 км/ч.

Таблица П3.2

Образование числительных

Числительные			
Количественные			Порядковые
1 – 12	13 – 19 (суффикс **–teen**)	20 – 90 (суффикс **–ty**)	
1 – one			1 – the first (1^{st})
2 – two		20 – twenty	2 – the second (2^{nd})
3 – three	13 – thirteen	30 – thirty	3 – the third (3^{rd})
4 – four	14 – fourteen	40 – forty	4 – the fourth (4^{th})
5 – five	15 – fifteen	50 – fifty	5 – the fifth (5^{th})
6 – six	16 – sixteen	60 – sixty	13 – the thirteenth (13^{th})
7 – seven	17 – seventeen	70 – seventy	15 – the fifteenth (15^{th})
8 – eight	18 – eighteen	80 – eighty	20 – the twentieth (20^{th})
9 – nine	19 – nineteen	90 – ninety	21 – the twenty-first (21^{st})
10 – ten			30 – the thirtieth (30^{th})
11 – eleven			40 – the fortieth (40^{th})
12 – twelve			100 – the hundredth (100^{th})
100 – hundred 1 000 – thousand		1 000 000 – million 1 000 000 000 – billion	

Таблица П3.3

Местоимения

	Личные	Притяжательные		Возвратно-усилительные
	И. п. (кто? что?)	Объектный падеж (кому? кого?)	простая форма (чей?)	абсолютная форма (чей?)	
I	я	me *мне, меня*	my	mine	myself
you	ты, вы	you *тебе, тебя*	your	yours	yourself
he	он	him *ему, его*	his	his	himself
she	она	her *ей, её*	her	hers	herself
it	оно	it *ему, его, ей, её*	its	its	itself
we	мы	us *нам, нас*	our	ours	ourselves
you	вы	you *вам, вас*	your	yours	yourselves
they	они	them *им, их*	their	theirs	themselves

1st place in the world in export of nitric fertilizers, 2nd and 3rd in export of phosphoric and potash fertilizers.

1st place in the world in reserves of diamonds and 2nd in their production.

1st place in the world in physical volume of export of diamonds.

1st place in the world in explored reserves of silver.

2nd place in the world in explored reserves of gold.

2nd place in the world in explored reserves of platinum and 1st in its export.

3rd place in world reserves of coal (30% of world reserves).

3rd place in the world in explored reserves of copper and lead.

3rd place in the world in explored reserves of tungsten and molybdenum.

7th place in world reserves of oil (18% of world reserves).

9th place in world reserves of uranium (10% of world reserves)

During the Second World War metro stations were used as air-raid shelter. 150 people were born there.

The way from Moscow to Chicago is closer than from Chicago to Rio-de-Janeiro.

There is the closest point between Russia and America that is only 4 km long.

The total length of the Kremlin walls is 2235 meters.

The biggest flood in Moscow was in the year of 1908 when waters went up to 9 metres and immersed 1600 hectares of the city territory.

There are 7 towns in the Golden Ring of Russia.

The Moscow River is 65 km long and flows along the whole city.

During the reign of Peter the Great, any Russian nobleman who chose to wear a beard had to pay a special beard tax.

Moscow has the worlds most used subway system.

Ответьте на вопрос:

What additional information about Russia have you known from this text?

Текст 3. RUSSIAN CUSTOMS AND TRADITIONS

There are certain peculiarities that only Russians have and it's useful to know them. Otherwise you risk losing friends, getting shot, or having an argument.

Below we tried to list some common traits of the Russian character and list some things that Russians love and hate. If you are lucky enough to meet a person whose character incorporates all of the items from the list below, we can assure you that this person possesses the pure Russian spirit and should be treated with high respect. If you decide to become a Russian, you can use the list below as guidelines.

- **We are a free nation**. Here we despise all the rules. It's an honor for our drivers to move on the red light or to bother other drivers and scorn pedestrians.

control column – штурвальная колонка; штурвал
tilt – 1) наклонять; опрокидывать; откидывать, поворачивать; 2) наклоняться; опрокидываться; откидываться, поворачиваться; 3) давать крен (о судне)
foot pedal – ножная педаль

An aircraft has three different lines of flight. It can roll, yaw and pitch. Rolling is rotating the plane along the axis of its fuselage and is accomplished by turning the control so that the aileron on the wings are up on one side and down on the other. Yawing is turning the plane left or right, using the vertical rudder on the tail which is controlled by foot pedals. The pitch of a plane is its angle of ascent or descent and is controlled by the elevators on the tail. Pushing the control column forward tilts the elevator down causing the plane to dive.

Текст 16. TURBOFAN ENGINE

Пояснения к тексту

turbofan engine – турбовентиляторный двигатель
suck in – засасывать
vaporize – испаряться

The turbofan which is the most common type of jet engine operates by sucking in air using a large fan melted at its opening. This air is forced into the compressor a series of rotating blades which pressurize the air and force it into the gradual pan along the length of the engine combustion chamber. Here the air is mixed with vaporized fuel and burned the resulting hot gases which shoot out of the combustion chamber are used in two ways. Some spin the turbine which powers the compressor. The rest shoot out of the engine through a nosily which increases their pressure this thrust propels the aircraft in accordance with Newton's third law of motion that every action causes an equal and opposite reaction.

Текст 17. INDUSTRIAL ELECTRONICS

Industrial electronics is a branch of electronics that deals with power electronic devices such as thyristors, SCRs, AC/DC drives, meters, sensors, analyzers, load cells automatic test equipment, mulitimeters, data recorders, relays, resistors, semiconductors, transistors, waveguides, scopes, amplifiers, radio frequency (RF) circuit boards, timers, counters, etc. It covers all of the methods and facets of: control systems, instrumentation, mechanism and diagnosis, signal processing and automation of various industrial applications. The core research areas of industrial electronics include electrical power machine designs, power conditioning and power semiconductor devices. A lot of consideration is given to power economy and energy management in consumer electronic products.

ode, quickly ruining it. Designers developed tube designs that sealed reliably. This was why most tubes were constructed of glass. Metal alloys (such as Cunife and Fernico) and glasses had been developed for light bulbs that expanded and contracted in similar amounts, as temperature changed. These made it easy to construct an insulating envelope of glass, while passing connection wires through the glass to the electrodes.

When a vacuum tube is overloaded or operated past its design dissipation, its anode (plate) may glow red. In consumer equipment, a glowing plate is universally a sign of an overloaded tube. However, some large transmitting tubes are designed to operate with their anodes at red, orange, or in rare cases, white heat.

"Special quality" versions of standard tubes were often made, designed for improved performance in some respect, such as long life, low noise, mechanical ruggedness, low microphony, for applications where the tube will spend much of its time cut off, etc. The only way to know the particular features of a special quality part is by reading the data sheet.

tional rankings of higher education studies. While it was placed 77th overall by the Academic Ranking of World Universities and 112th by QS World University Rankings, it was not included among top 200 universities by recent Times Higher World University Rankings and came in at 296th (based on the full THE World University Rankings in their iPhone application). Furthermore, the national rankings produced by RIA Novosti / Higher School of Economics and Forbes placed the university outside top 5 in Russia.

Ответьте на вопросы:

1) Who founded Moscow State University?
2) When was the University established?
3) How many students and postgraduates are there at Lomonosov Moscow State University at present?
4) Do foreign students study at the University?
5) What is the University library famous for?
6) Where is the University located?
7) How many faculties are there at Lomonosov Moscow State University?
8) Who is the current rector of Lomonosov Moscow State University?
9) What can you say about international contacts of Lomonosov Moscow State University?
10) Why the 25th of January is celebrated as Students' Day in Russia?
11) What place does Lomonosov Moscow State University take according to the international rankings of higher education studies?

Тема 2. РОССИЯ: ЭКОНОМИКА, ПРОМЫШЛЕННОСТЬ, БИЗНЕС, КУЛЬТУРА

Текст 1. THE RUSSIAN FEDERATION

Пояснения к тексту

1) GDP (Gross Domestic Product) – валовый внутренний продукт
2) purchasing power parity PPP – паритет покупательной способности
3) stockpile of weapons of mass destruction – запас оружия массового уничтожения

Russia, officially known as both Russia and the Russian Federation, is a country in northern Eurasia. It is a federal semi-presidential republic, comprising 83 federal subjects.

From northwest to southeast, Russia shares borders with Norway, Finland, Estonia, Latvia, Lithuania and Poland (both via Kaliningrad Oblast), Belarus, Ukraine, Georgia, Azerbaijan, Kazakhstan, China, Mongolia, and North Korea.

So to put it simply, industrial electronics refers to equipment, tools and processes that involve electrical equipment in an industrial setting. This could be a laboratory, automotive plant, power plant or construction site etc. Industrial electronics are also used extensively in: chemical processing plants, oil/gas/petroleum plants, mining and metal processing units, electronics and semiconductor manufacturing.

The scope of industrial electronics ranges from the design and maintenance of simple electrical fuses to complicated programmable logic controllers (PLCs), solid-state devices and motor drives. Industrial electronics can handle the automation of all types of modern day electrical and mechanical industrial processes. Some of the specialty equipment used in industrial electronics includes: variable frequency converter and inverter drives, human machine interfaces, hydraulic positioners and computer or microprocessor controlled robotics.

Industrial electronics is a large family indeed, but remember it is different than entertainment and consumer electronics. Instead of thinking DVD players and computers we are talking about things such as capacitors, motor drives, panel meters, limit switches and testers. Actually the list goes on and on.

Because industrial electronics covers such a wide range of devices it's important that you keep on top of your maintenance schedule or you will find yourself replacing items quite frequently. You should also keep abreast of all the new developments in the electronic world as new items are being manufactured all of the time and you may want too upgrade some of your components to stay up to date. As with all types of electronics you should also be aware of all of the safety hazards of each individual item.

Текст 18. COMPARISON WITH VACUUM TUBES

Prior to the development of transistors, vacuum (electron) tubes (or in the UK "thermionic valves" or just "valves") were the main active components in electronic equipment.

In electronics, a *vacuum tube, electron tube* (in North America), or *thermionic valve* (elsewhere, especially in Britain), reduced to simply "tube" or "valve" in everyday parlance, is a device that relies on the flow of electric current through a vacuum. Vacuum tubes may be used for rectification, amplification, switching, or similar processing or creation of electrical signals. Vacuum tubes rely on thermionic emission of electrons from a hot filament or *cathode*, that then travel through a vacuum toward the anode (commonly called the *plate*), which is held at a positive voltage relative to the cathode. Additional electrodes interposed between the cathode and anode can alter the current, giving the tube the ability to amplify and switch.

Vacuum tubes were critical to the development of electronic technology, which drove the expansion and commercialization of radio communication and

Towns of Zolotoe Kolco are a vivid encyclopedia of Old-Russian architecture.

A monument to blessed Alexander Nevsky was erected in Pskov in 1993. The monument was made of bronze, its height is 30 m, weight – 163 tons. The monument embodies Russian collegiality, unity and indivisibility of Russian lands.

Caucasian Mineral Waters are situated only in 90 km from the Elbrus.

The Ural mountains are ones of the first mountains in the world.

It seems as if Kamchatka volcanoes are turned into ski slopes.

Ski resort Dombai has about 20 km of prepared ski routes.

In Altai there are more than 820 glaciers covering over 600 sq km.

Russia is the only State, on the territory of which there are 12 seas.

On the territory of Russia there are 100 reserves, total area of which makes 33.55 mln ha, and 35 national parks with total area of 6.96 mln ha.

The delta of the Volga is famous for its famous Caspian rose – lotus flower.

250-300 swans and 1.5-2 thousand wild ducks fly together in Swan lake in Altai Krai every year.

The first archeological "Museum of lively history" of Russia is established in Great Novgorod. It is considered that it was the place constructions of so called Slovenian end were located. "Museum of lively nature" will be protected from moods of the weather by a giant "umbrella".

The hot spring is the only place in Russia, combining medicinal properties of mineral waters of Essuntuki type and hydrosulfide baths of Sochi-Modest type.

1st place in the world in explored reserves of natural gas (32% world reserves).

1st place in the world in natural gas extraction and export.

1st place in the world in oil production.

1st place in the world by per capita natural resources supply.

1st place in the world reserves of peat (47% world reserves)

1st place in the world in reserves of forest resources (23% world reserves)

1st place in the world in reserves of salt.

1st place in the world in reserves of drinking water and 2nd place in reserves of fresh water.

1st place in the world in reserves of crab and sturgeon in the 200 mile economic area, and 2nd-3rd place in reserves of cod, herring, capelin, salmon, etc.

1st place in the world in reserves (40% world reserves) and production (22% world production) of nickel.

1st place in the world in explored reserves of iron ore (about 28% world reserves).

1st place in the world in export of steel and 3rd place in export of metal-roll.

1st place in the world in production and export of primary aluminium.

It also has maritime borders with Japan by the Sea of Okhotsk, and the United States by the Bering Strait. At 17,075,400 square kilometres (6,592,800 sq mi), Russia is the largest country in the world, covering more than one eighth of the Earth's inhabited land area.

Russia is also the eighth most populous nation with 143 million people. It extends across the whole of northern Asia and 40 % of Europe, spanning nine time zones and incorporating a wide range of environments and landforms. Russia has the world's largest reserves of mineral and energy resources. It has the world's largest forest reserves and its lakes contain approximately one-quarter of the world's fresh water.

Modern-day Russia has the world's 11th largest economy by nominal GDP or the 6th largest by purchasing power parity, with the 5th largest nominal military budget. It is one of the five recognized nuclear weapons states and possesses the largest stockpile of weapons of mass destruction. Russia is a great power and a permanent member of the United Nations Security Council, the Council of Europe, the Asia-Pacific Economic Cooperation, the Shanghai Cooperation Organization, the Eurasian Economic Community, the Organization for Security and Cooperation in Europe (OSCE), and is the leading member of the Commonwealth of Independent States.

Ответьте на вопросы:

1) What are the borders of Russia?
2) Is Russia a large country?
3) What is the population of Russia?
4) How can you characterize the economy of Russia in general?
5) Russia is a superpower, isn't it?

Текст 2. INTERESTING FACTS ABOUT RUSSIA

Arbat is the first reserved street among the reserved zones of the capital.

"Alexander and Natalie" is the only Moscow fountain with drinking water.

Now in S.-Petersburg there are 221 museums, 2 000 libraries, more than 80 theaters, 100 concert organizations, 45 galleries, show-rooms, 62 cinemas, 80 club establishments of culture. About 100 festivals and competitions of different trends of culture and art including 50 international ones are held every year.

More than 70 balls for shows are built in the Winter palace. The Mikhailovsky (Inzhenerniy) castle is considered the most romantic construction in S.-Petersburg.

In Petergoph there are more than 40 operating fountains and 5 cascades. Ladoga lake is the largest one in Europe. Its area makes 18 400 sq km, average depth is 51 m, the largest one is up to 23 m.

Baikal lake area is 31.5 thousand sq km. The Baikal is the deepest lake in Russia, it is a large reservoir for fresh water (23 thousand km³).

broadcasting, television, radar, sound reproduction, large telephone networks, analog and digital computers, and industrial process control. Although some of these applications had counterparts using earlier technologies, such as the spark gap transmitter or mechanical computers, it was the invention of the triode vacuum tube and its capability of electronic amplification that made these technologies widespread and practical.

In most applications, vacuum tubes have been replaced by solid-state devices such as transistors and other semiconductor devices. Solid-state devices last much longer, and are smaller, more efficient, more reliable, and cheaper than equivalent vacuum tube devices. However, tubes still find particular uses where solid-state devices have not been developed or are not practical.

Текст 19. RELIABILITY

One reliability problem of tubes with oxide cathodes is the possibility that the cathode may slowly become "poisoned" by gas molecules from other elements in the tube, which reduce its ability to emit electrons. Trapped gases or slow gas leaks can also damage the cathode or cause plate (anode) current runaway due to ionization of free gas molecules. Vacuum hardness and proper selection of construction materials are the major influences on tube lifetime. Depending on the material, temperature and construction, the surface material of the cathode may also diffuse onto other elements. The resistive heaters that heat the cathodes may break in a manner similar to incandescent lamp filaments, but rarely do, since they operate at much lower temperatures than lamps.

The heater's failure mode is typically a stress-related fracture of the tungsten wire or at a weld point and generally occurs after accruing many thermal (power on-off) cycles. Tungsten wire has a very low resistance when at room temperature. A negative temperature coefficient device, such as a thermistor, may be incorporated in the equipment's heater supply or a ramp-up circuit may be employed to allow the heater or filaments to reach operating temperature more gradually than if powered-up in a step-function. Low-cost radios had tubes with heaters connected in series, with a total voltage equal to that of the line (mains). Following World War II, tubes intended to be used in series heater strings were redesigned to all have the same ("controlled") warm-up time. Earlier designs had quite-different thermal time constants. The audio output stage, for instance, had a larger cathode, and warmed up more slowly than lower-powered tubes. The result was that heaters that warmed up faster also temporarily had higher resistance, because of their positive temperature coefficient. This disproportionate resistance caused them to temporarily operate with heater voltages well above their ratings, and shortened their life.

Another important reliability problem is caused by air leakage into the tube. Usually oxygen in the air reacts chemically with the hot filament or cath-

island of Ireland lies to its west. Politically, Great Britain may also refer to the island itself together with a number of surrounding islands which comprise the territory of England, Scotland and Wales.

The entire island is territory of the sovereign state of the United Kingdom of Great Britain and Northern Ireland, and most of the United Kingdom's territory is in Great Britain. Most of England, Scotland, and Wales are on the island of Great Britain, as are their respective capital cities: London, Edinburgh, and Cardiff.

The Kingdom of Great Britain resulted from the political union of the kingdoms of England and Scotland with the Acts of Union 1707 on 1 May 1707 under Queen Anne. In 1801, under a new Act of Union, this kingdom merged with the Kingdom of Ireland to create the United Kingdom of Great Britain and Ireland. After the Irish War of Independence most of Ireland seceded from the Union, which then became the United Kingdom of Great Britain and Northern Ireland.

The term *Great Britain* can refer either to the largest island within the United Kingdom of Great Britain and Northern Ireland, or to England, Scotland and Wales as a unit (including many smaller islands associated with these three countries). It does not include Northern Ireland.

The term *Britain*, as opposed to Great Britain, has been used to mean the United Kingdom, for example in official government yearbooks between 1975 and 2001. Since 2002, however, the yearbooks have only used the term "United Kingdom".

Ответьте на вопросы:

1) Where is Great Britain situated?
2) What is the UK?
3) What does the term *Great Britain* mean?
4) What new facts about Great Britain have you known from the text?

Текст 2. LONDON

London is the capital city of England and the United Kingdom, the largest metropolitan area in the United Kingdom, and the largest urban zone in the European Union by most measures. Located on the River Thames, London has been a major settlement for two millennia, its history going back to its founding by the Romans, who called it *Londinium*. London's ancient core, the City of London, largely retains its square-mile medieval boundaries. Since at least the 19th century, the name London has also referred to the metropolis developed around this core. The bulk of this conurbation forms the London region and the Greater London administrative area, governed by the elected Mayor of London and the London Assembly.

turbomachinery – турбины
electric propulsion – электроракетный двигатель, ЭРД
ion propulsion – ионный ракетный двигатель
control engineering – техника автоматического управления; техника автоматического регулирования
excursion – 1) диапазон; размах; 2) рабочий ход (механизма); 3) отклонение; 4) экскурс
aeroelasticity – аэроупругость
divergence – 1) дивергенция; 2) несовпадение, несходство; 3) расходимость; расхождение; 4) отклонение

Aerospace engineering is the branch of engineering behind the design, construction and science of aircraft and spacecraft. It is broken into two major and overlapping branches: aeronautical engineering and astronautical engineering. The former deals with craft that stay within Earth's atmosphere, and the latter deals with craft that operates outside of Earth's atmosphere.

While **aeronautical engineering** was the original term, the broader "aerospace" has superseded it in usage, as flight technology advanced to include craft operating in outer space. Aerospace engineering, particularly the astronautics branch, is often informally called rocket science.

Overview

Flight vehicles undergo severe conditions such as differences in atmospheric pressure, and temperature, with structural loads applied upon vehicle components. Consequently, they are usually the products of various technological and engineering disciplines including aerodynamics, avionics, materials science and propulsion, structural analysis and manufacturing. These technologies are collectively known as aerospace engineering. Because of the complexity of the field, aerospace engineering is conducted by a team of engineers, each specializing in their own branches of science.

The development and manufacturing of a modern flight vehicle is an extremely complex process and demands careful balance and compromise between abilities, design, available technology and costs. Aerospace engineers design, test, and supervise the manufacture of aircraft, spacecraft, and missiles. Aerospace engineers develop new technologies for use in aviation, defense systems, and space exploration.

History

Alberto Santos-Dumont, a pioneer who built the first machines able to fly, played an important role in the development of aviation. Some of the first ideas for powered flight may have come from Leonardo da Vinci, who, although he did not build any successful models, did develop many sketches and ideas for "flying machines".

Текст 14. FORCES

Пояснения к тексту

thrust – тяга
aerodynamic drag – аэродинамическое сопротивление
aerodynamic lift – аэродинамическая подъёмная сила
upward – направленный вверх, поднимающийся, восходящий
downward – спускающийся, нисходящий, направленный книзу
airflow – 1) воздушный поток; 2) обтекание (тела) воздушным потоком
airfoil – 1) аэродинамическая поверхность; крыло; профиль крыла
curved – изогнутый, искривленный, кривой, криволинейный
smooth – гладкий, ровный; скользкий (о поверхности)
airworthy – годный к полетам; годный к эксплуатации в воздухе

Two pairs of opposing forces act on an aircraft in flight. Thrust, the forward driving force provided by a propeller or jet is opposed by the friction of air known as drag. Lift is the upward force developed as air passes by an aircraft's wings. Weight, the downward force resulting from the earth's gravity, is the opposing force that must be overcome by lift for flight to occur.

Planes are designed around wings and wings are designed according to the rules of aerodynamics. If a vertical plate is subjected to fast moving air, a turbulent and chaotic airflow will occur as air passes by. But if this plate is rotated toward the direction of the airflow and turned into an airfoil, with a curved upper surface and a flat lower surface, lift will result from a reduced air pressure that occurs above the wing. The faster air moves, the lower its pressure.

Air flow over a curved surface is faster than a flat one. So the reduced air pressure above the wing results in lift. By decreasing air friction and turbulence, with smooth design, drag is minimized, making an aircraft more airworthy. The angle of the wings affects lift, increasing the angle at which the wing meets the air can increase lift to a point, but beyond the critical angle, airflow will become turbulent, increasing drag, and decreasing lift.

Текст 15. THREE LINES OF FLIGHT

Пояснения к тексту

yaw – 1) отклонение от направления движения; 2) рыскать, отклонять
roll – крен, крениться, вертеться, вращаться
pitch – наклон самолёта относительно поперечной оси, тангаж
ascent – 1) набор высоты; подъём; 2) крутизна (траектории полёта)
angle of ascent – угол подъема; угол восхождения
descent – снижение, спуск

- **It's cool to do nothing** and to just lie on the sofa thinking about how great you are. Really, Russia is such an amazing country and we have given the world so much that we can rest a bit.
- **If you're invited for a meal**, expect that the hosts will feed you until you feel completely full and not capable of moving. If you think that's dangerous for your health or you're on a diet, we advise you to emulate satiety, otherwise you will end up badly.
- **We value generosity**. We can give you the last piece of bread we have if we believe you really need it. And we expect the same in return.
- **Some of us are naturally indifferent**; we don't care too much about dirt on the streets, saving money, the war in Chechnya, breaking the rules, risking without particular reason, drinking too much…
- **… and most of us are very proud.** Don't talk to us about our vices, we won't listen anyway. And don't dare to criticize the way our country is -- Russia is the best place and we will prove it to the whole world very soon.
- **Some of us are quite emotional**, but somehow it's all kept inside most of the time. We may seem a bit cold and too much to ourselves at first, but when you get know us better, we're like a volcano.
- **We love trends** – even though we're not the global trend-setters, we take them to the extremes. Give us the latest Dazed & Confused and we'll show you how to turn avant-garde to mainstream and even make good money on it. By the way, same goes for technology and the internet. We get it later, but we make it better.
- **We are not politically correct**, we take pleasure in talking our opinions out loud and we will not use fancy words to conceal our real feelings.
- **We don't feel easy about talking to strangers on the street,** but if you start conversation saying that you're from another country or ask for some help, there's a good chance we will be very open, because we are naturally curious about foreigners.
- **Some of us think that foreigners are bloody rich**; so if we spot a foreigner, we try to make some money on him, because we still have this communist idea that **everybody should be equal.**
- **Women and old women are much respected** here. It's considered polite if while being in the metro and seeing a woman or an old woman coming in and there're no free seats, man offers her his seat.
- **Beware of the babushkas** (old women). They are active, pushy and very proud of themselves, so if you do something not the way they think you should've done, better disappear.
- When you are invited to the party **bring something with you** - beer is usually accepted with pleasure. If you invited a girl or a woman somewhere **be prepared to pay for her** everywhere. If you invited a man, he'll pay for

The origin of aerospace engineering can be traced back to the aviation pioneers around the late 19th century to early 20th centuries, although the work of Sir George Cayley has recently been dated as being from the last decade of the 18th to mid 19th century. One of the most important people in the history of aeronautics, Cayley was a pioneer in aeronautical engineering and is credited as the first person to separate the forces of lift and drag, which are in effect on any flight vehicle. Early knowledge of aeronautical engineering was largely empirical with some concepts and skills imported from other branches of engineering. Scientists understood some key elements of aerospace engineering, like fluid dynamics, in the 18th century. Several years later after the successful flights by the Wright brothers, the 1910s saw the development of aeronautical engineering through the design of World War I military aircraft.

The first definition of aerospace engineering appeared in February 1958. The definition considered the Earth's atmosphere and the outer space as a single realm, thereby encompassing both aircraft (*aero*) and spacecraft (*space*) under a newly coined word *aerospace*. The National Aeronautics and Space Administration was founded in 1958 as a response to the Cold War. United States aerospace engineers launched the first American satellite on January 31, 1958 in response to the USSR launching Sputnik in October 4, 1957.

Elements

Some of the elements of aerospace engineering are:

• Fluid mechanics – the study of fluid flow around objects. Specifically aerodynamics concerning the flow of air over bodies such as wings or through objects such as wind tunnels.

• Astrodynamics – the study of orbital mechanics including prediction of orbital elements when given a select few variables. While few schools in the United States teach this at the undergraduate level, several have graduate programs covering this topic (usually in conjunction with the Physics department of said college or university).

• Statics and Dynamics (engineering mechanics) – the study of movement, forces, moments in mechanical systems.

• Mathematics – in particular, calculus, differential equations, and linear algebra.

• Electrotechnology – the study of electronics within engineering.

• Propulsion – the energy to move a vehicle through the air (or in outer space) is provided by internal combustion engines, jet engines and turbomachinery, or rockets (see also propeller and spacecraft propulsion). A more recent addition to this module is electric propulsion and ion propulsion.

• Control engineering – the study of mathematical modeling of the dynamic behavior of systems and designing them, usually using feedback signals, so that their dynamic behavior is desirable (stable, without large excursions,

• We estimate about every one out of five Moscovitans can speak English well enough, and there's a higher chance among younger people.

• **We like all things fancy.** But our understanding of it is very original. You will often see men in suits or tucked-in shirts and office trousers (even in clubs on Friday night), while women prefer noticeable and sexy outfits. The colors for men are usually dark or grey, while women like light and white colors. This is a generalization and of course you'll see a lot of different people and outfits.

• **A club is not a place to party - it's the place for the chosen ones.** If you want to visit clubs, they have this thing called "dress code" where you might not be allowed because you wear Nike sneakers, old khakis or a fleece coat. However, the rules are more lax for foreigners, so if unsure about your appearance just speak English while you're passing the club's entrance, and you're guaranteed to get in.

• **We express what we feel, but we're not extrovert.** We shout in public and we kiss in public. It's acceptable to **show affection** in public (look at how many kissing couples there are on the long escalators in Moscow metro!) but **extrovert behaviour** may be resisted. You won't see a lot of people sitting in public places with their legs stretched or crossed (in an American way) and Russians do not gesticulate much when they are talking.

• **Smoking** is a national sport, but many people understand it's not good for health and will always agree to turn off their cigarette if it bothers you. Many people have a positive attitude towards **healthy lifestyle** and have a daily morning exercise routine or run in the park.

• We believe that if you are a **vegetarian**, chances are you are one of those Hare Krishna guys or you have problems with digestion. (However, we should say that the creators of this site were vegetarian for two years... until we traveled to Siberia and were presented with the choice of either making a good travel guide or not eating the meat that was offered.

Ответьте на вопрос:

Do you agree or disagree with these stereotypes concerning Russian people?

Тема 3. КУЛЬТУРА И ТРАДИЦИИ СТРАН ИЗУЧАЕМОГО ЯЗЫКА

Текст 1. GREAT BRITAIN

Great Britain or *Britain* is an island situated to the northwest of Continental Europe. It is the ninth largest island in the world, and the largest European island, as well as the largest of the British Isles. With a population of about 60.0 million people in mid-2009, it is the third most populous island in the world. Great Britain is surrounded by over 1,000smaller islands and islets. The

himself, and there's a good chance he'll pay for you as well without telling you about it.

• **Men should be strong and assertive and women should be smart and beautiful**. That's just one of our stereotypes.

• **No, Russians are not racists**. We were grown up in the world, where everybody is equal and where the friendship of nations is an important part of our agenda. If you notice one of us starting occasionally at a black person, it's just because we are curious - there's not many black people in Russia... The only word of warning is about older people, who are sometimes too much patriotic, so be careful: don't offend their feelings.

• **Yes, we love vodka, but we're not alcoholics.** Despite what some people think, Russians are not drunkards, they just have a special resistance to alcohol, that's why they can drink so much. And we actually get our strength from it and it warms us during the cold winters. By the way, if you drink with us, you'll have to drink as much as we do, or we will be offended.

• **Russians are weird.** We think that a sudden change from communism to capitalism has something to do with it, but this topic deserves a more thorough exploration. The only smart explanation that can be proposed here is that some of us jumped too deep into capitalist world, while some stayed too far behind.

• **Russians are hooligans.** It's not because we're bad - we just like everything extraordinary. But too often we don't express this feeling enough, so when it comes out, it's like a volcanoe. That's why you hear our tourists singing folk songs at 3 a.m. and that's why we make a revolution every 80 years.

• **We believe in magnetism.** The thing is that every so often the sun sends some electro-magnetic signals and this affects the whole course of events on the earth, including our mood and feelings.

• So, if you see two housewives discussing how bad their day went because of the electro-magnetic storm that happened in the afternoon - don't think they are adepts of some sort of new age philosophy, it's completely normal here.

• **Yes, we are superstitious.** And if you want to shake our hand, you can never ever do it through the door: you have to come in, otherwise we will quarrel. If you come back to your house just after you left - look at the mirror, it's for your own good. If you're sitting at the corner of the table, you won't be married for 7 years. If a fork falls, a woman is going to come, if a knife falls, a man will certainly appear.

• **Most of us know a few words in English, but we are too shy to speak - no practice, you see...** However, you will be surprised at how many things are written in English on the streets: it is used to show a shop or a cafe, to advertise a new product, and there's a lot of foreign goods. Also, almost more than a half of Russian products have their ingredients listed in English. Russians learn English at school, and many people can understand the basics, but are shy to speak to a stranger.

with minimum error). This applies to the dynamic behavior of aircraft, spacecraft, propulsion systems, and subsystems that exist on aerospace vehicles.

• Aircraft structures – design of the physical configuration of the craft to withstand the forces encountered during flight. Aerospace engineering aims to keep structures lightweight.

• Materials science – related to structures, aerospace engineering also studies the materials of which the aerospace structures are to be built. New materials with very specific properties are invented, or existing ones are modified to improve their performance.

• Solid mechanics – Closely related to material science is solid mechanics which deals with stress and strain analysis of the components of the vehicle. Nowadays there are several Finite Element programs such as MSC Patran/Nastran which aid engineers in the analytical process.

• Aeroelasticity – the interaction of aerodynamic forces and structural flexibility, potentially causing flutter, divergence, etc.

• Avionics – the design and programming of computer systems on board an aircraft or spacecraft and the simulation of systems.

• Software – the specification, design, development, test, and implementation of computer software for aerospace applications, including flight software, ground control software, test & evaluation software, etc.

• Risk and reliability – the study of risk and reliability assessment techniques and the mathematics involved in the quantitative methods.

• Noise control – the study of the mechanics of sound transfer.

• Flight test – designing and executing flight test programs in order to gather and analyze performance and handling qualities data in order to determine if an aircraft meets its design and performance goals and certification requirements.

The basis of most of these elements lies in theoretical mathematics, such as fluid dynamics for aerodynamics or the equations of motion for flight dynamics. There is also a large empirical component. Historically, this empirical component was derived from testing of scale models and prototypes, either in wind tunnels or in the free atmosphere. More recently, advances in computing have enabled the use of computational fluid dynamics to simulate the behavior of fluid, reducing time and expense spent on wind-tunnel testing.

Additionally, aerospace engineering addresses the integration of all components that constitute an aerospace vehicle (subsystems including power, aerospace bearings, communications, thermal control, life support, etc.) and its life cycle (design, temperature, pressure, radiation, velocity, life time).

Extrusion

Extrusion is pushing the billet to flow through the orifice of a die. Products may have either a simple or a complex cross section. Aluminium window frames are the examples of complex extrusions.

Tubes or other hollow parts can also be extruded. The initial piece is a thick-walled tube, and the extruded part is shaped between a die on the outside of the tube and a mandrel held on the inside.

In back-extrusion (штамповка выдавливанием) the workpiece is placed in the bottom of a hole and a loosely fitting ram is pushed against it. The ram forces the metal to flow back around it, with the gap between the ram and the die determining the wall thickness. The example of this process is the manufacturing of aluminum beer cans.

1. Переведите текст на русский язык.

2. Ответьте на следующие вопросы:

1) What is rolling? Where is it used?
2) What is extrusion? What shapes can be obtained after extrusion?
3) What are the types of extrusion?

Текст 13. AEROSPACE ENGINEERING

Пояснения к тексту

aerospace –1) воздушное и космическое пространство; 2) авиакосмическая промышленность
avionics – авиационное электронное оборудование
sketch – эскиз, набросок
aerodynamic drag – сила лобового сопротивления, аэродинамическое сопротивление
fluid dynamics – гидродинамика
structural analysis – структурный анализ; анализ прочности конструкции, расчёт прочности конструкции
lift – гидро- или аэродинамическая подъёмная сила
propulsion – 1) приведение в движение, сообщение движения вперёд; 2) тяговое усилие, тяга; 3) ракетный двигатель; 4) силовая установка
fluid mechanics – гидравлика; пневматика, гидроаэромеханика, гидромеханика, механика жидкостей и газов, механика текучих сред
wind tunnel – аэродинамическая труба
astrodynamics – астродинамика
orbit mechanics – орбитальная механика
electrotechnology – электрофизические принципы электротехники
internal combustion engine – двигатель внутреннего сгорания
jet engine – реактивный двигатель

London is a leading global city, with strengths in the arts, commerce, education, entertainment, fashion, finance, healthcare, media, professional services, research and development, tourism and transport all contributing to its prominence. It is the world's largest financial centre alongside New York City and has the fifth-largest city GDP in the world (and the largest in Europe). It has the most international visitors of any city in the world and London Heathrow is the world's busiest airport by number of international passengers. London's 43 universities form the largest concentration of higher education in Europe. In 2012 London will become the first city to host the modern Summer Olympic Games three times.

London has a diverse range of peoples, cultures, and religions, and more than 300 languages are spoken within its boundaries. In July 2010 Greater London had an official population of 7,825,200, making it the most populous municipality in the European Union. The Greater London Urban Area is the second-largest in the EU with a population of 8,278,251, while London's metropolitan area is the largest in the EU with an estimated total population of between 12 million and 14 million. London had the largest population of any city in the world from around 1831 to 1925.

London generates approximately 20 per cent of the UK's GDP (or $446 billion in 2005); while the economy of the London metropolitan area—the largest in Europe – generates approximately 30 per cent of the UK's GDP (or an estimated $669 billion in 2005). London is one of the pre-eminent financial centres of the world and vies with New York City as the most important location for international finance.

London's largest industry is finance, and its financial exports make it a large contributor to the UK's balance of payments. Around 325,000 people were employed in financial services in London until mid-2007. London has over 480 overseas banks, more than any other city in the world. Currently, over 85% (3.2 million) of the employed population of greater London works in the services industries. Due to its prominent global role, London's economy has been affected by the late-2000s financial crisis. The City of London estimates that 70,000 jobs in finance will be cut within a year. The City of London is home to the Bank of England, London Stock Exchange, and Lloyd's of London insurance market.

Over half of the UK's top 100 listed companies (the FTSE 100) and over 100 of Europe's 500 largest companies are headquartered in central London. Over 70 per cent of the FTSE 100 is located within London's metropolitan area, and 75 per cent of Fortune 500 companies have offices in London.

Along with professional services, media companies are concentrated in London and the media distribution industry is London's second most competitive sector. The BBC is a significant employer, while other broadcasters also have headquarters around the City. Many national newspapers are edited in London. London is a major retail centre and in 2010 had the highest non-food

Тема 4. БУДУЩАЯ ПРОФЕССИЯ И ЕЁ МЕСТО В СОВРЕМЕННОМ МИРЕ

1. Прочитайте новые слова и переведите предложения:

1) to deal (with) – иметь дело с, работать. Mechanical engineers deal with machinery, mechanisms and engines.
2) operation – действие, работа, операция. Computers can perform several millions of operations in a second.
3) complex – множество, сложный. Some problems are too complex to solve.
4) property – свойство, качество, особенность. Synthetic materials have useful mechanical and physical properties.
5) field – область, сфера, поле (деятельности). He is a specialist in the field of electronics.
6) to consume – потреблять. Production of aluminium consumes a lot of electricpower.
7) among – между, посреди, среди. There was a small village among the fields.
8) to transmit – передавать, пропускать, проводить. Mobile phones transmit and receive microwave radio signals.
9) to reduce – сокращать, уменьшать. Automation reduces the costs of production.
10) application – применение, использование, употребление. Application of new techniques raised the quality of production.
11) trend – направление, тенденция. Use of composite materials is a new trend in engineering.
12) device – устройство, аппарат, прибор. Modern cars have a number of safety devices.
13) to create – создавать, проектировать, разрабатывать. Computer programmers create new software.
14) dimensions – размеры, величина; объем мат. измерение. Egyptian pyramids are structures of very large dimensions. Computers allow to work with three dimensional models.
15) to replace – заменять. Digital telephone systemsare replacing analogue ones.
16) digital – цифровой. Digital sound recording is made on compact discs.
17) analogue – аналоговый. Analogue signal can be transformed into digital one.
18) speed – скорость, быстрота. New models of computer processors have greater speed and are more reliable.

is called a component. Alloys may be binary (two-component), ternary (three-component), etc. The ability of various metals to form alloys differs greatly.

1. Найдите русские эквиваленты следующих словосочетаниям:

the metals resemble one another; are based upon their physical or chemical properties; metals vary greatly in density; about one-half as heavy as water; also vary in hardness; can resist a strain; to offer more or less resistance; with any given substance; in the molten condition; the ability of various metals.

металлы изменяются сильно по удельному весу; металлы схожи друг с другом; способности различных металлов; основаны на их физических или химических свойствах; также изменяются по твердости; оказывать более или менее сопротивление; в расплавленном состоянии; могут противостоять деформации; для любого данного вещества; почти в два раза легче воды.

2. Ответьте на вопросы:

1) What do metals resemble one another in?
2) What do metals greatly vary in?
3) What metal is the lightest?
4) What metal is the heaviest?
5) What is an alloy?
6) What is each constituent of an alloy called?

3. Закончите предложения:

1) The uses to which metals are put are based upon their…
a) only physical properties;
b) only chemical properties;
c) both physical and chemical properties.

2. The lightest metal is…
a) magnesium;
b) aluminium;
c) lithium.

3. The heaviest metal is…
a) platinum;
b) silver;
c) osmium.

4. The resistance to the flow of an electric current through a substance is determined by…
a) its density;
b) its dimensions;
c) its temperature.

retail sales of any city in the world, with a total spend of around £64.2 billion. The Port of London is the second-largest in the United Kingdom, handling 45 million tonnes of cargo each year.

London has five major business districts: the City, Westminster, Canary Wharf, Camden & Islington and Lambeth & Southwark. One way to get an idea of their relative importance is to look at relative amounts of office space: Greater London had 27 million m^2 of office space in 2001, and the City contains the most space, with 8 million m^2 of office space.

Transport is one of the four main areas of policy administered by the Mayor of London however the mayor's financial control does not extend to the longer distance rail network that enters London. In 2007 he assumed responsibility for some local lines, which now form the London Overground network, adding to the existing responsibility for the London Underground, trams and buses. The public transport network is administered by Transport for London (TfL) and is one of the most extensive in the world. Cycling is an increasingly popular way to get around London. The London Cycling Campaign lobbies for better provision.

The lines that formed the London Underground, as well as trams and buses, became part of an integrated transport system in 1933 when the London Passenger Transport Board (LPTB) or *London Transport* was created. Transport for London (TfL) is now the statutory corporation responsible for most aspects of the transport system in Greater London, and is run by a board and a commissioner appointed by the Mayor of London.

Текст 3. LONDON ATTRACTIONS

London is more than twenty centuries old and there are a lot of interesting buildings and sights in it. The majority of them are in the West End, Westminster and the City. The West End of London is famous for its beautiful monuments and palaces, fine parks fashionable shopping centers and expensive hotels.

There are many places of interest in London. One of them is Trafalgar Square with the Nelson's monument and the National Gallery with its rich collection of European paintings. Buckingham Palace is the royal residence. Westminster Abbey is one of the beautiful buildings in London. It contains the memorials of many prominent citizens of Britain. Close to Westminster Abbey are the Houses of Parliament with probably the most famous clock tower and tower clock, Big Ben.

But the most attractive sights of London are the British Museum and St. Paul's Cathedral. A lot of people from Britain and all over the world come every year to visit these fine sights. The British Museum contains the richest collection of the Greek ancient art.

As London is on the banks of the river Thames there is a number of bridges in London. The most famous of them are the Tower Bridge, Waterloo Bridge and Westminster Bridge. There is another famous English city on the banks of this river. This is Windsor. There is a private castle of the British monarch there.

Текст 4. RAG DAY FUN RAISES IN EXCESS OF £9,000 FOR GOOD CAUSES

Students in fancy dress brought some good spirited fun to the town as Bridgwater College's annual RAG (Raise and Give) Day generated donations in excess of £9,000.

Students donned costumes ranging from Oompah Loompahs to sumo wrestlers, and from Elvis to Lady Ga Ga for the annual fundraiser, and their efforts were matched by College staff, with the best team hotly battled out between the College's Reception and Course Enquiries team staging a Michael Jackson Thriller tribute and Student Support redecorating their offices as a boozy Wild West Saloon.

A host of events took place in the College including fashion shows showing off the full range of RAG Day costumes, a DJ mixing competition, gladiatorial games and a staff football challenge, won by the Automotive staff. There was also face painting, a bouncy castle, a shooting gallery and the Macarena World Record breaking attempt - which sadly was not achieved, but staff and students enjoyed putting their best feet forward!

Senior tutor Carole Melia said "We're always delighted and impressed by how much effort everyone puts into dressing up and organizing fundraising activities for our RAG Day charities. Everyone has worked really hard to raise a record breaking amount for this year's chosen charities - War Child, WaterAid and The Miscarriage Association. All the staff would like to say a huge thank you to the students for their good spirits and to the people who were so generous with their donations."

RAG Day – "студенческие забавы", студенческие шествия (по улицам университетского города; весёлые и шумные, часто сопровождающиеся самодеятельными выступлениями; проводятся раз в год для сбора пожертвований в благотворительных целях)

cross-sectional area cannot support the maximum stress of the cyclic force. Knowledge of tensile stress, elastic limits, and the resistance of materials to creep and fatigue are of basic importance in engineering.

Creep is a slow, permanent deformation that results from a steady force acting on a material. Materials at high temperatures usually suffer from this deformation. The gradual loosening of bolts and the deformation of components of machines and engines are all the examples of creep. In many cases the slow deformation stops because deformation eliminates the force causing the creep. Creep extended over a long time finally leads to the rupture of the material.

1. Переведите текст на русский язык.

2. Ответьте на следующие вопросы.

1) What do we call fatigue? When does it occur? What are the results of fatigue?

2) What do we call creep? When does this type of permanent deformation take place? What are the results of creep?

Текст 12. METALWORKING

Пояснения к тексту

die – штамп, пуансон, матрица, фильера, волочильная доска
rolling – прокатка
extrusion – экструзия, выдавливание
initial piece – заготовка
drawing – волочение
hollow – полый
forging – ковка
thick-walled – толстостенный
mandrel – оправка, сердечник
loosely – свободно, с зазором
billet – заготовка, болванка
fitting – *здесь* посадка
orifice – отверстие
ram – пуансон, плунжер
cross section – поперечное сечение

Rolling

Rolling is the most common metalworking process. More than 90 percent of the aluminum, steel and copper produced are rolled at least once in the course of production. The most common rolled product is sheet. Rolling can be done either hot or cold. If the rolling is finished cold, the surface will be smoother and the product stronger.

4. Закончите предложения, используя данные слова: pure metals; hardness; solids; vary; density; solidify; alloys; offer; resistance.

1) All substances... more or less... to the flow of an electric current through them.
2) The metals also vary in ...
3) The metals ... greatly in ...
4) The... obtained when two or more metals are mixed in the molten condition and allowed to ... are called ...
5) ... are seldom used in engineering.

5. Переведите на английский язык:

1) Чистые металлы редко используются в промышленности.
2) Они производят сталь двумя главными методами.
3) Магний, железо и цинк способны задержать кислород из воды.
4) Способности различных металлов обрабатывать сплавы сильно отличаются.
5) Каждая составляющая часть сплава называется компонентом.

Текст 11. HOW MATERIALS REACT TO EXTERNAL FORCES

Пояснения к тексту

compression – сжатие
to stretch – растягивать
creep – ползучесть
tension – напряженность, растягивающее усилие, растяжение
cross-sectional area – площадь поперечного сечения
to bend – гнуть, согнуть
to extend – расширять, продолжаться
elastic limit – предел упругости
to meet the needs – отвечать требованиям
fatigue – усталость металла
fracture – перелом, излом
torsion – кручение
twisting – закручивание, изгиб
rupture – разрыв, разрушение

Fatigue is the growth of cracks under stress. It occurs when a mechanical part is subjected to a repeated or cyclic stress, such as vibration. Even when the maximum stress never exceeds the elastic limit, failure of the material can occur even after a short time. No deformation is seen during fatigue, but small localized cracks develop and propagate through the material until the remaining

ergy. It finds wide application at every mill and factory. As for the electric crane, it can easily lift objects weighing hundreds of tons.

A good example, which is illustrating an important industrial use of the electric current, is the electrically heated furnace. Great masses of metal melted in such furnaces flow like water. Speaking of the melted metals, we might mention one more device using electricity that is the electric pyrometer. The temperature of hot flowing metals can be easily measured owing to the electric pyrometer.

These are only some of the various industrial applications of the electric current serving us in a thousand ways.

Текст 10. PROPERTIES OF METALS

Пояснения к тексту

behaviour – режим (работы)
density – плотность, удельный вес
sodium – натрий
lead – свинец
extent – мера
solids – твердые металлы
molten – расплавленный, литой
solidify – твердеть, застыть
alloy – сплав, примесь
constituent – составляющая часть целого

The metals resemble one another in their general chemical behaviour with other substances, but they differ markedly in activity.

The uses to which metals are put are based upon their physical or chemical properties. The metals vary greatly in density. The lightest is lithium, which has the density of 0.534 and is, therefore, about one-hall as heavy as water. The heaviest is osmium (D. 22.48) which is closely related to platinum (D. 21.45) in physical and chemical properties. The so-called light metals, of which sodium, potassium, magnesium and aluminium are examples, have a density less than 4; iron, lead, tin, silver, etc. are known as heavy metals.

The metals also vary in hardness, from potassium, which can be molded like wax, to chromium, which will cut glass. The metals and other substances differ in the extent to which they can resist a strain that tends to bring about a permanent change in their form. All substances offer more or less resistance to the flow of an electric current through them. With any given substance, the resistance is determined by its dimensions and the temperature.

The solids obtained when two or more metals are mixed in the molten condition and allowed to solidify are called alloys. Each constituent of an alloy

19) maintenance – эксплуатация, техническое обслуживание. The maintenance of the device is not very difficult.

20) purpose – цель; назначение, намерение. To become a good specialist is the purpose of my study.

21) artificial – искусственный. The first artificial satellite was launched on the 4th of October, 1957.

22) to perform – делать, выполнять. Robots can perform the work faster than people.

23) to intend – намереваться. We intended to complete the experiment by Friday.

24) to move – двигать(ся), передвигать(ся), перемещать(ся). The Earth moves on its orbit around the Sun.

25) to require – нуждаться (в чем-л.); требовать (чего-л.). Working on computer requires much attention.

26) essential – существенный; необходимый; основной. Fast typing is an essential skill nowadays.

27) to devote – посвящать. He devoted himself to research work.

28) to select – выбирать, отбирать. John was selected for the basketball team.

29) particularly – особенно, в частности. He was particularly interested in modern Internet technologies.

30) appropriate – подходящий, соответствующий. Every computer device has an appropriate driver.

31) to specify – точно определять, устанавливать. The instructions specify how the device is to be used.

32) to withstand – противостоять, выдерживать. New artificial materials can withstand high temperatures.

33) procedure – методика, метод. The testing procedure is rather simple.

34) to assist – помогать, содействовать. The young nurse was assisting at her first operation.

35) to suggest – предлагать, советовать. They suggested to make a new research.

36) occupation – род занятий, профессия. His occupation is a project manager (начальник строительства).

37) improvement – улучшение, усовершенствование. The tests showed that the device needs improvements.

2. Прочитайте следующие слова и найдите их русские эквиваленты:

canal, material, mechanism, pneumatic, ventilation, signal, laser, radar, optics, revolution, parallel, aerodynamics, navigation, atmosphere, rocket, reactor, radiation, radioactive, method.

their ancillary mechanisms and structures. Heating, ventilating, air-conditioning, transportation, manufacturing, and vibration are some areas falling within their domain. The art of mechanical engineering dates back to the labor-saving devices and military machines of ancient times, but it received its greatest boost in the eighteenth century with the invention of the steam engine and industrial machinery, which marked the onset of the industrial revolution.

Mining and Metallurgical Engineering. The production and use of metals, has two distinct branches. One deals with the location, extraction, and treatment of ores to obtain base metals, and the other with the transformation of these metals into useful forms and with the study of techniques for improving their performance in specific applications. The study of ceramics is often included in this field. Special topics range all the way from materials that may be used with living tissue to the development of composites for high-temperature applications such as in the heat shields used for satellite reentry.

In addition to the fields identified above, other categories of engineering are often encountered. These include architectural, ceramic, geological naval and marine, nuclear, petroleum, sanitary, and textile engineering.

Текст 2. ENGINEERING AS A PROFESSION

Engineering is often compared to medicine and law in discussions of professional status. It would appear to qualify according to the dictionary meaning of the word. Engineering require specialized knowledge and intensive preparation with continued study after leaving the university. The profession has a strong organizational structure, requires high standards, and operates in the public service. These attributes are commonly associated with the word professional as it is used here. This is a rather restricted interpretation and it differs from its use in describing, say, a professional actor or sportsman who is paid for his efforts, as opposed to an amateur who performs for enjoyment. It is also sometimes used in reference to level of experience so that one speaks of a professional job house painting or plumbing. Another use refers to a continued effort over an extended period of time so that one hears reference to a "professional student" as one who spends many years at a university.

Most important is the fact that engineers see themselves as professionals. They have to be technically competent and operate with responsibility in conformity with accepted notions of professionalism.

The type of responsibility is rather different from a doctor. The doctor's responsibility is clearly recognizable because of directness of a doctor's relationship. For the engineer, the result of his labors – be it a bridge, air – conditioning unit, automobile or computer – is interposed between himself and the user. However, since people's lives are often at stake if an error is made, a high level of competence is essential.

In this connection one might remember the Russian academician V. V. Petrov. He was the first to carry on experiments and observations on the electrification of metals by rubbing them one against another. As a result he was the first scientist in the world who solved that problem.

Who does not know that the first man to get the electric current was Volta after whom the unit of electric pressure, the volt, was named? His discovery developed out of Galvani's experiments with the frog. Galvani observed that the legs of a dead frog jumped as a result of an electric charge. He tried his experiment several times and every time he obtained the same result. He thought that electricity was generated within the leg itself.

Volta began to carry on similar experiments and soon found that the electric source was not within frog's leg but was the result of the contact of both dissimilar metals used during his observations. However, to carry on such experiments was not an easy thing to do. He spent the next few years trying to invent a source of continuous current. To increase the effect obtained with one pair of metals, Volta increased the number of these pairs. Thus the voltaic pile consisted of a copper layer and a layer of zinc placed one above another with the layer of flannel moistened in salt water between them. A wire was connected to the first disc of copper and to the last disc of zinc.

The year 1800 is a date to be remembered: for the first time in the world's history a continuous current was generated.

Volta's Short Biography.

Volta was born in Como, Italy, on February 18, 1745. For some years he was a teacher of physics in his home town. Later on he became professor of natural sciences at the University of Pavia. After his famous discovery he travelled in many countries, among them France, Germany and England. He was invited to Paris to deliver lectures on the newly discovered chemical source of continuous current. In 1819 he returned to Como where he spent the rest of his life. Volta died at the age of 82.

Текст 7. EARLY HISTORY OF ELECTRICITY

Let us now turn our attention to the early facts, that to say, let us see how it all started.

History shows us that at least 2,500 years ago the Greeks were already familiar with the strange force, which is known today as electricity. Generally speaking, three phenomena made up all of man's knowledge of electrical effects. The first phenomenon under consideration was the familiar lightning flash – a dangerous power, as it seemed to him, which could both kill people and burn or destroy their houses. The second manifestation of electricity he was more or less familiar with was as following: he sometimes found in the earth a strange stone, which looked like glass. On being rubbed, that yellow stone, that is to say am-

ber, obtained the quality of attracting light objects of a small size. The third phenomenon was connected with the so-called electric spark, which possessed the property of giving more or less electric shocks, which could be obtained by a person coming into contact with the electric fish.

Nobody knew that the above phenomena were due to electricity. People could neither understand their observation nor find any practical applications for them.

As a matter of fact, all of man's knowledge in the field of electricity has been obtained during the last 370 years. Needless to say, it took a long time before scientists understood how to make use of electricity. In effect, most of the electrically operated devices, such as the electric lamp, the refrigerator, the tram, the lift, the radio, and so on, – in less one hundred years old. They play an important part in man's everyday life all over the world. In fact, we cannot do without them at present.

We have not named the scientists who contributed to the scientific research on electricity. However, famous names are connected with its history and among them we find that of Phales, the Greek philosopher. As early as about 600 B.C. (that is, before our era) he discovered that when amber was rubbed, attracted and held minute light objects. However, he could not know that amber was charged with electricity owing to the process of rubbing. Then Gilbert, the English physicist, began the first systematic scientific research on electrical phenomena. He discovered that various other substances possessed the property similar to that of amber or, in other words, they generated electricity when they were rubbed. He gave the name "electricity" to the phenomenon he was studying. He got this word from the Greek "electrum" meaning "amber".

Many learned men of Europe began to use the new word "electricity" in their conversation as they were engaged in research of their own. Scientists of Russia, France, and Italy made their contribution as well as the English men and the Germans.

Текст 8. ENERGY

In the language of science, energy is the ability to do work. There are various forms of energy, such as heat, mechanical, electrical, chemical, atomic, and so on. One might also mention the two kinds of mechanical energy – potential and kinetic, potential energy being the energy of position while kinetic energy is the energy of motion.

It is well known that one form of energy can be changed into another. A waterfall may serve as an example. Water falling from its raised position, changes energy from potential to kinetic energy. The energy of falling water is generally used to turn the turbines of hydroelectric stations. The turbines in their turn drive the electric generators, the latter producing electric energy. Thus, the

Agricultural Engineering is one of the earliest forms of engineering practiced by man. It uses agricultural machinery, irrigation, and surveying and deals with the many associated problems of crop raising and animal husbandry. Not only are the fundamental engineering subjects such as hydraulics, metallurgy, and structures of importance, but soil conservation, biology, and zoology are also necessary components. It is here tat machines interface with the animal and kingdoms. Challenging problems occur in areas such as land reclamation and efficient utilization, and improved methods of food production and harvesting.

Chemical Engineering encompasses the broad field of raw material and food processing and the operation of associated facilities. It is mainly involved with the manufacture and properties of materials such as fuels, plastics, rubber, explosives, paints, and cleaners. The chemical engineer is well grounded in both basic and engineering chemistry and apart the production of special materials, may be involved in such areas as combustion, recycling of waste products, and air and water pollution.

Civil Engineering is one of the oldest branches of the engineering profession. It covers a wide field, and many subsidiary branches have grown from it. The civil engineer is mainly employed in the creation of structures such as buildings, bridges, dams, highways, harbors, and tunnels. He is usually knowledgeable in hydraulics, structures, building materials, surveying, and soil mechanics. One important area comprises water supply, drainage, and sewage disposal. More than any other branch of engineering, the results of the civil engineer's efforts are the most visible in a permanent form.

Electrical Engineering, in general, deals with creation, storage, transmission and utilization of electrical energy and information. Most of its activities may be identified with power or communications. Electrical engineering is of recent origin, dating back only to the eighteenth century, when electrical phenomena were first subjected to scientific scrutiny. After this, useful applications were quickly identified. Today, the impact of a power failure graphically illustrates our dependence on electrical power. The field encompasses information systems, computer technology, energy conversion, automatic control, instrumentation, and many other specialties.

Industrial Engineering is mainly concerned with the manufacture of useful commodities from raw materials. Since most of the other engineering fields have a bearing on this activity, the industrial engineer requires a particularly broad view. The management of men, materials, machines, and money are all within his endeavor in achieving effective production. Plant layout, automation, work methods, and quality control are included, and, more than in most of the other traditional branches of engineering, the industrial engineer needs to have some grounding in psychology and dealing with personnel.

Mechanical Engineering develops machines for the generation and utilization of power. Mechanical engineers design turbines, engines, pumps, and

3. Найдите в правой колонке перевод английских слов:

1) appropriate	A. отбирать
2) essential	B. передавать
3) property	C. помогать
4) speed	D. предлагать
5) to assist	E. свойство
6) to create	F. скорость
7) to reduce	G. создавать
8) to require	H. сокращать
9) to select	I. соответствующий
10) to suggest	J. существенный
11) to transmit	K. требовать

4. Прочтите и переведите следующие словосочетания:

design of large buildings; construction materials; to operate machinery of all types; electric power and signals; engineering problems; electronic circuits; important developments; to transmit power; to reduce power losses; communication systems; speed of computer operations; techniques of modern shipbuilding; particular requirements of production; to withstand the high temperatures; to reduce accidents

Текст 1. REALM OF ENGINEERING

Traditionally, engineering activities have been grouped into certain areas of specialization. These originated as civil and military engineering, catering to man's early needs. Scientific discoveries and their development gave birth to a variety of fields of application such as mechanical, chemical, and electrical engineering.

Today the rapid rise of technology is bringing the adequacy of even these widely accepted designations into question in describing specialist areas within engineering. Several of the more commonly accepted categories are described below.

Aerospace Engineering combines two fields, aeronautical and astronautical engineering. The former is concerned with aerodynamics, structure and propulsion of vehicles designed for the flight in the Earth's atmosphere. The latter relates to flight above the Earth's atmosphere and involves the design of rockets and space vehicles incorporating sophisticated propulsion, guidance, and life support systems.

The day when one man drew his design in chalk on the floor and then proceeded to build it are long past. Today large teams of engineers are needed to cope with the complexity of modern flight vehicles. The design of an aircraft involves a multitude of specialty areas such as stress analysis, control surface theory, aircraft stability, vibration, production techniques and flight testing.

mechanical energy of falling water is turned into electric energy. The electric energy, in its turn, may be transformed into any other necessary form.

When an object loses its potential energy, that energy is turned into kinetic energy. Thus, in the above-mentioned example when water is falling from its raised position, it certainly loses its potential energy, that energy changing into kinetic energy.

We have afready seen that energy of some kind must be employed to generate the electic current. Generally speaking, the sources of energy usually employed to produce current are either chemical, as in the battery, or mechanical, as in the electromagnetic generator. Chemical sources of current having a limited application, the great quantities of electric energy generated today come from various forms of mechanical energy.

The rising standards of modern civilization and growing industrial application of the electric current result in an increasing need of energy. Every year we need more and more energy.

Текст 9. ELECTRIC CURRENT SERVES US IN A THOUSAND WAYS

The electric current was born in the year 1800 when Volta constructed the first source of continuous current. Since that time numerous scientists and inventors, Russian and foreign, have greatly contributed to its development and practical application.

As a result, we cannot imagine modern civilization without the electric current. We can't imagine how people could do without electric lamps, without vacuum cleaners, refrigerators, washing machines and other electrically operated devices that are widely used today. In fact, telephones, lifts, electric trams and trains, radio and television have been made possible only owing to the electric current.

The student reading this article is certainly familiar with the important part which the electric current plays in everyday life. From the moment when he gets up in the morning until he goes a bad at nigh, he widely uses electric energy. Only when going to the institute either on foot or by bicycle, he can do without electricity. In fact, it is well known that electric current is necessary for the operation of trolley-buses, trams, buses and modern trains.

During the day the student will also use some electrical devices working in the laboratory, making use of the telephone, the lift, the tram and so on. As for the evening, if he studies or reads by an electric lamp, watches television, goes to the theatre or cinema, he certainly uses electricity.

Some people are more familiar with the various application of the electric current in their everyday life than they are with its numerous industrial applications. However, electric energy finds its most important use in industry. Take, for example, the electric motor transforming electric energy into mechanical en-

3. Найдите неверные утверждения и исправьте их.

1) V. Petrov discovered the electric arc, a form of the carbon filament.
2) In Petrov's experiments the arc flame lasted for a long time.
3) Thomas Edison invented an arc that burned like a candle.
4) A lamp with a tungsten filament was invented by Lodygin.
5) Artificial daylight lamps are more expensive than incandescent lamp.
6) Automation deals with electricity.
7) All of the measuring devices are not electrically operated.

4. Переведите с русского на английский:

1) Наши дома освещаются.
2) В. Петров открыл электрическую дугу, пламя которой горело недолго.
3) П. Яблочков изобрел дугу, которую назвали «свечой Яблочкова».
4) Т. Эдисон использовал углеродную нить накала.
5) Сегодня мы используем «холодную лампу», лампу дневного света.
6) Мы не можем себе представить наше существование без радио и телефона.
7) Электричество внесло огромный вклад в развитие радиокоммуникаций.
8) Измерительные приборы работают от источника питания.
9) Невозможно жить без помощи электричества.
10) Искусственные лампы дневного света дешевле, чем лампы накаливания.

Текст 6. FROM THE HISTORY OF ELECTRICITY

There are two types of electricity, namely, electricity at rest or in a static condition and electricity in motion, that is, the electric current. Both of them are made up of electric charges, static charges being at rest, while electric current flows and does work. Thus, they differ in their behaviour.

Let us first turn our attention to static electricity. For a long time it was the only electrical phenomenon to be observed by man. As previously mentioned at least 2,500 years ago, or so, the Greeks knew how to get electricity by rubbing substances. However, the electricity to be obtained by rubbing objects cannot be used to light lamps, to boil water, to run electric trains, and so on. It is usually very high in voltage and difficult to control, besides it discharges in no time.

As early as 1753, Franklin made an important contribution to the science of electricity. He was the first to prove that unlike charges are produced due to rubbing dissimilar objects. To show that the charges are unlike and opposite, he decided to call the charge on the rubber – negative and that on the glass – positive.

Engineering is somewhat tainted in the public eye. It is recognized that technology, or its misapplication, is responsible for the various pollution threats and also for devastating weapons of war, and the public assumes that it is the engineers who have brought us to this pass. It should be realized that technology, too operates according to demands, and just as the demand for goods, and comfort has led to environmental damage, so technology can also correct this. In one sense engineers with their machines are the tools of society, and it is society that ultimately determines how they are to be used.

The usual structure of engineering curricula includes four main components. First come the basic sciences of physics, chemistry and mathematics. Then a block of humanities courses is required. The engineering courses fall in the general areas of mechanics of solids, properties of materials, mechanics of fluids, thermodynamics, electrical science, transfer and rate processes and systems. Finally come the design courses which put it all together. It is this design discipline which exemplifies engineering in action, for it illustrates how engineers solve practical problems by applying their scientific knowledge and skills in the interactive decision-making process. This is how engineers adapt science to human needs.

Раздел 2. ГРАММАТИКА

Тема 5. ИМЯ СУЩЕСТВИТЕЛЬНОЕ

Таблица 5.1

Образование множественного числа существительных

Правила	Примеры
1	*2*
1. Существительные образуют множественное число прибавлением окончания ***-s*** к форме единственного числа	scientist – scientist**s**, science – science**s**, day – day**s**, radio – radio**s**
2. Существительные, оканчивающиеся на свистящий или шипящий звук, принимают окончание ***-es***	class – class**es**, box – box**es**, match – match**es**
3. В существительных, оканчивающихся на ***-y*** с предшествующей согласной, ***y*** переходит в ***i*** и прибавляется окончание ***-es***	city – cit**ies**, library – librar**ies**
4. Существительные, оканчивающиеся на ***-o*** с предшествующей согласной, принимают окончание ***-es***	negro – negro**es**, tomato – tomato**es**
5. В существительных, оканчивающихся на ***-f*** или ***-fe***, ***f*** обычно переходит в ***v*** и прибавляется окончание ***-es***	leaf – lea**ves**, life – li**ves**, *но* roof – roo**fs**

2. Выберите правильный вариант из предложенных.

1) The new line should be so profitable as/as profitable as the old one.
2) This handset is the most profitable/the more profitable we've ever made.
3) This version of the programme is *the most recent/recenter*.
4) The guarantee is a year longer *than/that* with our older models.
5) Nothing is *worse/worst* than missing a flight because of traffic.
6) This printer is one of the best/better.
7) The meeting wasn't long as /as long as I thought.
8) Today the share price is more bad/worse than it was yesterday.
9) I'm sorry, the journey took longer than/the longest we expected.
10) We'll be there soon. It's not much farer/further.

Тема 7. НЕОПРЕДЕЛЕННЫЕ МЕСТОИМЕНИЯ

Таблица 7.1

Производные слова

Место-имения	+ thing	+ body + one	+ where	Употреб-ление
some	**something**	**somebody**	**somewhere**	в утверди-тельном предложе-нии
некоторый	*что-то*	**someone**	*где-то*	
какой-то	*что-нибудь*	*кто-то*	*куда-нибудь*	
какой-нибудь		*кто-нибудь*	*куда-то*	
			где-нибудь	
any	**anything**	**anybody**	**anywhere**	в утверди-тельном предложе-нии
какой	*всё*	**anyone**	*везде*	
любой		*какой*	*повсюду*	
		все		
not any = **no** *никакой*	**not … anything** = **nothing** *ничто ничего*	**not … anybody** = **nobody** **no one, none** *никто*	**not … anywhere** = **nowhere** *нигде нигда*	в отрица-тельном предложе-нии
any? *какой-нибудь?*	**anything?** *что-то?* *что-нибудь?*	**anybody?** *кто-то?* *кто-нибудь?*	**anywhere?** *где-то?* *куда-то?* *где-нибудь?* *куда-нибудь?*	в вопроси-тельном предложе-нии
everything *каждый* *всякий*	**everything** *всё*	**everybody** **everyone** *все*	**everywhere** *везде* *повсюду*	во всех трёх типах пред-ложений

A man, who has been an apprentice for some years in a building trade and has therefore enough skill to be considered a skilled worker at his trade[1], is called tradesman or craftsman.

He may be a carpenter-and-joiner, bricklayer, mason, slater-and-tiler[2], plumber, electrician, house painter, glazier, floor-and-wall tiler, plasterer, paperhanger, steeplejack, hot water fitter[3] and so on.

Bricklayer is a tradesman who builds and repairs brickwork, lays and joints salt glazed stoneware drains, sets, chimney pots, manhole frames and fireplaces. He renders brickwork, including the insides of manholes. A sewer and tunnel bricklayer is a specialized bricklayer.

Carpenter is a man who erects wood frames, fits joints, fixes wood floors, stairs and window frames, asbestos sheeting and other wall-board. He builds or dismantles wood or metal formwork. The two trades of carpenter and joiner were originally the same, and most men can do both, but specialize in one or the other.

Joiner is a man who makes joinery and works mainly at the bench on wood, which has been cut and shaped by the machinists. His work is finer than the carpenter's, much of it being highly finished and done in a joinery shop.

Mason is a stone worker or stone setter. A fixer or a fixer mason or a builder mason is a mason who sets prepared stones in walls.

Plasterer is a tradesman who may be a fibrous plasterer or a plasterer in solid work. The latter lays successive coats of plaster or rendering and fixes fibrous plaster such as mould cornices and wall pattern.

A construction manager, or CM, provides services similar to those of general constructor, but represents client's interest during all phases of the building process — design as well as construction. They are usually paid a negotiated fee for the scope of services rendered.

The CM decides who bids the job, picks up the request for invitation to bid, evaluates the bids, and awards work to the most reasonable bidder. The CM also prepares contracts and sends them out to the subcontractors. As a result, the subcontractors are under the CM's direction. The CM may also be responsible for the safety of workers on the construction site.

Текст 5. USES OF ELECTRICITY

Пояснения к тексту

wherever – где бы ни, куда бы ни
instantly – немедленно
arc – дуга
flame – пламя
discharge – разряд
carbon – углерод

filament – нить накала
tungsten – вольфрам
average – средний
flood with light – освещать
incandescent lamp – лампа дневного накаливания
"cold" daylight lamp – «холодная» лампа дневного света

Electricity is the power that has made possible the engineering progress of today. Wherever we look around us, we can find this power serving us in some way. When we use a switch and have our room instantly flooded with light, we seldom think of what is happening to make it possible. Probably the important use of electricity in the modern home is producing light.

Do you know that the first ever man-made electric light illuminated the laboratory of the St. Petersburg physicist was Vasily Petrov in 1802? He had discovered the electric arc, a form of the gas discharge. But in Petrov's experiments the arc flame lasted for only a short time.

In 1876, Pavel Yblochkov invented an arc that burned like a candle for a long time and it was called "Yablochkov's candle". The source of light invented by Yablochkov won world-wide recognition. But while he and several other inventors were improving the arc light, some engineers were working along entirely different lines. They thought to develop an incandescent lamp. It was a young Russian engineer, Alexander Lodygin, who made the first successful incandescent lamp. The famous American inventor Thomas Edison improved the lamp having used a carbon filament. But it was again Lodygin who made another important improvement in the incandescent lamp, having invented a lamp with a tungsten filament, the lamp we use today.

Another electric light we use today is the light of the luminescent lamp – a "cold" daylight lamp. Artificial daylight lamps are much cheaper than incandescent lamps and last much longer. This is the lighting of the future.

The uses of electricity in the home do not end with lighting. There are more and more electric devices helping us in our home work.

But we should not forget that electricity is the most important source of energy in industry as well. A worker in a modern manufacturing plant uses on the average in the machines which he operates over 10 000 kilowatt-hours electrical energy a year.

Automation which is one of the main factors of technical progress today is impossible without electricity.

Our life can't be imagined without telephone, telegraph and radio communications. But it is also electricity that gives them life. In recent years has made a great contribution to radio communication between the spaceships and also between the astronauts and the Earth.

4) I'd like some sandwich.
5) How many wine do we need?
6) Can you buy a rice for tonight?
7) How many peoples are coming to the party?
8) I have some five dollar bill.
9) I'd like some fruits.
10) How much vegetables do we have?

Тема 6. ИМЯ ПРИЛАГАТЕЛЬНОЕ

Таблица 6.1

Степени сравнения прилагательных

Исходная форма	Сравнительная степень (the Comparative Degree)	Превосходная степень (the Superlative Degree)
Односложные прилагательные		
big young	bigg**er** young**er**	**the** bigg**est** **the** young**est**
Многосложные прилагательные		
interesting beautiful	**more** interesting **more** beautiful	**the most** interesting **the most** beautiful
Исключения		
good/well bad many much little old far	better worse more more less older / elder farther / further	the best the worth the most the most the least the oldest / the eldest the farthest / the furthest

Упражнения

1. Исправьте ошибки.

1) Most tallest office towers in the world are in Kuala Lumpur.
2) Cleveland is now one of the most cleanest cities in North America.
3) In Buenos Aires foreign bankers are as common than coffee house poets.
4) The London Underground is worst than the Tokyo Underground system.
5) Ireland is not as larger as Sweden.
6) The London Stock Exchange is very older than the Singapore Exchange.
7) Their prices are very high in compared to us.

Продолжение табл. 5.1

1	*2*
6. Существительные, заимствованные из греческого и латинского языков, сохранили форму множественного числа этих языков	basis – bases, crisis – crises, datum – data, phenomenon – phenomena
7. Некоторые существительные латинского происхождения имеют две формы множественного числа	medium – media – mediums, memorandum – memoranda – memorandums
8. Несколько существительных сохранили древнюю форму образования множественного числа и являются исключениями	man – men, woman – women, child – children, tooth – teeth, foot – feet
9. Сложные имена существительные образуют множественное число путем добавления окончания к основному слову	sister-in-law – sisters-in-law, editor-in-chief – editors-in-chief, carpet-sweeper – carpet-sweepers

Упражнения

1. Выберите правильный вариант.

1) The Evans have four *child / children / childrens*, two boys and two girls.
2) Three or four *mans / men / man* are sitting on chairs.
3) In some countries you can have more *wife / wifes / wives*.
4) *That / These / This* shoes cost too much.
5) These people *has / have / is* a nice house.
6) Outside a farm you often see *chicken / chickens*.
7) In my fridge I have some *chicken / chickens*.
8) On my desk there are a lot of *paper / papers*.
9) An envelope is made of *paper / papers*.
10) The young woman had beautiful *hair / hairs*.
11) The old man had only a few *hair / hairs* on his head.
12) The man carried some *bag / bags*.
13) The man carried some *luggage / luggages*.
14) Before he left home, his mother gave him some good *advice / advices*.

2. Исправьте следующие предложения.

1) How much apples do you want?
2) Do you want a wine?
3) I have four childs.

Little could be done in modern research laboratory without the aid of electricity. Nearly all of the measuring devices used in developing nuclear power for the use of mankind are electrically operated.

1. Ответьте на вопросы:

1) What is electricity?
2) Does electricity serve us?
3) What is the most important use of electricity?
4) Who was the first man-made electric light?
5) What had he discovered?
6) Did the arc flame in Petrov's experiment last for a long times?
7) What did P. Yablochkov invent?
8) Was "Yablochkov's candle" the last invention? What followed it?
9) Who made the first incandescent lamp?
10) How did Thomas Edison improve the lamp?
11) What did Lodygin invent?
12) What is another electric light we use today?
13) Is electricity the most important source of energy?
14) Is automation impossible without electricity?
15) Are measuring devices used in developing nuclear power electrically operated?

2. Найдите в тексте английские эквиваленты следующих словосочетаний:

1) немедленное освещение –
2) электрическая дуга –
3) разряд газа –
4) пламя дуги –
5) горела как свеча –
6) источник свет –
7) всемирное признание –
8) вольфрамовая нить накала –
9) искусственные лампы дневного света –
10) сконструировать генератор –
11) исследовательская лаборатория –
12) без помощи электричества –
13) измерительные приборы –
14) вместительные приборы –
15) вместил огромный вклад –

Продолжение табл. 9.1

Группа	Present	Past	Future	Временные указатели
Perfect Continuous	**have been + V(ing)** **has been + V(ing)** *have been asking* *has been taking* *спрашивает, берёт*	**had been + V(ing)** *had been asking* *had been taking* *спрашивал* *брал*	**will have been + V(ing)** *will have been asking* *will have been taking* *будет спрашивать* *будет брать*	by the time, since morning, for 3 hours, since he came

Упражнения

1. Поставьте глаголы в подходящую форму Present Indefinite, Past Indefinite или Past Perfect:

1) The company is doing very well. Last year sales _______ (go up) by 15%, and so far this year they _______ (go up) another 12%.

2) We _______ (operate) all Latin America. Recently we _______ (set up) branches in Peru and Ecuador.

3) This _______ (not look) like the right block. Are you sure we _______ (come) to the right address?

4) ______ (you/see) my laptop? I'm sure I _______ (leave) it here earlier.

5) I ______ (just/meet) Andrew from Sales _______ (you/know) him?

6) I _______ (never/speak) to him, but I _______ (speak) to his assistant on the phone yesterday.

7) I _______ (work) for WorldCom now - _______ (be) there for more than five years_______ (you /know) WorldCom?

8) I _______ (work) for WorldCom since last year, but now I _______ (want) to change jobs. _______ (you/hear) of any vacancies?

2. Выберите подходящий вариант из данных:

1) While I *looked/was looking* for my keys, I suddenly remembered I *left/had left* them at home.

2) In those days the unions *used to/had used to* go on strike whenever there *was/was being* a problem.

3) After they *were buying/had bought* the company, they *started/were starting* to make a lot of people redundant.

4) Jack used to *have/was having* a Mac, but then he *used to change/changed* to a PC.

5) I asked about my package in reception, but they *said/were saying* that it still *hadn't arrived/wasn't arriving*.

Текст 2. TO THE HISTORY OF CONSTRUCTION

With the introduction of the railways and steam machinery, transportation and manufacturing costs were considerably reduced and concrete came to be more widely used, but it was still very much a neglected material. Therefore, good concrete was scarce and a great deal of poor concrete was used.

The big break-through was the discovery of Portland cement by Joseph Aspdin in 1824, a worker in an English town.

When he was working an idea came to him as to how to make his work better. He started his experiments. After some time he obtained a powder. When it was mixed with water and allowed to stand it "set" forming a hard substance. This substance was so much like the building stone from Portland that the powder was named Portland cement. As years passed different materials were found in many countries from which Portland cement could be made.

Portland cement was first used on a large scale in the construction of the Thames tunnel in 1828.

As early as 1830 the first idea of reinforced concrete was mentioned in a publication, which suggested that a lattice of iron rods be embeded in concrete to form a roof.

Patents were taken out for all sorts of systems in all countries. The development of reinforced concrete really got under way in the 1850's and 60's.

Lambort, a French contractor, built a concrete boat for the Paris International Exhibition of 1855, with 2 inches sides reinforced with a skeleton of iron rods.

W.Wilkinson, who patented a method of constructing a concrete floor in 1854, is considered by many to be the inventor of reinforced concrete as well.

But many people say that a Frenchman, J.Monier, who took out a patent in 1867 for the construction of plant tubs, tanks, etc., made of concrete reinforced with a mesh of rods or wires, should be credited with the invention. Certainly Monier did a great deal to develop the use of reinforced concrete and his name came to be so closely linked with reinforced concrete that reinforced concrete was known as the Monier System.

Wilkinson, however, certainly appears to have been the first. His patent covered for concrete floor slabs reinforced with a network of flat iron rods placed on edge. One of his main claims was the good fire resistance of the floor. He appears to have understood the principles of reinforced concrete, for he stated that the reinforcement was to be placed in the concrete to take the tension.

A number of buildings were erected, using Wilkinson's system. He also described method for the construction of pipes, reservoirs, and walls of concrete reinforced with metal sheets, bars and chains.

4. Определите видовременные формы глагола. Переведите предложения на русский язык.

1) Grass roof serves to regulate the climate in winter, saving fuel, and has a cooling effect in summer.

2) Design of a new station required improved passages, signage, staircases, and elevator tower.

3) The simulation of the appearance of a rock crystal was achieved by a carefully studied structural layout.

4) The gigantic screen caused a sensation owing to its huge dimensions.

5) Such a system of construction is termed as prestressed concrete.

6) The concrete fiber stresses are directly computed from the external forces applied to the concrete.

7) The design process starts with the choice of a preliminary geometry.

8) Under service-load conditions, the beam is assumed to be homogeneous and elastic.

5. Перепишите предложения, подчеркните в них модальные глаголы и переведите предложения на русский язык.

1) In summer time much greater air motion is needed.

2) An outlet for this air should be provided in order to have good ventilation.

3) The dome may be regarded as the three-dimensional counterpart of the arch.

4) Unique structures can accommodate human activity in its myriad forms.

5) Variations are to be expected in the described foundation types.

Текст 4. SOME BUILDING PROFESSIONS

Пояснения к тексту

apprentice – ученик, подмастерье
bid – предложение цены; претензия
carpenter – плотник; joiner – столяр
chimney – труба, дымоход
cornice – карниз
drain – дренажная труба, канава; дренировать, осушать
mould –слепок, шаблон; формировать
plumber – водопроводчик; паяльщик
render – воздавать; представлять; делать, превращать
request – просьба, требование; *кол.* спрос
sheet – лист (бумаги и т. п.)
to be considered a skilled worker at his trade – считаться искусным в своем ремесле
slater-and-tiler – кровельщик (мастер по укладке черепицы)
hot water fitter – теплотехник

Упражнения

1. Выберите правильный вариант.

1) Not Scotland again! It rained everyday last time, I want to go *somewhere / somebody / something* sunny this summer.

2) I'm not a fussy eater, I'll eat *something/ nothing / anything* at all!

3) *Nobody / Someone / Anybody* wanted to come and see the film with me, so I went on my own.

4) Would you like *nothing / something / any* to drink?

5) We can't blame *anyone/no* one but ourselves for this mess.

6) There's *anything/nothing* in the post for you this morning.

7) There isn't *anything/nothing* in the post for you this morning.

8) *Anyone/someone* could for you earlier , but I don't know who.

9) Isn't there *anywhere/nowhere* to go that's open at this time of night?

10) Can I ask you *anything/something*?

11) There's *anyone/someone* on the phone to speak to you.

12) You can do *anything/something* you want, it won't make any difference.

13) Sorry, I don't know *anything/nothing* about it.

14) No *one/someone* knew what to do, so I used my own initiative.

2. Вставьте any / some или no.

1) I'm sure I made…………….. mistakes on the exam.

2) My friend didn't make …………….. mistakes on the exam.

3) Do you know …………….. good restaurants in Vancouver?

4) 'Would you like to have …………….. coffee with your meal, Sir?' asked the waiter.

5) I went to the butcher, but I bought …………..meat. It was so expensive!

6) Please come to see me …………….. time you are free.

Тема 8. ГЛАГОЛЫ "TO BE", "TO HAVE"

Глагол **to be** в **Present, Past** и **Future Simple** имеет следующие формы:

Present	Past	Future
I am	was	shall be
(she, he, it) is	was	will be
we are	were	shall be
(you, they) are	were	will be

Freyssinet is known, for his work in prestressed concrete for which he had his first ideas before World War I. With the improved materials and the new knowledge available, Freyssinet realised the advantage to be obtained from prestressing, and he used his system in prestressed works.

From now on structures became bigger, better and more exciting, and concrete steadily strengthened its position as a building material. Reinforced concrete was recognized as the best material for all types of structures.

The post-war era has given the biggest boost to concrete, both reinforced and prestressed. After the war steel was short in Europe and many architects had to use either reinforced or prestressed concrete in their structures in order to economize in steel.

Architects were perhaps a little surprised to discover that in many cases reinforced concrete structures, apart from using the minimum of steel, were also cheaper than other forms of construction, and could be erected as quickly. They also discovered that they had more freedom for planning than they had ever before, and a larger number of different solutions to each structural problem were available.

Beams could be eliminated, floor spans could be increased, and shells were available for roofing large areas.

Another big factor, which encouraged the use of concrete, was the introduction of fire regulations, which recognized the superiority of concrete over other structural materials in its fire resistance properties.

Текст 3. COLUMNS

Columns are vertical compression members of a structural frame intended to support the load-carrying beams. They transmit loads from the upper floors to the lower levels and then to the soil through the foundation. Since columns are compression elements, failure of one column in a critical location can cause the progressive collapse of the adjoining floors and the ultimate total collapse of the entire structure.

Structural column failure is of major significance. Thus extreme care needs to be taken in column design.

Columns can be classified on the basis of the form and arrangement of reinforcement, the position of the load on the cross-section, and the length of the column in relation to its lateral dimensions. There are three types of columns:

- Rectangular or square columns reinforced with longitudinal bars and lateral ties.
- Circular columns reinforced with longitudinal reinforcement and spiral reinforcement, or lateral ties.
- Composite columns where steel structural shapes are encased in concrete.

Although tied columns are the most commonly used because of lower construction costs, spirally bound rectangular or circular columns are also used where increased ductility is needed, such as in earthquake zones. The ability of the spiral column to sustain the maximum load at excessive deformations prevents the complete collapse of the structure before total redistribution of moments and stresses is complete.

Failure of columns can occur as a result of material failure by initial yielding of the steel at the tension face or initial crushing of the concrete at the compression face, or by loss of lateral structural stability.

If a column fails due to initial material failure, it is classified as a short column. As the length of the column increases, the probability that failure will occur by buckling also increase.

1. Письменно ответьте на вопросы к тексту "Columns":

1) What is a column?
2) What can failure of one column cause?
3) What types of columns do you know?
4) Where are spirally bound rectangular or circular columns employed?
5) What is slenderness ratio?

2. Найдите в данном из текста английские эквиваленты следующих выражений:

функционировать –	
гибкость –	
поперечное сечение –	
боковые размеры –	
продольная балка –	
железобетонная колонна с жесткой несущей арматурой –	
пластичность -	
растянутая грань –	
структурная устойчивость –	

3. Сопоставьте английские и русские слова и словосочетания:

columns	постепенное разрушение
progressive collapse	разрушаться при продольном изгибе
column design	колонны
to failure by buckling	сжатая грань
spiral reinforcement	длина колонны
the compression face	проект колонны
the length of the column	спиральная арматура

В вопросительных предложениях глагол **to be** ставится перед подлежащим:

Are they students? *Они студенты?*
Where **were** you yesterday? *Где вы были вчера?*

В отрицательной форме после глагола **to be** ставится отрицание ***not***:

They **are *not*** in the library. *Они не в библиотеке*

Упражнения

1. Образуйте отрицательную форму глагола to be по образцу.

▶ I'm Greek, but (- from Athens) *I'm not from Athens.*

1) She's tired, but (- ill) .....
2) They are in England, but (- in London) .....
3) You're tall, but (- too tall) .....
4) We are late, but (- very late) .....
5) It's summer, but (- hot) .....

2. Вставьте was или were.

▶ In summer 1990 I *was* in Brazil.

1) Lunch.....OK, but the vegetables.....not very good.
2) I can't find my keys. They.....here this morning.
3) It.....cold and dark, and we.....tired.
4) .....you in London yesterday? No, I... in Glasgow.
5) When.....your exam? It.....yesterday.

3. Закончите предложения по образцу.

▶ Tomorrow *it will be* very hot in Cairo. (Cairo 35 °C)
It ..... hot in ..... (Rio 30 °C)
..... warm in ..... (Paris 23 °C)
..... cold in ..... (London 3 °C)
..... very cold in ..... (Moscow –18 °C)

Глагол **to have** в **Present, Past** и **Future Simple** имеет следующие формы:

Present	Past	Future
I have	had	shall have
(she, he, it) has	had	will have
we have	had	shall have
(you, they) have	had	will have

Вопросительные предложения с глаголом **to have** образуются двумя способами:

1) путем постановки глагола **to have** перед подлежащим:
Have* you a dictionary*? *У вас есть словарь?*

2) с помощью вспомогательного глагола **to do**:
***Do* you *have* a dictionary?** *У вас есть словарь?*

Отрицательная форма также образуется двумя способами:

1) с помощью отрицательного местоимения **no** перед существительным:
I *have no* dictionary. *У меня нет словаря.*

2) с помощью вспомогательного глагола **to do** и частицы **not**
I *do not have* a dictionary. *У меня нет словаря*

Тема 9. ОБРАЗОВАНИЕ ВРЕМЕН ГЛАГОЛА В ДЕЙСТВИТЕЛЬНОМ ЗАЛОГЕ

Таблица 9.1

Времена активного залога (Active Voice Tenses)
to ask – asked – asked (спрашивать) to take – took – taken (брать)

Группа	Present	Past	Future	Временные указатели
Indefinite	**do (does), V1(s)** *ask(s)* *take(s)* *спрашивает* *берёт*	**did, V2(ed)** *asked* *took* *спрашивал* *брал*	**will + V1** *will ask* *will take* *спросит* *возьмёт*	usually, seldom, every day, always, today, ago, yesterday, tomorrow
Continuous	**am + V(ing)** **is + V(ing)** **are + V(ing)** *am asking* *is taking* *are asking* *спрашиваем* *берёт*	**was + V(ing)** **were + V(ing)** *was asking* *were taking* *спрашивал* *брал*	**will be + V(ing)** *will be asking* *will be taking* *будет спрашивать* *будет брать*	during, now, at this moment, at present, for, from 5 to 7
Perfect	**have + V3(ed)** **has + V3(ed)** *have asked* *has taken* *спросил* *взял*	**had + V3(ed)** *had asked* *had taken* *спросил* *взял*	**will have + V3(ed)** *will have asked* *will have taken* *спросит* *возьмёт*	ever, never, just, already, yet, lately, since, when he came

Продолжение табл. 11.1

Модальный глагол	Случаи употребления	Перевод	Примеры
need (–,?)	1. Необходимость	1. Нужно, есть ли необходимость	1. *Need* I do it today?
	2. Отсутствие необходимости	2. Не надо, нет необходимости	2. He *needn't* hurry.
	3. Разрешение не делать чего-либо	3. Можно не	3. You *needn't* copy the text.
	4. Смысловой глагол	4. Нуждаться в чём-либо	4. He *needs* a long rest.

Упражнения

1. Выберите подходящий вариант из данных:

1) If you travel to Morania you *can* / *should* / *must* have a visa.
2) You *shouldn't* / *don't have to* / *couldn't* laugh at old people.
3) Passengers *must* / *must not* / *should not* smoke in the toilets.
4) I think you *should* / *must* / *may* eat less and take more exercise.
5) You *mustn't* / *may not* / *needn't* tell me if you don't want to.
6) You *may* / *have to* drive on the left in Britain.
7) She has new clothes every week. She *can* / *could* / *must* have plenty of money.
8) She doesn't answer the phone. She *mustn't* / *can't* / *shouldn't* be in her office.
9) Bill isn't here. He *may has gone* / *may have gone* / *may have go* home.

2. Выберите подходящий вариант из данных и составьте предложение по образцу:

► I know how to swim (*can* / *may*). *I can swim*.
1) It is necessary for you to phone Martin (*must* / *might*).
2) It is possible that Ann will be here this evening (*can* / *might*).
3) It is not necessary for you to wait (*mustn't* / *needn't*).
4) It's not good for people to watch TV all the time. (*mustn't* / *shouldn't*).
5) Do you want me to open a window (*shall* / *will*)?

К неличным формам относятся:

Инфинитив: To be or not to be, that is the question.

Герундий: The best part of living is loving and giving.

Причастие I: Lose an hour in the morning and you will spend all day looking for it.

Причастие II: Lost time is never found again.

2. К подчеркнутой грамматической конструкции подберите соответствующий русский перевод.

1) Having finished the translation she typed it.
a) заканчивая;
b) закончив;
c) законченный.

2) The problem being discussed now is very important.
a) обсуждая;
b) обсудив;
c) обсуждаемая.

3) Having been signed by both sides the treaty came into force soon.
a) подписавший;
b) подписанный;
c) подписав.

4) Oleg's refusing our help is regrettable.
a) то, что Олег отказался;
b) то, что Олег отказывается;
c) то, что Олегу отказали.

5) He apologized to the teacher for not having done his lessons.
a) за то, что не сделал;
b) за то, что не делает;
c) за то, что не будет делать.

6) She looked after the playing children.
a) играя;
b) поиграв;
c) играющими.

7) We would read the book on this problem all evenings long if it were interesting.
a) будем читать;
b) читали бы;
c) бывало читали;

8) Having been defeated, the enemy had to retreat.
a) терпящий поражение;
b) потерпев поражение;
c) будучи поражен.

ПРИЛОЖЕНИЕ 2

ТЕКСТЫ ДЛЯ ДОПОЛНИТЕЛЬНОГО ЧТЕНИЯ

Текст 1. THE COMMUNITY AND ARCHITECTURE

The forms to be taken by community must be decided before they are constructed. But long-term "master plans", we have learned, must not be too detailed. Someone must plan where streets are to run, parks are to be laid out, and industrial facilities are to be furnished. Someone must plan new housing and new public buildings, parks, and playgrounds. Surely architects are necessary for these goals. And yet, community plans need the contribution of experts in many fields. Modern city planning has become so complex, so enmeshed in static, and so controlled by financial interests that too often community plans appear that are lifeless and mechanical. In this field it is the architect's task to redress the balance, to realize that cities exist for people, that business and industry and science should serve the people and not enslave them.

During the last century hundreds of cities grew up throughout the world, and thousands of country towns expanded into great industrial or commercial centers. In the sense that all the buildings in Chicago or Los Angeles were constructed in recent times, they are modern communities. But in these new cities one searches in vain for any common principle of design that would distinguish them from earlier towns.

If, however, one examines the contemporary city more closely, one comes upon forms that had no counterpart in any earlier civilization. The country villa and the suburb are time-honored forms; but only with the development of rapid transportation, however, did it become possible to disperse the population of a great center over an area at least ten times as great as the biggest cities of the past. The skyscraper has permitted the assembling of business offices and light industry in concentrated hives, served by vertical transportation; but the erection of such buildings on streets designed for four-story buildings and horse drawn transportation has everywhere produced chaos.

Nowhere have the new forces in urbanism been organized so as to create both a functional and an aesthetic unity. One cannot derive an archetype for the modern city from any existing example. Neither can one create it merely by uncritically accepting all technological devices as essential ingredients. There is room, then, for an effort to define the modern community in ideal terms, on the basis of existing facts and tendencies. These facts and tendencies are not confined to the provinces of engineering and architecture; they issue from industry, from education, from medicine and psychology, and indeed from politics.

6) I was sure that I *used to lock/had locked* the door to my office last night, but it *was/had been* open this morning.
7) I'm sure that the winters *used to be/had been* colder when I was a child. I remember that we *used to walk/were walking* to school in the snow every winter.
8) I *had gone/went back* to the restaurant to look for my umbrella, but *found/was finding* that someone *took/had taken* it.
9) When George *saw/was seeing* Diane at the seminar, he *knew/was knowing* that he *met/had met* her somewhere before.
10) *While I had/was having* breakfast I *looked/was looking* at the financial pages to see the share prices. I *saw/was seeing* that my original investment *grew/had grown* by over 40 %.

3. Раскройте скобки, поставьте глагол в нужную форму:

1) She told me his name after he (to leave).
2) Columbus (to discover) America more than 400 years ago.
3) He (to do) nothing before he saw me.
4) My friend enjoyed the food as soon as he (to taste) it.
5) He thanked me for what I (to do).
6) I (to be) sorry that I had hurt him.
7) After they (to go) I (to sit) down and (to rest).
8) As soon as you (to go) I wanted to see you again.
9) They dressed after they (to wash).
10) After I (to hear) the news I hurried to see them.
11) She told me her name after I (to ask) her twice.
12) Before we (to go) very far we (to find) that we (to lose) our way.
13) How long ago (to be) the last war?
14) They (to come) here a month ago.
15) I (to buy) one like it a month ago.
16) We (to finish) our supper an hour ago.
17) How long ago you (to arrive) here?
18) I read the book after I (to finish) my work.
19) He died after he (to be) ill for a long time.
20) In England he soon remembered all he (to learn).

9) The plant being built here will produce radio-sets.
a) построенный;
b) строящийся;
c) построив.

10) The operating machine was installed in the shop.
a) работающая машина;
b) машина, на которой работают;
c) работа машины.

3. Подберите к данным предложениям соответствующий им русский перевод из указанных ниже предложений.

1) Given the book only yesterday he was not able to read it.
a) Так как ему дали книгу только вчера, он не смог прочитать ее.
b) Так как он вчера отдал книгу, он не смог прочитать ее.
c) Отдав вчера книгу, он не смог прочитать ее.

2) He is said to be writing his course paper.
a) Он говорит, что пишет курсовую работу.
b) Говорят, что он пишет курсовую работу.
c) Говорят, что он написал курсовую работу.

3) I don't like being asked such questions.
a) Я не люблю задавать такие вопросы.
b) Я не люблю, когда мне задают такие вопросы.
c) Я не любил, когда мне задавали такие вопросы.

4) His having failed in the examination surprised everybody.
a) То, что он не сдавал экзамен, удивило всех.
b) То, что он не сдал экзамен, удивило всех.
c) Всех удивляет, что он не сдает экзамен.

5) They want a useful article to be found.
a) Они делают это, чтобы найти полезную статью.
b) Они хотят найти полезную статью.
c) Они хотят, чтобы была найдена полезная статья.

6) Having refused to accept the invitation he left the office.
a) Отказав в приглашении, он покинул офис.
b) Отказавшись принять приглашение, он покинул офис.
c) Отказывая в приглашении, он покидает офис.

2) They have broken the window. The window … .
3) Somebody has bought all the ingredients. All the ingredients … .
4) Nobody ate the food. The food … .
5) A robot drives this airplane. This airplane ……by a robot.

3. Закончите предложения, употребив глагол в страдательном залоге.

1) If you hadn't been so unprofessional, you … (sack).
2) The man who … (suspect) of stealing your handbag has been captured.
3) This company is very inefficient. The telephone …(never / answer) promptly.
4) It seems to me that no proper records … (keep).

Тема 11. МОДАЛЬНЫЕ ГЛАГОЛЫ И ИХ ЭКВИВАЛЕНТЫ

Таблица 11.1

Модальные глаголы

Модальный глагол	Случаи употребления	Перевод	Примеры
can (could) = to be able to	1. Возможность 2. Разрешение 3. Запрещение	1. Могу, умею, возможно 2. Можно 3. Нельзя	1. I *can* speak English. 2. You *can* read aloud. 3. You *can't* cross street here.
may (might) = to be allowed to	1. Разрешение 2. Строгое запрещение 3. Предположение	1. Можно, разрешается 2. Не смей 3. Возможно, может быть	1. *May* I come in? 2. You *may not* smoke here. 3. He *may* know her address.
must = to have to to be to	1. Долг, обязательство 2. Настоятельный совет, приказ 3. Запрещение 4. В связи с обстоятельствами 5. С планом, по договорённости	1. Должен 2. Должен 3. Запрещено, нельзя 4. Приходится, вынужден 5. Должен	1. We *must* study hard. 2. You *must* consult a doctor. 3. You *mustn't* run here. 4. You *have to* go to hospital. 5. He *is to* meet us at 5.
should ought to	Моральный долг, обязательство Совет, рекомендация, порицание	Должен, следует, Нужно (было бы), следовало бы	You *should* stop smoking. You *ought to* help your friends.

7) The delegation is reported to have arrived.
a) Делегация сообщает, что уже прибыла.
b) Сообщают, что делегации уже прибыла.
c) Сообщают, что делегации прибывает.

8) The teacher was surprised at your having made so many mistakes.
a) Учитель удивился, что вы делаете так много ошибок.
b) Учитель удивился, что было сделано так много ошибок.
c) Учитель удивился, что вы сделали так много ошибок.

9) They should tell us about it.
a) Они должны были бы сказать нам об этом.
b) Они должны сказать нам об этом.
c) Им, должно быть, сказали об этом.

Тема 10. ОБРАЗОВАНИЕ ВРЕМЕН ГЛАГОЛА В СТРАДАТЕЛЬНОМ ЗАЛОГЕ

Таблица 10.1

Времена пассивного залога (Passive Voice Tenses)

to ask – asked – asked (спрашивать) to take – took – taken (брать)

Группа	Present	Past	Future
Indefinite	**am + V3(ed)** **are + V3(ed)** **is + V3(ed)** The student *is asked*. Студента *спрашивают*. The books *are taken*. Книги *берут(ся)*.	**was + V3(ed)** **were + V3(ed)** The student *was asked*. Студента *спросили*. The books *were taken*. Книги *были взяты*.	**will be + V3(ed)** The student *will be asked*. Студента *спросят*. The books *will be taken*. Книги *возьмут*.
Continuous	**am being + V3(ed)** **are being + V3(ed)** **is being + V3(ed)** The student *is being asked*. Студента *спрашивают*. The books *are being taken*. Книги *берут(ся)*.	**was being + V3(ed)** **were being + V3(ed)** The student *was being asked*. Студента *спрашивали*. The books *were being taken*. Книги *брали*.	–
Perfect	**have been + V3(ed)** **has been + V3(ed)** The student *has been asked*. Студента *спросили*. The books *have been taken*. Книги *взяли*.	**had been + V3(ed)** The student *had been asked*. Студент *был спрошен*. The books *had been taken*. Книги *были взяты*.	**will have been + V3(ed)** The student *will have been asked*. Студента *спросят*. The books *will have been taken*. Книги *возьмут*.

Упражнения

1. Выберите подходящий вариант из данных:

1) Derek *posted* / *was posted* his letter to the university today.
2) My friend Douglas *speaks* / *is spoken* seven languages.
3) A new hospital *will build* / *will be built* in the town centre.
4) You can't come in here – the room *is cleaning* / *is being cleaned*.
5) We *have invited* / *have been invited* to John's party tonight.

2. Закончите предложения, употребив глагол в страдательном залоге:

1) They were rebuilding their house. Their house … .

15) “You … not come home late”, said Mother to her son.
a) need; b) must; c) have.

16) You …. not come early, John will help me.
a) need; b) must; c) can.

17) A firm … goods abroad is an exporter.
a) sells; b) selling; c) having sold; d) sold.

18) … cars is his business.
a) being repaired; b) are repaired; c) repairing; d) having been repaired.

19) Have you finished …. ?
a) writing; b) write; c) wrote; d) was writing.

20) After … everything she needed, she went home.
a) is buying; b) buying; c) being bought; d) has bought.

21) She likes … and is very good at it.
a) being cooked; b) were cooked; c) is cooking; d) cooking.

22) I saw him … the room.
a) entered; b) enter; c) to enter; d) was entering.

23) They wanted … the river
a) to cross; b) are crossing; c) have crossed; d) didn’t cross.

24) It is time …up.
a) haven’t got; b) got; c) was getting; d) to get.

25) … this book, you must go to the library.
a) to have getting; b) have got; c) to get; d) is getting.

26) Nature has many secrets … .
a) to be discovered; b) has discovered; c) is discovered; d) discovering.

27) … chess was his greatest pleasure.
a) to play; b) has played; c) played; d) to have been playing.

28) Excuse me … you at such a moment.
a) leaving; b) being left; c) left; d) was leaving.

29) The goods …. by this factory are of high quality.
a) producing; b) produced; c) having produced; d) produce.

30) … the sounds of music, we stopped talking.
a) having heard; b) hearing; c) heard; d) have been hearing.

31) A letter… from St. Petersburg today will be received in Moscow tomorrow.
a) send; b) sending; c)having sent; d) being sent.

Тема 12. НЕЛИЧНЫЕ ФОРМЫ ГЛАГОЛА. ИНФИНИТИВ

Инфинитив, или неопределенная форма глагола, отвечает на вопрос что делать? или что сделать? Показателем инфинитива является частица to.

Таблица 12.1

Формы инфинитива

Simple	Active	Passive	Выражает действия, одновременные с действием глагола-сказуемого
	to write	to be written	
Progressive	to be writing	-	
Perfect	to have written	to have been written	Выражает действия, предшествующие действию глагола-сказуемого, и переводится прошедшим временем
Perfect Progressive	to have been writing	-	

В предложении инфинитив или инфинитивный оборот может быть:

1) подлежащим (переводится существительным или неопределенной формой глагола): ***To operate*** *the complex device is rather difficult. –* ***Управлять*** *(управление) этим сложным механизмом довольно трудно.*

2) частью сказуемого:

а) составного глагольного (переводится неопределенной формой глагола): *You must (had to)* ***improve*** *your methods of work. – Вы должны (должны были)* ***улучшить*** *методы работы.*

This engineer is ***to design*** *a new high-speed device. – Этот инженер* ***должен спроектировать*** *новый скоростной механизм.*

б) именной частью сказуемого после подлежащего, выраженного словами **aim, purpose** *цель*, **duty** *долг, обязанность*, **task** *задача,* **method** *метод*, **wish** *желание*, **plan** *план*, **function** *назначение, функция*, **problem** *проблема, задача* и др., и глагола-связки **to be**, причем глагол-связка либо совсем не переводится на русский язык, либо переводится словами: *заключаться в том, что(бы); состоять в том, чтобы: Our aim is* ***to fulfil*** *our work in time. – Наша цель –* ***выполнить*** *работу в срок. Наша цель заключается в том (состоит в том), чтобы выполнить работу в срок.*

3) дополнением (переводится неопределенной формой глагола): We hope ***to get*** new data in a week or two. *– Мы надеемся* ***получить*** *новые данные через неделю или две.*

4) определением; инфинитив в функции определения всегда стоит после определяемого существительного и переводится: а) определительным придаточным предложением, сказуемое которого выражает долженствование, возможность или будущее время; б) неопределенной формой глагола; в) существительным:

Тема 13. НЕЛИЧНЫЕ ФОРМЫ ГЛАГОЛА. ПРИЧАСТИЕ

Причастие – это неличная форма глагола, имеющая признаки как прилагательного, так и глагола.

Таблица 13.1

Формы причастия

	Active	Passive	
Participle I	Building	Being built	Выражает действие, одновременное с действием глагола-сказуемого
Participle II	-	Built	Выражает действие, одновременное с действием глагола-сказуемого или предшествующее ему
Perfect Participle	Having built	Having been built	Выражает действие, предшествующее действию глагола-сказуемого

Причастие переводится:

1) глаголом: *She is* ***reading****. – Она* ***читает****.*

2) деепричастием: ***Going*** *into chemical combination elements entirely change their properties. –* ***Вступая*** *в химические соединения (реакции), элементы полностью меняют свои свойства.*

3) конструкцией при + существительное: (*While) **making** his experiment the lab assistant put down all the necessary data. – **При проведении** опыта лаборант записывал все необходимые данные. (или **Проводя** опыт, лаборант записывал все необходимые данные. **В то время как** лаборант **проводил** опыт, он записывал...)*

4) ***When heated*** the polymer changed its properties completely. ***При нагревании*** *полимер полностью изменил свои свойства. (или* ***Когда*** *полимер* ***нагрели,*** *он полностью изменил свои свойства.)*

5) причастием: *The* ***boiling*** *water changes into steam. –* ***Кипящая*** *вода превращается в пар. – The water* ***boiling*** *in the vessel changes into steam. –* ***Вода, кипящая*** *в сосуде, превращается в пар. The fibres* ***produced*** *by our shop are of* ***improved*** *quality. – Волокна,* ***выпускаемые*** *нашим цехом, улучшенного качества. Most of the laboratories* ***equipped*** *with the latest apparatus are housed in the main building. – Большинство лабораторий,* ***оборудованных*** *новейшей аппаратурой, находится в главном здании.*

6) прилагательным: ***As seen*** *from the article these engines are produced in Minsk. –* ***Как видно*** *из статьи, эти двигатели изготавливаются в Минске. Unless* ***tested*** *the machine must not be put into operation. –* ***Если*** *машина* ***не испытана*** *(не прошла испытаний), её нельзя эксплуатировать. Copper is of great value,* ***being*** *a good conductor of electricity. – Медь представляет большую ценность,* ***являясь (так как она является)*** *хорошим проводником электричества.*

3. The main advantages of IGBT over a Power MOSFET and a BJT are:
a) It has a very low on-state voltage drop due to conductivity modulation and has superior on-state current density. So smaller chip size is possible and the cost can be reduced.
b) Low driving power and a simple drive circuit due to the input MOS gate structure. It can be easily controlled as compared to current controlled devices (thyristor, BJT) in high voltage and high current applications.
c) Wide SOA. It has superior current conduction capability compared with the bipolar transistor. It also has excellent forward and reverse blocking capabilities.
4. The main drawbacks are:
a) Switching speed is inferior to that of a Power MOSFET and superior to that of a BJT. The collector current tailing due to the minority carrier causes the turnoff speed to be slow.
b) There is a possibility of latchup due to the internal PNPN thyristor structure.
The IGBT is suitable for scaling up the blocking voltage capability.

5. Прочитайте 3-й и 4-й абзацы текста и ответьте письменно на следующие вопросы:
1) What are the main advantages of IGBT over a Power MOSFET and a BJT?
2) What are the main disadvantages of IGBT?

The metal ***to be used*** *in our experiment is hard. – Металл,* ***который будет использован (нужно, можно использовать)*** *в нашем опыте – твёрдый.*

The idea ***to use*** *this new substance didn't leave us. – Мысль* ***об использовании*** *этого нового вещества* ***(о том, чтобы использовать…)*** *не покидала нас.*

5) обстоятельством цели; стоит в начале предложения перед подлежащим или в конце предложения. Иногда вводится союзом **in order to** *для того чтобы*. Переводится на русский язык неопределенной формой глагола с союзом *чтобы, для того чтобы* или существительным с предлогом *для*:

To reinforce *the metal engineers use artificial fibres. –* ***Чтобы усилить*** *металл (для усиления металла) инженеры используют искусственные волокна.*

A number of devices were developed ***in order to detect*** *cosmic rays. – Было разработано несколько приборов* ***для обнаружения*** *(чтобы обнаружить…) космических лучей.*

Инфинитивные обороты

1. Complex Object – сложное дополнение

I saw him cross the street. – Я видел, как он переходил улицу.

The scientist consider the sun to emit radio signals. – Ученые считают, что солнце испускает радиосигналы.

В этих оборотах используются глаголы: ***see, hear, feel, notice, smell, find, know, think.*** На русский язык придаточное предложение переводится с помощью союзов «как, что».

После глаголов ***want, wish*** при переводе придаточное предложение начинается с союза «чтобы»: *I want him to open the door. – Я хочу, чтобы он открыл дверь.*

2. Complex Subject – сложное подлежащее

Этот оборот состоит из подлежащего, выраженного существительным в общем падеже или местоимением в именительном падеже и инфинитива. Между компонентами оборота стоит сказуемое, выраженное:

1) глаголом в форме страдательного залога

is said – говорят; is known – известно; is supposed – предполагают; is believed – полагают; is assumed – предполагают; is thought – думают; is considered – считают; is found – обнаружено.

These tubes are said to give considerable economy. – Говорят, что эти лампы дают значительную экономию.

2) с глаголами в форме активного залога ***to seem, to appear, to prove, to happen*** перевод начинается с вводного слова «кажется, оказывается»: *He seems to know English. – Кажется, он знает английский.*

ПРИЛОЖЕНИЕ 1

ИТОГОВЫЙ ТЕСТ

1. Выберите правильный вариант.

1) Nylon … in the early 1930s by an American chemist Julian Hill.
a) is invented; b) was invented; c) were invented.

2) This work … by the end of the month.
a) will be completed; b) will have been completed; c) will complete.

3) Our research group … a lot of data before the experiment began.
a) has obtained; b) had obtained; c) have obtained; d) had been obtained

4) I can't believe my eyes! My book … already!
a) is published; b) was published; c) has been published.

5) At the institute the students . … many different subjects.
a) doesn't taught; b) are taught; c) has taught; d) is taught.

6) A new plan … now.
a) was being discussed; b) is being discussed; c) has been discussed; d) discussed.

7) The work of this student … attention to.
a) was paid; b) is paying; c) has paid; d) are paid.

8) I can't go out because I … my work yet.
a) didn't finish; b) don't finish; c) haven't finished; d) hasn't finished.

9) I … a new dress last week, but I haven't worn it yet.
a) have bought; b)had bought; c) bought; d) has bought.

10) My parents … to the USA many times.
a) were; b) have been; c) has been; d) have being.

11) My sister …. you the answer yesterday.
a) tell; b) told; c) has told; d) tells.

12) … you play football? Yes, I am good at football.
a) can; b) may; c) must.

13) You … take this book if you like it.
a) must; b) may; c) have.

14) … I speak to the secretary? - I'm afraid not. She is out.
a) may; b) must; c) can.

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3) инфинитив употребляется со словосочетаниями ***to be likely, to be unlikely, to be certain, to be sure*** (вероятно, похоже, наверняка). *He is likely to know English. – Вероятно, он знает английский.*

3. For-to – Infinitive – Инфинитив с for.

Аналогичной конструкции в русском языке нет, поэтому она представляет некоторую трудность для понимания.

It is not unusual for restored cars to sell for more than they did when new. – Для реставрированных машин не является необычным тот факт, что они продаются дороже, чем стоили, когда были новыми.

Упражнения

1. Выберите соответствующую форму инфинитива:

1) I don't want her /think, to think/ me /say, to say/ a lie. 2) The doctor made them /to open, open/ the windows to air the stuffy room and /stop, to stop/ smoking at once. 3) His joke made us all /to laugh, laugh/ heartily. 4) Don't make her /agree, to agree/ with you. It will do no good -she is very stubborn. 5) She saw them /look, to look/ at the map of the city that is why she saw /they were strangers, them to be strangers/. 6) I didn't expect the weather /to change, change/ soon so I hadn't taken the umbrella. 7) Everybody believes Greg /to be, be/ a very good surgeon. 8) Why didn't you want us /see, to see/ him off to the railway station? 9) I think I was right – I let him /ask, to ask/ all the questions and answered them frankly. There is no place for tricks between the partners. 10) She didn't want anyone to see her /to cry, cry/ and wanted everyone/to leave, leave/ her alone.

2. Выберите соответствующий вариант перевода:

1) To read English is a great pleasure.
а) читать на английском; б) чтобы прочитать на английском.
2) To read English well students must work hard.
а) чтобы читать на английском; б) читать на английском.
3) The experiment to be made is very important.
а) эксперимент, который был выполнен; б) эксперимент который надо провести.
4) The problem to be solved was discussed at the last meeting.
а) проблема была решена; б) проблема, которую надо решить.
5) To finish this work they had to invite American experts.
а) чтобы завершить эту работу; б) завершение этой работы.
6) To finish this work was easy.
а) чтобы завершить эту работу; б) завершение этой работы.
7) The sum to be paid was terrible.
а) сумма, которую нужно заплатить; б) сумма была выплачена.

1) If you had translated the article, you could have used valuable data in your work.

2) If the quality of the equipment were higher, the results of the experiment would be more accurate.

3) If you end up with the wrong type of analyzer it won't be able to perform its functions properly.

4. Прочитайте и устно переведите с 1-го по 4-й абзацы текста. Перепишите и письменно переведите 1-й и 2-й абзацы.

Пояснения к тексту

insulated-gate bipolar transistor – биполярный транзистор с изолированным затвором
minority carrier – неосновной носитель (заряда)
MOS (metal-oxide semiconductor) – металл-окисел-полупроводник
МОП-технология (структура) – наиболее широко используемый тип полевых транзисторов
MOSFET (metal-oxide-semiconductor field-effect transistor) – канальный полевой униполярный МОП-транзистор
bipolar junction transistor (BJT) – биполярный плоскостной транзистор
PWM (Pulse Width Modulator) – широтно-импульсный модулятор
UPS (Uninterruptible Power Supply) – источник бесперебойного питания
SMPS (Switch-Mode Power Supply) – импульсный источник питания
SOA (service-oriented architecture) – сервис-ориентированная архитектура

INSULATED GATE BIPOLAR TRANSISTOR (IGBT) FUNDAMENTALS

1. The Insulated Gate Bipolar Transistor (IGBT) is a minority-carrier device with high input impedance and large bipolar current-carrying capability. Many designers view IGBT as a device with MOS input characteristics and bipolar output characteristic that is a voltage-controlled bipolar device. To make use of the advantages of both Power MOSFET and BJT, the IGBT has been introduced. It's a functional integration of Power MOSFET and BJT devices in monolithic form. It combines the best attributes of both to achieve optimal device characteristics.

2. The IGBT is suitable for many applications in power electronics, especially in Pulse Width Modulated (PWM) servo and three-phase drives requiring high dynamic range control and low noise. It also can be used in Uninterruptible Power Supplies (UPS), Switched-Mode Power Supplies (SMPS), and other power circuits requiring high switch repetition rates. IGBT improves dynamic performance and efficiency and reduced the level of audible noise. It is equally suitable in resonant-mode converter circuits. Optimized IGBT is available for both low conduction loss and low switching loss.

Существуют *два причастных оборота*:

1) **зависимый** причастный оборот относится к подлежащему предложения: ***Having repaired the engine****, the mechanic showed it to the engineer.* – ***Отремонтировав мотор****, механик показал его инженеру.*

2) **независимый** причастный оборот – причастие выражает действие существительного (местоимения), стоящего пред ним.

а) причастный оборот, стоящий в начале предложения, переводится обстоятельственным придаточным предложением с союзами *когда, после того как, так как, хотя, если* (выбор союза диктуется контекстом): ***The temperature being 100 °C*** *water boiled quickly.* – ***Так как температура была 100 °С,*** *вода закипела быстро.*

б) причастный оборот, стоящий в конце предложения, переводится придаточным предложением с союзами *причем, а, но: The students wrote their English test-paper,* ***each doing his variant.*** *– Студенты писали контрольную работу по английскому языку,* ***причем каждый делал свой вариант.***

Независимый причастный оборот может вводиться предлогом ***with***, который не переводится: ***With experiments having been carried out****, we started new investigation.* – ***После того, как опыты были произведены****, мы начали новые исследования.*

Упражнения

1. Определите функции причастий в следующих предложениях, переведите их.

1) Radio occupies one of the leading places among the greatest achievements of modern engineering. 2) Having performed the flight around the Moon Zond VI automatic station returned to Earth. 3) Being heated a magnet loses some or all of its magnetism. 4) Hydrogen is the lightest substance known. 5) If heated molecules of the material move faster. 6) Probably, the first metals used by man were gold, silver and copper, these metals being found in nature in the native or metallic state. 7) Oxygen combining with another substance, an oxide is formed.

2. Переведите предложения.

1) Weather permitting, we will go for a walk. 2) Electric current is capable of carrying power over a great distance, the conversion of power being effected with almost 100 per cent efficiently. 3) Young Dickens noticed everything, his power of observation being phenomenal. 4) The manuscript being written in pencil, I cannot read it without spectacles. 5) Japan's population has grown to 115 million with women outnumbering men by 1.7 million. 6) The text did not seem difficult, many words having been learned before. 7) Chemistry and physics are interrelated sciences, any chemical change involving a physical change. 8) Of seven Ranger spacecraft aimed at the moon, five reached the lunar

promising field of knowledge. 9) We know of Yoffe's having contributed much to the research of transistors.

3. Образуйте деепричастия от глаголов в скобках.

1) He's good at *repairing*. (repair) 2) ..... fruit is good for you. (eat) 3)..... a car costs money. (run) 4) I hate ..... the washing-up. (do) 5) He enjoys ..... orders. (give) 6) ..... holes is hard work. (dig) 7) Do you mind ..... places? (change) 8) ..... beds is boring. (make) 9) What do you know about ..... maps? (make) 10) You should avoid ..... rules. (make)

4. Раскройте скобки, употребив соответствующую форму деепричастия.

1) I'm sorry for *having disturbed* you. (have disturb) 2) I didn't take it. I deny ..... it. (have take) 3) I'm annoyed about ..... all that money. (have lose) 4) I appreciate ..... me. (you have help) 5) I enjoy .....with you. (have work) 6) That explains his (fire) from his job. 7) I don't mind ..... above me. (his have promote) 8) I resent ..... (have dismissed)

Тема 15. СРАВНЕНИЕ НЕПИЧНЫХ ФОРМ ГЛАГОЛА

Формы герундия совпадают с формами причастия, но герундий имеет ряд отличительных признаков:

1) наличие перед формой с окончанием -ing какого-либо предлога (of, after, before, by, for, from, in, on, without). *There are two ways of measuring engine power.* – *Существуют два способа измерения мощности двигателя.*

2) наличие перед ing-формой притяжательного местоимения (my, her, etc). *The professor approved of my solving problem.* – *Профессор одобрил мое решение задачи.*

3) наличие существительных в притяжательном или общем падежах. *We know of Newton's having developed the principles of mechanics.* – *Нам известно, что Ньютон разработал основные принципы механики.*

Герундий и причастие могут выполнять функцию определения. Различать их в этой функции можно только на основе смыслового содержания, учитывая, что причастие выражает действие определяемого существительного, например: a *writing* man – пишущий человек, тогда как герундий указывает на назначение предмета и на русский язык переводится существительным, например: a *writing* table – письменный стол, т.е. стол для письма.

Сравнение: a *smoking* man – курящий человек (причастие)
a *smoking* room – комната для курения (герундий).

Отглагольное существительное тоже имеет окончание -ing (verbal noun). Признаком такого существительного является наличие перед ing-формой артикля и предлога *of* перед идущим за ней существительным. От-

2) Later known as the Fleming valve, it could be used as a rectifier of alternating current and as a radio wave detector. This greatly improved the crystal set which rectified the radio signal using an early solid-state diode based on a crystal and a so-called cat's whisker. Unlike modern semiconductors, such a diode required painstaking adjustment of the contact to the crystal in order for it to rectify. The diode tube was a reliable alternative for rectifying radio signals. Higher power diode tubes or power rectifiers found their way into power supply applications until they were eventually replaced by silicon rectifiers in the 1960s.

3) A rectifier diode is an electrical device that converts alternating current (AC), which periodically reverses direction, to direct current (DC), which flows in only one direction. The process is known as rectification. Physically, rectifiers take a number of forms, including vacuum tube diodes, mercury arc valves, solid-state diodes, silicon-controlled rectifiers and other silicon-based semiconductor switches.

4) Rectifiers have many uses, but are often found serving as components of DC power supplies and high-voltage direct current power transmission systems. Rectification may serve in roles other than to generate direct current for use as a source of power. As noted, detectors of radio signals serve as rectifiers. In gas heating systems flame rectification is used to detect presence of flame.

5. Прочитайте 3-й и 4-й абзацы текста и ответьте письменно на следующие вопросы:

1) What is a rectifier diode?
2) What forms of rectifiers do you know?
3) What is the application of rectifiers?

ВАРИАНТ 4

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) The crew is reported to have carried out a great deal of scientific experiments.

2) Different types of industrial analyzers are known to be used for mechanical, electronic or chemical processes.

3) The type of analyzer to be used depends on the type of application and the object that you want to analyze.

2. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) A person beginning some experiment should be very careful and attentive.

2) Some types of analyzers used in the industrial world include gas analyzers, logic analyzers, network analyzers, signal analyzers and spectrum analyzers.

3) The computer's electronic memory recording all the operator's commands, the picture of deviations was produced.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения. Обратите внимание на то, как переводятся условные предложения (см. образец выполнения 3).

1) If your analyzer isn't calibrated or programmed properly then you won't get the accuracy you are looking for.

2) If the service life of the instrument had been prolonged, the economic effect would have been increased many times.

3) All scientific and technical problems can be solved without a computer but it would require millions of arithmetical operations.

4. Прочитайте и устно переведите с 1-го по 5-й абзацы текста. Перепишите и письменно переведите 1,2 и 3-й абзацы.

Пояснения к тексту

analyzer – анализатор
add-on – 1) дополнение; 2) добавляемый для расширения (напр., возможностей системы)
calibration – 1) калибровка; градуировка; тарирование; 2) поверка
interface cables – соединительные кабели
resistant to wear – износостойкий

ANALYZERS

1) Analysis can be defined as a process of investigating an entity or an object by examining its properties and its relationship with other objects. Many industrial processes and even domestic applications make use of analyzers to study various processes or objects. Instrumentation and process control applications make wide use of analyzers at various stages of an operation.

2) The type of analyzer you need to use depends on the type of application and the object that you want to analyze. There are different types of industrial analyzers and they can be used for mechanical, electronic or chemical processes. Some types of analyzers used in the industrial world include gas analyzers, logic analyzers, network analyzers, signal analyzers and spectrum analyzers. The analyzers used must be able to correctly examine and investigate the properties of the object or process and then give you the required details, which can be used for further inferences.

переводится придаточным предложением, вводными словами «то, что», «того, что», «о том, что».

Существительное или местоимение, стоящее перед герундием, становится в русском языке подлежащим придаточного предложения, а герундий – сказуемым. *The **man's** coming so early surprised us. – То, что этот **человек** пришел так рано, нас удивило. I never doubted **his** working in this field of science. – Я никогда не сомневался в том, что **он** работает в этой области науки. **Scientists'** working together and their sharing ideas with one another is of great advantage for science. – То, что **ученые** работают вместе и делятся своими идеями друг с другом, приносит большую пользу науке.*

Если существительное, к которому относится действие, выраженное герундием, является неодушевленным, то оно ставится перед герундием в общем падеже, поскольку в притяжательном падеже неодушевленное существительное употребляться не может. *They insist on **this experiment being made** once more. – Они настаивают на том, чтобы эксперимент был сделан еще раз. We looked forward to **the contract being signed**. – Мы с нетерпением ожидали подписания контракта.*

Упражнения

1. Образуйте герундий от глаголов в скобках. Переведите:

1) (look) 20 years ahead isn't easy.
2) (launch) a new product is essential for survival of a company.
3) (work) on an assembly line sometimes can be very boring.
4) (be) fired is always a shock.
5) (farm) has always involved hard physical labour.
6) (form) a corporation is not always easy.
7) (lead) a team is a key management function.
8) (increase) sales means getting more customers for the product.
9) (control) the company's finances is very important.

2. Переведите следующие предложения, обращая внимание на функции герундия.

1) Large-scale application of electronic technique is a trend of technical progress capable of revolutionizing many branches of industry. 2) Leningrad physicists have developed a method for using optical quantum generators for spectral analysis. 3) The operating speeds of these systems will be measured in nano-seconds. 4) Telemetry is the science of seeing some place without being there. 5) Electronics is not so much a new subject as a new way of looking at electricity. 6) We know of Kondakov's having made the first synthetic rubber in the world. 7) Russian physicists saw in semiconductors the way of solving complicated engineering problems. 8) These scientists continue working in this

surface, with the last three providing 17,000 photographs. 9) Objects reflect only a certain part of the light, the remainder being absorbed. 10) Almost three quarters of the earth is covered with water, the most extensive areas of water being the great oceans.

Тема 14. НЕПИЧНЫЕ ФОРМЫ ГЛАГОЛА. ГЕРУНДИЙ

Герундий – это неличная форма глагола, имеющая признаки как существительного, так и глагола и выражающая действие как процесс. Герундий образуется путем прибавления окончания -ing к основе глагола и выражает отвлеченное понятие о действии, не указывая на число, лицо и наклонение. Самостоятельно вне контекста на русский язык не переводится, так как в русском языке аналогичных форм нет.

Таблица 14.1

Формы герундия

Формы	Active	Passive
Simple	discovering (Infinitive + ing)	being discovered (being + Participle II)
Perfect	having discovered (having + Participle II)	having been discovered (having been + Participle II)

Герундий переводится:

1) существительным: ***Using** virtual environments has considerably widened the range of training possibilities. – **Использование** виртуальной реальности существенно расширило возможности обучения.* (функция подлежащего)

2) инфинитивом: *I like **skating**. – Я люблю **кататься** на коньках.* (функция дополнения) ***Measuring** temperatures is necessary in many experiments. – **Измерять** температуру необходимо при многих опытах.* (функция подлежащего) *One more fact is worth **mentioning**. – Стоит **упомянуть** еще один факт. I can't help **being surprised** at their success. – Не могу **не удивляться** их успеху.* (функция – именная часть составного именного сказуемого)

3) деепричастием: *After **skating** for two hours we went home. – **Покатавшись** на коньках два часа, мы пошли домой.*

4) личной формой глагола в составе придаточного предложения: *We were surprised at Peter **having got** an excellent mark in physics. – Мы были удивлены, **что** Петр **получил** отличную оценку по физике.*

Герундиальные обороты

Сочетание герундия с предшествующим ему притяжательным местоимением или существительным в притяжательном или общем падеже называется сложным герундиальным оборотом. Такой оборот обычно

3) You should also keep in mind that you can purchase accessories and add-ons for virtually every type of analyzer, which can help improve usability and accuracy.

4) The analyzers must be compatible with the apparatus used to study the behavior of the material and some analyzers may also require being properly calibrated before they are put to use. If your analyzer isn't calibrated or programmed properly then you won't get the accuracy you are looking for. They also need to be maintained properly so that they are resistant to wear, chemicals and other spurious signals.

5) Because analyzers are basically used in all walks of life the topic can often get a little confusing. There are literally dozens of analyzers on the market and you should make sure that you find the specific type of analyzer you are looking for. If you end up with the wrong type of analyzer it won't be able to perform its functions properly.

5. Прочитайте 4-й и 5-й абзацы текста и ответьте письменно на следующие вопросы:

1) What properties must the analyzers possess?
2) Why is it important to find the right analyzer?

ВАРИАНТ 5

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) The Insulated Gate Bipolar Transistor (IGBT) is considered to be used as a device with MOS input characteristics and bipolar output characteristic.

2) All the changes of temperature and changes of state to be discussed are shown by a graph in Fig. 2.

3) Conduction is known to be a process by which heat is transmitted through a substance by molecular activity.

2. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) When collected the data were fed into the computer.

2) The stream of electrons moving along the conductor is called electric current.

3) He is a great scientist, his experiments and pedagogical activities being closely linked.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения. Обратите внимание на то, как переводятся условные предложения (см. образец выполнения 3).

3) We want all the problems of the greatest importance not to remain unsolved.

2. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) In 1904, as a result of experiments conducted on Edison effect bulbs imported from the USA, he developed a device he called an "oscillation valve".

2) Having worked out computers, scientists solved many important problems.

3) The students having computers, the work did not last long.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения. Обратите внимание на то, как переводятся условные предложения (см. образец выполнения 3).

1) If the gathered data had been presented in time, the results of the experiments would have been different.

2) If it were not for your assistance, we could not go on with our experiment.

3) It would be impossible to carry on a careful study of the process without the new device.

4. Прочитайте и устно переведите с 1-го по 4-й абзацы текста. Перепишите и письменно переведите 1-й и 2-й абзацы.

Пояснения к тексту

Edison effect – термоэлектронная эмиссия
oscillating valve – качающийся клапан
Fleming valve – электровакуумный диод
rectifier – выпрямитель, устройство для преобразования переменного тока в постоянный
crystal set – детекторный приёмник
cat's whisker – кристаллический детектор, разновидность детектора, применявшегося в первых детекторных приёмниках

DIODES

1) The English physicist John Ambrose Fleming worked as an engineering consultant for firms including Edison Telephone and the Marconi Company. In 1904, as a result of experiments conducted on Edison effect bulbs imported from the USA, he developed a device he called an "oscillation valve" (because it passes current in only one direction). The heated filament, or cathode, was capable of thermionic emission of electrons that would flow to the plate (or anode) when it was at a higher voltage. Electrons, however, could not pass in the reverse direction because the plate was not heated and thus not capable of thermionic emission of electrons.

глагольное существительное может употребляться в форме множественного числа. *The readings of the voltmeter were correct. – Показания вольтметра были правильны.*

Тема 16. УСЛОВНЫЕ ПРЕДЛОЖЕНИЯ

Обстоятельственные придаточные предложения условия вводятся союзами **if** е*сли (бы),* **in case** *в случае,* **provided, providing** *при условии,* **unless** *если не*, **but for** *если бы не.*

Условные предложения подразделяются на три типа:

1. Предложения первого типа выражают *реальное (выполнимое)* условие, могут относиться к любому времени и переводятся изъявительным наклонением.

If the temperature is low, the reaction will proceed slowly. *Если температура будет низкой, реакция будет проходить медленно.*

Our engineer always took part in the discussions unless he was busy. *Наш инженер всегда принимал участие в обсуждениях, если был не занят.*

2. Предложения второго типа употребляются для выражения *нереального (невероятного) или мало вероятного* предположения, относящегося к настоящему или будущему времени. Переводятся сослагательным наклонением.

We would test the device if we got it. *Мы бы проверили этот прибор, если бы получили его (но это маловероятно).*

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

Он бы мог закончить проверку, если бы у него было время(сегодня, завтра).

3. Предложения третьего типа употребляются для выражения *нереального (невыполнимого*) предположения, так как относятся к прошедшему времени. Переводятся сослагательным наклонением.

He would have used the device	**if it had been in order.**
Он бы использовал этот прибор (в прошлом),	*если бы он был в порядке (но он не был в порядке).*
I might have come to the conference (last week)	**provided I had been in town.**
Я, возможно, пришел бы на конференцию (на прошлой неделе),	*если бы был в городе (но меня не было).*

Упражнения

1. Выберите подходящий вариант из предложенных:

1) If *we're/we would be* late, *they'll start/they'd start* without us.
2) If we *will take/take* a taxi, *we'll arrive/we arrive* sooner.

дать на решению переделанную или вновь выполненную работу. Следует приложить работу, исправленную решением. Контрольные работы следует отправлять по адресу: 681013, ул. Ленина, 27, КнАГТУ, деканат НЭФ.

КОНСУЛЬТАЦИИ

Следует сообщать обо всех затруднениях, возникших при самостоятельном изучении английского языка и при выполнении контрольных работ, а именно:

а) какие предложения в тексте вызывают затруднения при переводе;

б) какой раздел грамматики не понятен, какие правила, пояснения, формулировки не ясны;

в) какие упражнения и что именно в них представляется затруднительным.

Консультации для студентов-заочников проводятся по расписанию. Обращаться к преподавателю лично по адресу: ул. Комсомольская, 50, кафедра «Общий и профессиональный английский язык», ауд. 312/4.

ПОДГОТОВКА К ЗАЧЕТАМ И ЭКЗАМЕНУ

В процессе подготовки к зачетам и экзамену рекомендуется:

а) повторить пройденный грамматический материал;

б) просмотреть материал решенных контрольных работ;

в) сделать библиографию отдельные упражнения из материалов других вариантов для самопроверки и самоконтроля;

г) повторить материал устных упражнений.

ТРЕБОВАНИЯ К ЗАЧЕТУ И ЭКЗАМЕНУ

К устному зачету по английскому языку допускаются студенты, выполнившие все устные и письменные работы, получившие зачет по контрольным работам и сдавшие нормы по чтению и переводу иностранной технической литературы, установленные для данного курса.

Для получения **зачета** студент должен:

1) уметь правильно читать и понимать без словаря учебные тексты, изученные в течение данного периода обучения, а также тексты выполнен-ных контрольных работ;

2) уметь перевести со словарем текст объемом 1500 печатных знаков за 1 ч 20 мин письменно;

3) прочитать текст объемом 1800 печатных знаков за 10 мин и перевдать содержание прочитанного на русском языке.

К экзамену по английскому языку допускаются студенты, сдавшие зачеты по самостоятельной работе за все предшествующие экзамену семестры.

1) Semiconductors are electronic devices that, under specific conditions of temperature and voltage, operate as insulators or conductors. They are also called solid-state devices since they do not use vacuum tubes to conduct electricity. These items use electronic conduction in the solid state as opposed to the gaseous state or thermionic emission in a high vacuum. Semiconductor units are made as single devices or as integrated circuits (ICs), which consist of a number devices manufactured onto a single semiconductor substrate.

2) Semiconductor materials are the foundation of modern electronics, including radio, computers, telephones, and many other devices. Such devices include transistors, solar cells, many kinds of diodes including the light-emitting diode, the silicon controlled rectifier, microprocessors and digital and analog integrated circuits.

3) Common semiconducting materials are crystalline solids, but amorphous and liquid semiconductors are also known. These include hydrogenated amorphous silicon and mixtures of arsenic, selenium and tellurium in a variety of proportions.

4) These devices are known to be made of PN layers (anode, cathode) that allow them to conduct electricity. They operate on the principle of electrons and holes. Electrons tend to move towards the hole layer and this makes them conductive. Semiconductors are very useful in electronics because their conductivity can be altered when small amounts of impurities (dopants) are added. This is called doping. When you heavily dope a semiconductor you can actually increase its conductivity by a factor greater than a billion. In modern integrated circuits heavily-doped polycrystalline silicon is sometimes used as a replacement for metals.

5) Semiconductors are widely used in modern electronics and are used in one form or another in white goods, electronic instruments, automobiles, space applications, industrial circuits, audio equipment, etc.

5. Прочитайте 4-й и 5-й абзацы текста и ответьте письменно на следующие вопросы:

1) What are semiconductors made of?
2) What is doping?
3) What material is used instead of metals in modern integrated circuits?
4) Where are semiconductors employed?

3) If we *worked/would work* for ADC, *we'll get/we'd get* a better salary.

4) When inflation *will go/goes* up, there *would be/is* usually pressure on salaries.

5) If we *don't hurry/won't hurry*, *we would be/we'll be* late.

6) If you *change/are changing* your mind, *give me/you will give me* a ring.

7) Unless you *click/would click* on that icon, *it didn't/it won't* print out.

8) If you *ordered/order* on the Net, we always *will send/send* an email confirmation.

9) If I *lend/will lend* you this book, when do you *return/will you return* it?

10) If you *heard/hear* anything in the next few days, *let me/letting me* know.

11) If you *phoned/had phoned* me yesterday, I *had told/would have told* you.

12) If you *took/would have taken* more exercise, you *might feel/had felt* better.

13) If Tim *would have listened/had listened* more carefully, he *wouldn't have made/didn't make* that mistake.

14) If *we'd found/we found* suitable premises, *we'd have moved/we had moved* earlier.

15) If people *kept/had kept* their offices more tidy, it *might present/presented* a better image to our visitors.

16) If *I'd known/I would know* about their financial problems, I *wouldn't do/wouldn't have done* business with them.

17) If our side *had been/was* better prepared, we *succeeded/could have succeeded* in the negotiations .

18) I *wouldn't/won't* worry if I *am/were* you.

2. Выберите подходящий вариант из предложенных:

1) I wish I *hadn't drunk/didn't drink* so many whiskies last night.
2) There's so little space in here. I wish I *have/had* a bigger office.
3) I don't feel well. I wish I *could stay/will stay* in bed this morning.
4) I hope you *enjoyed/enjoy* yourselves at the theatre tonight.
5) I've been waiting thirty minutes for the bus. I wish I *took/had taken* a taxi.
6) I must get in touch with Sue. If only I *know/knew* her number!
7) I'm not a good typist. I wish I *could type/would type* better.
8) I wish Jim *didn't interrupt/doesn't interrupt* so often in meetings.
9) I have to finish this report by tomorrow. If only I *would have/had* more time.
10) Enjoy your holiday. I hope you *have/could have* a good time.
11) That presentation was a disaster! I wish I *could do/would do* it all again!
12) I'm disappointed with this camera. I wish I *didn't buy/hadn't bought* it.

Раздел 3. ВЫПОЛНЕНИЕ КОНТРОЛЬНЫХ ЗАДАНИЙ И ОФОРМЛЕНИЕ КОНТРОЛЬНЫХ РАБОТ

1) Студент должен выполнить на каждом курсе контрольное задание по английскому языку в соответствии с учебным планом вуза.

2) Каждое контрольное задание дается в пяти вариантах. Контрольное задание 4 выполняется по специальности (направлению) студента: «Промышленное и гражданское строительство», «Промышленная электроника», «Самолето- и вертолетостроение», «Технология машиностроения», «Электропривод и автоматика». Студент должен выполнить один из пяти вариантов в соответствии с последними цифрами учебного шифра (номера зачетной книжки): студенты, шифр которых оканчивается на 1 или 2, выполняют вариант 1; на 3 или 4 – вариант 2; на 5 или 6 – вариант 3; на 7 или 8 – вариант 4; на 9 или 0 – вариант 5. Все контрольные работы и задания к ним выполняются только в **письменном** виде.

3) Письменные контрольные работы следует выполнять в отдельной тетради. На тетради должны быть написаны: фамилия, инициалы, шифр, адрес студента, а также номер контрольной работы.

4) Иностранный текст каждого задания нужно переписывать на левой странице тетради, а на правой странице давать его русский перевод. Каждый абзац текста должен начинаться с новой строки.

5) Выполненные контрольные работы направляются в университет в установленные сроки для проверки и рецензирования.

6) Если контрольная работа выполнена не в соответствии с указаниями или не полностью, она возвращается студенту без проверки.

ИСПРАВЛЕНИЕ КОНТРОЛЬНОЙ РАБОТЫ НА ОСНОВЕ РЕЦЕНЗИЙ

1) При получении проверенной рецензентом (преподавателем) контрольной работы следует внимательно прочитать рецензию, ознакомиться с замечаниями рецензента и проанализировать отмеченные в работе ошибки.

2) Руководствуясь указаниями рецензента, следует повторить не вполне усвоенный материал, т.е. перечитать тексты, повторить правила, исправить ошибки в переводе и упражнениях. Все предложения, в которых были обнаружены орфографические и грамматические ошибки или неточности, надо исправить и переписать в конце проверенной контрольной работы.

3) Если рецензент потребует переделать в работе тот или иной раздел или вновь выполнить задание, необходимо сделать это и без задержки от-

ВАРИАНТ 2

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) Many consider the transistor to have been one of the greatest inventions of the 20th century.

2) Samples of semiconductors with improved properties are reported to be obtained on a new installation.

3) We know the transistor to be composed of a semiconductor material with at least three terminals for connection to an external circuit.

2. Перепишите и письменно переведите на русский язык следующие предложения, обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) A voltage or current applied to one pair of the transistor's terminals changes the current flowing through another pair of terminals.

2) The computers having been worked out, many important problems could be solved.

3) Having been carefully tested the device was put into operation.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения. Обратите внимание на то, как переводятся условные предложения (см. образец выполнения 3).

1) If you started to print, most of the fonts would be loaded into memory.

2) The computation would not have been carried out but for a high speed electronic computer.

3) If the computers had been introduced in human activity in the 19th century the technological processes would have been developed quicker.

4. Прочитайте и устно переведите с 1-го по 5-й абзацы текста. Перепишите и письменно переведите 1, 2 и 3-й абзацы.

Пояснения к тексту

point-contact transistor – точечный транзистор
bipolar junction transistor – биполярный плоскостной транзистор
field effect transistor – канальный (униполярный, полевой) транзистор
emitter – эмиттер; источник
drain – сток (в канальном транзисторе)
gate – затвор (в канальном транзисторе)

TRANSISTORS

1) Transistor is a semiconductor device used to amplify and switch electronic signals and power. It is composed of a semiconductor material with at least three terminals for connection to an external circuit. A voltage or current

applied to one pair of the transistor's terminals changes the current flowing through another pair of terminals. Because the controlled (output) power can be much more than the controlling (input) power, a transistor can amplify a signal. Today, some transistors are packaged individually, but many more are found embedded in integrated circuits.

2) In 1948, John Brattain and Walter Bardeen built the first working transistor, the germanium point-contact transistor. Shockley then designed bipolar junction (sandwich) transistor (BJT), which was manufactured for several years afterwards. But in 1960 Bell Labs' scientist John Atalla developed the new design based on William Shockley's original field-effect theories. Today, most transistors are field effect transistors (FETs).

3) There are two types of transistors, which have slight differences in how they are used in a circuit. A *bipolar transistor* has terminals labeled *base*, *collector,* and *emitter*. A small current at the base terminal (that is, flowing from the base to the emitter) can control or switch a much larger current between the collector and emitter terminals.

4) For a *field-effect transistor*, the terminals are labeled *gate, source*, and *drain*, and a voltage at the gate can control a current between source and drain. A logic gate consists of up to about twenty transistors whereas an advanced microprocessor, as of 2011, can use as many as 3 billion transistors.

5) The transistor is the fundamental building block of modern electronic devices, and is ubiquitous in modern electronic systems. Following its release in the early 1950s the transistor revolutionized the field of electronics, and paved the way for smaller and cheaper radios, calculators, and computers, among other things. Many consider it to be one of the greatest inventions of the 20th century.

5. Прочитайте 4-й и 5-й абзацы текста и ответьте письменно на следующие вопросы:

1) What terminals has a field-effect transistor?
2) How many transistors can an advanced microprocessor of 2011 use?
3) What is a transistor?
4) Where are transistors applied?

ВАРИАНТ 3

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) Flame rectification is known to be used to detect presence of flame in gas heating systems.

2) For the experiment we need several electrical devices to be connected in series.

ВАРИАНТ 1

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) Samples of semiconductors with improved properties are reported to be obtained on a new installation.

2) These devices are known to be made of PN layers (anode, cathode) that allow them to conduct electricity.

3) He described the device to be used in all modern systems.

2. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) Having received the information the computer could process the data obtained.

2) Transistors contain no moving parts.

3) Specialists use computers widely, the latter helping them in many spheres.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения, Обратите внимание на перевод условных предложений (см. образец выполнения 3).

1) If we had obtained the necessary data, we should have finished the work earlier.

2) If a selected font was not available the printer would beep.

3) Without computers further advance in industry would be impossible.

4. Прочитайте и устно переведите с 1-го по 5-й абзацы текста. Перепишите и письменно переведите 1, 2 и 4-й абзацы.

Пояснения к тексту

solid-state – полупроводниковый, транзисторный
integrating circuit – интегрирующая схема; интегрирующая цепь
hole – «дырка» – квазичастица, носитель положительного заряда, равного элементарному заряду в полупроводниках; незаполненная валентная связь, которая проявляет себя как положительный заряд, численно равный заряду электрона.
silicon rectifier – 1) кремниевый выпрямитель; 2) кремниевый диод
PN (Processing Node) – процессорный узел
dopant – присадка; (легирующая) примесь; диффузант (небольшая добавка примесного вещества для получения определённых свойств полупроводника)

Для сдачи **экзамена** студент должен:

1) уметь правильно читать и понимать без словаря учебные тексты, изученные в течение данного периода обучения, а также тексты выполненных контрольных работ;

2) уметь перевести со словарем профессионально-ориентированный текст объемом 1500 печатных знаков за 1 ч 20 мин письменно;

3) прочитать профессионально-ориентированный текст объемом 1800 печатных знаков за 10 мин и передать содержание прочитанного на русском языке.

КОНТРОЛЬНОЕ ЗАДАНИЕ 1

Для того чтобы правильно выполнить задание 1, необходимо усвоить следующие разделы курса:

1) имя существительное, множественное число, артикли и предлоги как показатели имени существительного; выражения падежных отношений в английском языке с помощью предлогов и окончания **-s**; существительное в функции определения и его перевод на русский язык;

2) имя прилагательное, степени сравнения прилагательных, конструкции типа **the more ... the less**;

3) числительные;

4) местоимения: личные, притяжательные, вопросительные, указательные, неопределенные и отрицательные;

5) форма **настоящего** (Present), **прошедшего** (Past) и **будущего** (Future) времени группы Indefinite действительного залога изъявительного наклонения; спряжение глаголов **to be, to have** в Present, Past и Future Indefinite; повелительное наклонение и его отрицательная форма;

6) простое распространенное предложение: прямой порядок слов повествовательного и побудительного предложений в утвердительной и отрицательной формах; обратный порядок слов вопросительного предложения; оборот **there is (are)**;

7) основные случаи словообразования.

Используйте следующие образцы выполнения упражнений.

Образец выполнения 1 (к упр. 1)

Грамматическая функция окончания **-s**

1. The students attend lectures and seminars on history.	Студенты посещают лекции и семинары по истории.

Lectures – множественное число от имени существительного **a lecture** *лекция.*

CAMBRIDGE UNIVERSITY

1) Cambridge is situated at a distance of 70 miles from London. It is one of the most beautiful towns in England. The dominating factor in Cambridge is its well-known University, a centre of education and learning. Many great men studied at Cambridge, among them Newton, Byron, and Darwin and others. Cambridge University started during the 13th century and has grown until today. Now there are more than thirty colleges.

2) Although all colleges belong to the same university, each has its own character and style. The oldest college is Peterhouse, which was founded in 1284. The most famous is probably King's College because of its magnificent chapel, the largest and the most beautiful building in Cambridge and the most perfect example left of English fifteenth-century architecture. Its choir of boys and undergraduates is also very well-known.

3) Cambridge is a very pleasant city to live and study in. Since there are so many colleges, a large number of the city's inhabitants are young students.

4) Sport plays a large part in university life. As Cambridge is on the river Cam, rowing seems to be the most popular sport. There are boat houses all along the river bank and early in the morning you'll see many students rowing whatever the weather. The best of them are preparing for the famous annual boat race against their rivals from Oxford. This race attracts much attention thousands of people line the banks of the Thames in London to cheer both teams on, and the race is broadcast on television in many different parts of the world.

5) Academically Cambridge ranks as one of the top universities in the world: first in the world in both the 2010 and 2011 *QS World University Rankings*, sixth in the world in the 2011 *Times Higher Education World University Rankings*, and fifth in the world (and first in Europe) in the 2011 *Academic Ranking of World Universities*.

7. Прочитайте 4-й и 5-й абзацы текста и письменно ответьте на вопросы:

1) What is the most popular sport at Cambridge University? Prove it.

2) What place has Cambridge among the top universities in the world?

ВАРИАНТ 2

1. Перепишите следующие предложения. Определите по грамматическим признакам, какой частью речи являются слова, оформленные окончанием **-s**, и какую функцию это окончание выполняет, т.е. служит ли оно:

а) показателем 3-го лица единственного числа глагола в Present Indefinite;

б) признаком множественного числа имени существительного:

3) All the problems to be discussed at the conference are of great importance for our company.

2. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) The house being built now will be a drama theatre.

2) The new material finding its way in construction now is called chemically resistant concrete.

3) The population increasing, housing construction should be paid much attention to.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения. Обратите внимание на то, как переводятся условные предложения (см. образец выполнения 3).

1) If new management techniques are not considered and adopted, there will be a loss in competitive advantage.

2) If they had taken into consideration the properties of these materials, they should have changed the draft.

3) It would be impossible to make cement without limestone and clay.

4. Прочитайте и устно переведите с 1-го по 6-й абзацы текста. Перепишите и письменно переведите 1, 2, 3 и 4-й абзацы.

Пояснения к тексту

reinforcement plate – накладка для усиления (шва)
tensile strain – деформация растяжения
concrete reinforcement wire – проволока для вязки арматуры бетона; арматурная проволока
матурный стержень – арматурный стержень периодического профиля; фасонный арматурный стержень
welded wire fabric – сварная проволочная сетка (для армирования бетона)
shells – 1) остов здания; каркас 2) оболочка 3) слой, обшивка
Building code – строительные нормы и правила (США)
ACI – Американский институт бетона

REINFORCED CONCRETE

1) Reinforced concrete is concrete in which reinforcement bars ("rebars"), reinforcement grids, plates or fibers have been incorporated to strengthen the concrete in tension. We know reinforced concrete to be a combination of two of the strongest structural materials, concrete and steel.

2) The reinforcing of concrete is known to be first introduced in France in 1861. The term Ferro Concrete refers only to concrete that is reinforced with iron or steel. Other materials used to reinforce concrete can be organic and inorganic fibres as well as composites in different forms.

2. He lectures on philosophy.	Он читает лекции по философии.

Lectures – 3-е лицо единственного числа от глагола **to lecture** в Present Indefinite.

3. My brother's son is a student.	Сын моего брата – студент

В слове **brother's** 's – окончание притяжательного падежа имени существительного в единственном числе.

My brothers' sons are students.	Сыновья моих братьев – студенты

Слово **brothers'** – форма притяжательного падежа имени существительного **a brother** во множественном числе.

Образец выполнения 2 (к упр. 2)

Особенности перевода на русский язык английских имен существительных, употребляющихся в функции определения, стоящего перед определяемым словом.

1. The scientist works at some problems of **low temperature** physics.	Этот ученый работает над некоторыми проблемами физики *низких температур.*
2. Many **Oxbridge students** come from public schools.	2. Многие студенты Оксфорда и Кембриджа – выпускники государственных школ.

Образец выполнения 3 (к упр. 5)

Lomonosov **founded** the first Russian University in Moscow.	Ломоносов *основал* первый русский университет в Москве.

Founded – Past Indefinite Active от стандартного глагола **to found.**

ВАРИАНТ 1

1. Перепишите следующие предложения. Определите по грамматическим признакам, какой частью речи являются слова, оформленные окончанием **-s**, и какую функцию это окончание выполняет, т.е. служит ли оно:

а) показателем 3-го лица единственного числа глагола в Present Indefinite;

б) признаком множественного числа имени существительного,

в) показателем притяжательного падежа имени существительного (см. образец выполнения 1).

Переведите предложения на русский язык.

1) They work on the problem of the plane's engines.

Используйте образцы выполнения упражнений.

Образец выполнения 1 (к упр. 1)

1. A more recent invention – the transistor - is known to have replaced the vacuum tube in many situations.	Известно, что более современное изобретение – транзистор – заменило электронные лампы.
2. We know all data to be translated into binary code before being stored in main storage.	Нам известно, что все данные нужно перевести в двоичный код перед сохранением их в оперативном запоминающем устройстве.
3. The high-speed devices to be used as a secondary storage are both input and output devices.	Высокоскоростные устройства, используемые как вспомогательное запоминающее устройство, являются как устройствами ввода, так и вывода.

Образец выполнения 2 (к упр. 2)

1. Early computers using vacuum tubes could perform computations in milliseconds.	Первые компьютеры, использующие электронные лампы, могли выполнять вычисления в течение миллисекунд.
2. Having received the information the computer could process the date obtained.	Получив информацию, компьютер смог обработать полученные данные.
3. The CPU controls the operation of the entire system, commands being issued to other parts of the system.	Центральный процессор контролирует работу всей системы, причем команды поступают к другим частям системы.

Образец выполнения 3 (к упр. 3)

1. Time will be saved if one uses a computer.	Если будут использовать компьютер, сэкономят время.
2. If the binary system had not existed computer designers would have had to invent it.	Если бы не существовало двоичной системы, то конструкторам вычислительных машин пришлось бы ее изобрести.
3. It would be impossible to imagine our modern life without computers.	Было бы невозможно представить нашу современную жизнь без компьютеров.

3) Concrete is strong in compression, but weak in tension, thus adding reinforcement increases the strength in tension. In addition, the failure strain of concrete in tension is so low that the reinforcement has to hold the cracked sections together. For a strong, ductile and durable construction the reinforcement shall have the following properties: high strength, high tensile strain, good bond to the concrete, thermal compatibility, durability in the concrete environment.

4) Steel reinforcement for concrete consists of bars, wires, and welded wire fabric. Deformations are rolled on the bar surface to increase the bond between concrete and steel. The deformed wire has indentations pressed into the wire or bar to serve as deformations. Only deformed bars, deformed wires, or wire fabric may be used in reinforced concrete under approved practice.

5) Welded wire fabric is increasingly used for slabs because of the ease of placing the fabric sheets, control of reinforcement spacing, and better bond. The fabric reinforcement is made of smooth or deformed wires that run in perpendicular directions and are welded together at intersections. To protect the reinforcement from corrosion and loss of strength in case of fire, codes specify a minimum required concrete cover.

6) In the case of slabs, plates, shells, and folded plates, where concrete is not exposed to a severe environment and where the reinforcement size does not exceed a № 11 bar diameter, the clear cover should not be less than ¾ in. Detailed requirements as to thickness of cover for various conditions can be found in various codes of practice, such as Underwriters' National Building Code and ACI 318 Code.

5. Прочитайте 5-й и 6-й абзацы текста и ответьте письменно на следующие вопросы:

1) What is welded wire fabric used for?
2) What wires is the fabric reinforcement made of?
3) In what case do the codes specify a minimum required concrete cover?
4) When the clear cover should not be less than ¾ in?

КОНТРОЛЬНОЕ ЗАДАНИЕ 4
для студентов направления «Промышленная электроника»

Чтобы правильно выполнить задание 4, необходимо усвоить следующие разделы курса английского языка по рекомендованному учебнику:

1) сложные формы инфинитива (Passive Infinitive, Perfect Infinitive). Оборотн, равнозначные придаточным предложениям: объектный инфинитивный оборот, субъектный инфинитивный оборот;

2) причастия (Participle I, II). Независимый (самостоятельный) причастный оборот;

3) условные предложения.

2) He works hard at his English.
3) Usually students have no classes in the summer.

2. Перепишите следующие предложения и переведите их, обращая внимание на особенности перевода на русский язык определений, выраженных именем существительным (см. образец выполнения 2).

1) The bus stop is not far from here.
2) Several Cambridge University postgraduates work at this problem.
3) There are only daylight lamps in this room.

3. Перепишите следующие предложения, содержащие разные формы сравнения, и переведите их на русский язык.

1) Cambridge is one of the most beautiful towns in England.
2) This reading-room is smaller than that one.
3) The longer is the night, the shorter is the day.

4. Перепишите и письменно переведите предложения на русский язык, обращая внимание на перевод неопределенных и отрицательных местоимений.

1) At some of the London Underground stations there are lifts, others have escalators.
2) Any student of our group can speak on the history of Cambridge University.
3) No sport in Cambridge is as popular as rowing.

5. Перепишите следующие предложения, определите в них видовременные формы глаголов и укажите их инфинитив; переведите предложения на русский язык (см. образец выполнения 3).

1) Many outstanding people studied at Cambridge.
2) The boat race attracts much attention of people.
3) In a few days she will leave for Oxford.

6. Прочитайте и устно переведите на русский язык с 1-го по 5-й абзацы текста. Перепишите и письменно переведите 1, 2 и 3-й абзацы.

Пояснения к тексту

Peterhouse – Питерхаус, колледж Святого Петра

QS World University Rankings – рейтинг 500 лучших университетов мира, проводимый компанией Quacquarelli Symonds, специализирующейся в области образования, основанной выпускником Wharton School MBA Nunzio Quacquarelli

Times Higher Education World University Rankings – международный рейтинг университетов, публикуемый в британском журнале *Times Higher Education* Academic Ranking of World Universities или Shanghai ranking – это издание, основанное университетом *Shanghai Jiaotong University (Шанхай),* представляющее рейтинг среди лучших университетов мира.

2) It is told that one of the Emperors of Rome delighted guests by throwing a tablecloth made of asbestos into fire and then removing it unchanged from the flame. A few centuries later Marco Polo told his friends in Italy about a substance he observed in Siberia. He told that it could be woven into attractive textiles, which did not burn even in direct flame.

3) Asbestos is one of the strongest of all the naturally occurring fibers. It is a rock which has been subjected to unusual treatment during its formation. Asbestos is the only mineral substance used as a textile fiber in the form it is obtained from natural sources. There are many varieties of asbestos rocks but only chrysotile is widely used for textile products. Chrysotile is mined in many countries of the world. The soft, long, white fibers of this mineral can be spun into yarn by the usual processes. Pure asbestos being very difficult to spin, a proportion of cotton fiber is usually added to help to bind the asbestos fibers together. The strangest characteristic of asbestos fibers is their resistance to heat and burning. This property determines the ways in which they are used.

4) Early uses for asbestos included such articles as handkerchiefs and table coverings. The Chinese used asbestos to make false sleeves, which could be cleaned by putting them in the fire. All the dirt was burned off, leaving the asbestos clean. We know commercial development of the fiber to have started in the 19th century. Asbestos was used in flameproof clothing of many kinds, for laboratory, industrial and military purposes.

5) Fabrics made of asbestos have good strength. Today the main applications are those in which non-inflammability is essential such as conveyor belting for hot materials, industrial packing, fireproof clothing, etc. Asbestos is sometimes used with glass fiber in making decorative fabrics for curtains used in hospitals, theatres and other buildings where the public assembles. Some grades of asbestos are used for electrical windings and insulation.

5. Прочитайте 4-й и 5-й абзацы текста и ответьте письменно на следующие вопросы:

1) How was asbestos used in the past?
2) What are the main applications of fabrics made of asbestos?
3) What is asbestos also used for?

ВАРИАНТ 5

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) We know reinforced concrete to be a combination of two of the strongest structural materials, concrete and steel.

2) The reinforcing of concrete is known to be first introduced in France in 1861.

в) показателем притяжательного падежа имени существительного (см. образец выполнения 1).

Переведите предложения на русский язык.

1) Oxford University consists of a number of colleges.

2) Small groups of students meet with a member of the university's teaching staff.

3) The inhabitants of Oxford are proud of their city.

2. Перепишите следующие предложения и переведите их, обращая внимание на особенности перевода на русский язык определений, выраженных именем существительным (см. образец выполнения 2).

1) The students of our group will go to the State History Museum tomorrow.

2) The degrees are awarded at public degree ceremonies.

3) The annual Boat Race is held between Oxford and Cambridge.

3. Перепишите следующие предложения, содержащие разные формы сравнения, и переведите их на русский язык.

1) Oxford is one of the oldest and most prestigious universities in Great Britain.

2) The more I thought of that plan, the less I liked it.

3) Your translation is better than mine.

4. Перепишите и письменно переведите предложения на русский язык, обращая внимание на перевод неопределенных и отрицательных местоимений.

1) Some students attended the tutorial.

2) Does he know any foreign language?

3) Any exhibit of this museum is valuable.

5. Перепишите следующие предложения, определите в них видовременные формы глаголов и укажите их инфинитив; переведите предложения на русский язык (см. образец выполнения 3).

1) Rivalry between Oxford and Cambridge dates back to around 1209.

2) These students came from public schools.

3) In two years my brother will become an engineer.

6. Прочитайте и устно переведите на русский язык с 1-го по 6-й абзацы текста. Перепишите и письменно переведите 1, 2, 3 и 6-й абзацы.

Пояснения к тексту

Master – мастер (титул главы некоторых колледжей в Оксфордском и Кембриджском университетах
rivalry – соперничество, конкуренция, соревнование
scholar – учёный
Times Higher Education World Reputation Rankings – международный рейтинг университетов, публикуемый в британском журнале *Times Higher Education*
academic – ученый, человек из университетской среды

exhibition – повышенная стипендия, именная стипендия
Times Higher Education World University Rankings – международный рейтинг университетов, публикуемый в британском журнале *Times Higher Education*

OXFORD UNIVERSITY

1) Oxford is one of the oldest universities in Europe. It is the second largest in Britain, after London. The town of Oxford is first mentioned in the Anglo-Saxon Chronicle in 911 AD and it was popular with the early English kings (Richard Coeur de Lion was probably here). Although the exact date of its foundation remains unclear, there is evidence of teaching there as far back as 1096.

2) There are thirty-eight colleges of the University of Oxford and six Permanent Private Halls, each controlling its membership and with its own internal structure and activities. All resident students, and most academic staff, must be members both of a college or hall, and of the university. Among the oldest colleges are University College, All Souls and Christ Church.

3) The academic year is divided into three terms, determined by Regulations. Michaelmas Term lasts from October to December; Hilary Term from January to March; and Trinity Term from April to June.

4) The normal length of degree course is three years. Some courses, such as languages or medicine, may be one or two years longer. The students may work for other degrees as well. The degrees are awarded at public degree ceremonies. Oxford and Cambridge cling to their traditions, such as the use of Latin at degree ceremonies. Full academic dress is worn at examinations.

5) There are many opportunities for students at Oxford to receive financial help during their studies. Students successful in early examinations are rewarded by their colleges with scholarships and exhibitions, normally the result of a long-standing endowment, although when tuition fees were first abolished, the amounts of money available became purely nominal.

6) In 2011 Times Higher Education World University Rankings, Oxford placed fourth in the world and first in Europe.

7. Прочитайте 4-й и 5-й абзацы текста и письменно ответьте на вопросы:

1) What traditions of Oxford and Cambridge Universities are mentioned in this paragraph?
2) How long does the degree course last?
3) What financial help may Oxford students receive during their studies?

5. Прочитайте 4, 5 и 6-й абзацы текста и ответьте письменно на следующие вопросы:

1) What aggregates may be used for making concrete?
2) What are the properties of concrete?
3) What is the purpose of using steel in the prestressed concrete?
4) Where is prestressed concrete employed now?

ВАРИАНТ 3

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) We know reinforced to be first investigated by the French engineer Vidal.
2) For the construction we need many large panels to be delivered in advance.
3) The team is reported to have made a great deal of work.

2. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) Having invented reinforced concrete our designers have got one of the strongest building materials.
2) Reinforced concrete slabs having been tested, they showed great strength.
3) An architect designing a building should be careful in calculations.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения. Обратите внимание на то, как переводятся условные предложения (см. образец выполнения 3).

1) If the quality of the equipment were higher the results of the experiment would be more accurate and complete.
2) Many building materials wouldn't have been saved, if reinforced concrete hadn't been widely used in building construction.
3) It would be impossible to make cement without limestone and clay.

4. Прочитайте и устно переведите с 1-го по 6-й абзацы текста. Перепишите и письменно переведите 1, 2, 3 и 4-й абзацы.

Пояснения к тексту

bind (bound) – связывать, скреплять
grind (ground) – размалывать
ignite – зажигать, загораться, прокаливать
lump – глыба, комок
putty – замазка, шпаклёвка
roast – обжигать, калькинировать

SILICATE INDUSTRY

1) Silicate industry is the industry processing the natural compounds of silicon. It includes the production of cement, glass, and ceramics.

2) The production of ceramic goods is based on the property of clay when mixed with water to form putty, from which various articles can easily be moulded. When these are dried and then for easily moulding baked, that is, ignited at a high temperature, they become hard and retain their shape, no longer being softened by water.

3) Cement Production. Cement is made from limestone and clay, or from their natural mixture, marls. The materials roasted in cylindrical rotary kilns are charged into a slowly rotating kiln at its upper end and travel, mixing continuously, towards the lower end, while a current of hot gases, the products of the burning of fuel, flows in the opposite direction. During the period of their movement through the kiln the clay and the limestone react chemically, and the material emerging from the kiln in lumps of a caked mass is cement, which is then grounded.

4) When cement is mixed with water, it forms mortar, which hardens, binding various objects, such as bricks or stones, very firmly. It is for this reason that cement is used widely as a binding material in large-scale construction, including underwater construction.

5) Cement is often mixed with sand or gravel, in which case we get concrete. Concrete has roughly the same coefficient of thermal expansion as iron.

6) Glass Production. The initial materials for the production of ordinary glass are mainly soda, limestone, and sand. A mixture of these substances is heated in a bath-shaped furnace. When it cools, the liquid mass of glass does not become hard at once. At first it becomes viscous and readily assumes any shape. This property of glass is used in making various articles out of it. Definite portions of the cooling semiliquid mass are taken from the bath, and these are blown or pressed to make various glassware. By machine methods glass sheets, tubes, etc., can be drawn continuously from the molten mass.

5. Прочитайте 5-й и 6-й абзацы текста и ответьте письменно на следующие вопросы:

1) How can we get concrete?
2) What materials are used for the production of ordinary glass?
3) When does the liquid mass of glass viscous?
4) How can various glassware be made?

б) признаком множественного числа имени существительного;

в) показателем притяжательного падежа имени существительного (см. образец выполнения 1).

Переведите предложения на русский язык.

1) There are thirty-eight colleges of the University of Oxford.
2) This course lasts 3 years.
3) We know the author's name of this article.

2. Перепишите следующие предложения и переведите их, обращая внимание на особенности перевода на русский язык определений, выраженных именем существительным (см. образец выполнения 2).

1) The degree course usually takes three years.
2) The tuition fees were first abolished.
3) Three years ago our family moved into a large three-room flat.

3. Перепишите следующие предложения, содержащие разные формы сравнения, и переведите их на русский язык.

1) The more I studied the English language, the more I liked it.
2) My friend is one of the best students of our group.
3) This reading room is smaller than that one.

4. Перепишите и письменно переведите предложения на русский язык, обращая внимание на перевод неопределенных и отрицательных местоимений.

1) No student of that group studies Spanish.
2) Some five hundred people were present at the meeting.
3) Have you any books on chemistry?

5. Перепишите следующие предложения, определите в них видовременные формы глаголов и укажите их инфинитив; переведите предложения на русский язык (см. образец выполнения 3).

1) The dean will come here later.
2) The student made no mistakes in his translation.
3) The town of Oxford is very old.

6. Прочитайте и устно переведите на русский язык с 1-го по 6-й абзацы текста. Перепишите и письменно переведите 1, 2, 3 и 6-й абзацы.

Пояснения к тексту

Anglo-Saxon Chronicle – «Англосаксонский Кроникл» (вестник)
AD= Anno Domini – нашей эры
Richard Coeur de Lion – английский король Ричард Львиное Сердце
Michaelmas Term – семестр, начинающийся в Михайлов день, День Архангела Михаила (празднуется католической церковью 29 сентября)
Hilary Term – семестр, начинающийся с Рождества
Trinity Term – семестр, названный по празднику Троицын день (восьмое воскресенье после Пасхи)

1) Oxford and Cambridge are the oldest and most prestigious universities in Great Britain. They are often called collectively Oxbridge. Both universities are independent. Many Oxbridge students come from public schools, and Oxbridge graduates often go on to become influential and powerful in British society.

2) Oxford and Cambridge Universities consist of a number of colleges. Each college is different, but in many ways they are alike. Each college has its name and its coat of arms. Each college is governed by a Master.

3) The degrees are awarded at public degree ceremonies. Oxford and Cambridge cling to their traditions, such as the use of Latin at degree ceremonies. Full academic dress is worn at examinations.

4) The principal method of undergraduate teaching (other than lectures) is the "supervision" or "tutorial": terms used at Cambridge and Oxford respectively, though the meaning is the same. These are typically weekly or more frequent hour-long sessions in which small groups of students - usually between one and three - meet with a member of the university's teaching staff or a doctoral student. Students are normally required to complete an essay or assignment in advance of the supervision/tutorial, which they will discuss with the supervisor/tutor during the session. Students typically receive one to three tutorials/supervisions per week.

5) Rivalry between Oxford and Cambridge also has a long history, dating back to around 1209 when Cambridge was founded by scholars taking refuge from hostile townsmen in Oxford. Many annual competitions are held between Oxford and Cambridge, including the annual Boat Race.

6) In 2011 the Times Higher Education World Reputation Rankings, based on a survey of 13,388 academics over 131 countries found that both Cambridge and Oxford belonged to the elite group of six universities touted as the "globally recognized super brands"; Cambridge ranked 3rd, Oxford 6th.

7. Прочитайте 4-й и 5-й абзацы текста и письменно ответьте на вопросы:

1) What is the main method of undergraduate teaching used at Cambridge and Oxford?
2) What do you know about the rivalry between Oxford and Cambridge?

ВАРИАНТ 3

1. Перепишите следующие предложения. Определите по грамматическим признакам, какой частью речи являются слова, оформленные окончанием **-s**, и какую функцию это окончание выполняет, т.е. служит ли оно:

а) показателем 3-го лица единственного числа глагола в Present Indefinite;

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) We know reinforced to be first investigated by the French engineer Vidal.
2) The method is said to be popular all over the world.
3) Reinforced concrete is the structural material to be used for erecting multistorey buildings and skyscrapers.

2. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образцы выполнения 2).

1) Having invented reinforced concrete our designers have got one of the strongest building materials.
2) The powerful machine-building factory having been built in our country, we began to produce new types of machines and equipment.
3) Many thousands of years ago men settling in caves wanted to protect themselves from stormy weather.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения. Обратите внимание на то, как переводятся условные предложения (см. образцы выполнения 3).

1) If the house had been built by December, you would have lived in a new flat already.
2) If plastics find a wide application in building a lot of structural materials will be saved.
3) Were I in your place I wouldn't use granite for decorating the facade of the building.

4. Прочитайте и устно переведите с 1-го по 5-й абзацы текста. Перепишите и письменно переведите 1, 2 и 3-й абзацы.

Пояснения к тексту

fiber = fibre – волокно, нить
yarn – пряжа, нить
sleeve – рукав
spin (span, spun) – прясть
handkerchief – носовой платок, косынка
treatment– обращение, обработка; *здесь* воздействие

ASBESTOS

1) Asbestos has been known and used as a textile since the earliest times. The first written evidence of asbestos was recorded by Pliny in the first century A.D.

Пояснения к тексту

aggregate – заполнитель, инертный материал (бетона)
load – груз, нагрузка
crack – треск, трещина;
cushioning material – амортизирующий материал
store – запас, склад;
tensile – растяжимый

MODERN BUILDING MATERIALS

1) Concrete is perhaps the most widely spread building material used nowadays. Concrete is an artificial stone, made by thoroughly mixing such natural ingredients or aggregates as cement, sand and gravel or broken stone together with sufficient water to produce a mixture of the proper consistency. It has many valuable properties. It sets under water, can be poured into moulds so as to get almost any desirable form, and together with steel in reinforced concrete it has very high strength, and also resists fire. Prestressed concrete is most widely used at present while prefabricated blocks are employed on vast scale for skeleton structures.

2) Aggregates (or cushioning materials) can be defined as a mass of practically inert mineral materials, which, when surrounded and bonded together by an active binder, form the rock. This rock is denoted by the general term “concrete”.

3) Aggregates have three principal functions in the concrete: they provide relatively cheap filler for the concreting material, or binder; they provide a mass of particles which are suitable for resisting the action of applied loads, of abrasion, of percolation of moisture through the mass, and of climate factors; they reduce volume changes resulting from the action of the setting and hardening of the concrete mass.

4) All aggregates, both natural and artificial, which have sufficient strength and resistance to weathering, and which do not contain harmful impurities may be used for making concrete.

5) Prestressed concrete is not a new material. Its successful use has been developed rapidly during the last two decades. Concrete is strong in compression but weak when used for tensile stresses. In prestressed concrete steel is not used as reinforcement, but as a means of producing a suitable compressive stress in the concrete. Therefore any beam (or member) made of prestressed concrete is permanently under compression, and is consequently devoid of crack under normal loading, or so long as the "elastic limit" is not exceeded.

6) Prestressed concrete is not only used for beams but is now employed extensively for columns, pipes, and cylindrical water towers, storage tanks, etc.

ВАРИАНТ 4

1. Перепишите следующие предложения. Определите по грамматическим признакам, какой частью речи являются слова, оформленные окончанием **-s**, и какую функцию это окончание выполняет, т.е. служит ли оно:

а) показателем 3-го лица единственного числа глагола в Present Indefinite;

б) признаком множественного числа имени существительного;

в) показателем притяжательного падежа имени существительного (см. образец выполнения 1).

Переведите предложения на русский язык.

1) Crimson is also the name of the Harvard sports teams.

2) Eliot’s reforms were of great importance at that time.

3) The friendly rivalry dates back to 1900.

2. Перепишите следующие предложения и переведите их, обращая внимание на особенности перевода на русский язык определений, выраженных именем существительным (см. образец выполнения 2).

1) During its four-century-old history the University experienced several dramatic events.

2) Harvard University is a private Ivy League university.

3) There are more than 13 000 graduate students at Harvard University.

3. Перепишите следующие предложения, содержащие разные формы сравнения, и переведите их на русский язык.

1) Harvard is the oldest institution of higher education in the United States.

2) The more experiments we carry out, the more data we obtain.

3) This college building is larger than that one.

4. Перепишите и письменно переведите предложения на русский язык, обращая внимание на перевод неопределенных и отрицательных местоимений.

1) Any monument in this ancient town has its own history.

2) Nobody knew anything about this experiment.

3) The names of some streets and squares are living history of this old city.

5. Перепишите следующие предложения, определите в них видовременные формы глаголов и укажите их инфинитив; переведите предложения на русский язык (см. образец выполнения 3).

1) Harvard is the best overall university in the world.

2) Today, the two schools cooperate as much as they compete, with many joint conferences and programmes.

3) John Harvard left a few hundred books by his will to the college library.

2) Stanford competes in 34 varsity sports.

3) He knew English when he was a child.

6. Прочитайте и устно переведите на русский язык с 1-го по 6-й абзацы текста. Перепишите и письменно переведите 3, 4, 5 и 6-й абзацы.

Пояснения к тексту

faculty – профессорско-преподавательский состав (в университетах США)
alumni – выпускники (мужского пола или университета)
Google – поисковая система Google, в 1998 г. её создали выпускники Стэнфордского университета Ларри Пэйдж (Larry Page) и Сергей Брин
Hewlett-Packard – корпорация Hewlett-Packard – производитель электронной и вычислительной техники, а также принадлежащая ей торговая марка
Beijing – Пекин (столица Китая)
Silicon Valley – "Кремниевая долина" ("Силиконовая долина") Название район она на западе штата Калифорния к югу от г. Сан-Франциско, где сконцентрировано высокотехнологичное производство, в том числе с использованием полупроводниковых кремниевых плат.
The Academic Ranking of World Universities (ARWU) – или Shanghai ranking – это издание, основанное университетом *Shanghai Jiaotong University*, представляющее рейтинг среди лучших университетов мира.

STANFORD UNIVERSITY

1) The *Leland Stanford Junior University*, commonly referred to as *Stanford University* or *Stanford*, is a private research university located near Palo Alto, California. It is situated in the northwestern Santa Clara Valley on the San Francisco Peninsula. Stanford is widely considered one of the most prestigious and selective universities in the world.

2) Leland Stanford, a Californian railroad magnate and politician, founded the university in 1891 in honor of his son, Leland Stanford, Jr., who died two months before his 16th birthday.

3) The university struggled financially after the senior Stanford’s 1893 death and after much of the campus was damaged by the 1906 San Francisco earthquake. Following World War II, Provost Frederick Terman supported faculty and graduates' entrepreneurialism to build self-sufficient local industry in what would become known as *Silicon Valley*. By 1970 Stanford had transformed itself into a major research university in computer science, mathematics, natural sciences, and social sciences. More than 50 Stanford faculty, staff, and alumni have won the Nobel Prize. Stanford faculty and alumni have founded many prominent technology companies including *Google, Hewlett-Packard, Rambus, Silicon Graphics* and *Yahoo!*

Образец выполнения 3 (к упр. 3)

1. If the installation is put into operation in time, the economic effect will be greater.	Если установка будет пущена вовремя, экономический эффект возрастет.
2. If the system had been perfected, we should have applied it for new buildings.	Если бы система была усовершенствована, мы бы применили ее для новых строений.
3. It would be impossible to build civil constructions without using new materials and alloys.	Было бы невозможно построить гражданские строения без применения новых материалов и сплавов.

ВАРИАНТ 1

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) We know new types of concrete to have found wide application in building.

2) Laminate is known to be impregnated with thermosetting resins.

3) Plastics to be designed for interior use may be recommended as structural material for window and door frames.

2. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) Wood being easily subjected to fire, wooden houses were immediately replaced by the stone ones.

2) Reinforced concrete showing great strength finds wide usage in building construction.

3) Having built a new prefabrication plant, we increased the output of fabricated structures and units.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения, Обратите внимание на перевод условных предложений (см. образец выполнения 3).

1) If the house had been built in stone it would not have been destroyed by the fire.

2) It would be impossible to erect the new bridge without a new device.

3) If the quantity and the distribution of reinforcement are carefully considered, high strength reinforced concrete will be produced.

4. Прочитайте и устно переведите с 1-го по 8-й абзацы текста. Перепишите и письменно переведите 6, 7 и 8-й абзацы.

Пояснения к тексту

froth – пена; пениться
impermeability – непроницаемость; герметичность
kiln – печь для обжига; mortar – раствор
resist – сопротивляться
sawdust – опилки
subject (to) – подвергать; подчинять

BUILDING MATERIALS

1) Some of the most important building materials are: timber, brick, stone, concrete, metal, plastics and glass.

2) Timber is provided by different kinds of trees. Timber used for building purposes is divided into two groups called softwoods and hardwoods. Timber is at present not so much used in building construction, as in railway engineering, in mining and in the chemical industry where it provides a number of valuable materials.

3) Brick is best described as a "building unit". It may be made of clay by moulding and baking in kilns, of concrete, of mortar or of a composition of sawdust and other materials. In shape it is a rectangular solid.

4) Metals: Aluminum, principally in the form of various alloys, is highly valued for its durability and especially for its light weight, while brass is frequently used for decorative purposes in facing.

5) Steel finds its use in corrugated sheets for roofing, for girders, frames, etc. Various shapes are employed in construction.

6) Plastics are artificial materials used in construction work for a vast number of purposes. Nowadays plastics can be applied to almost every branch of building, from the laying of foundation to the final coat of paint. Plastics have some good advantages as they are lighter than metals, not subject to corrosion, and they can be easier machined. Besides, they are inflammable, they can take any colour and pattern, and they are good electrical insulators. Moreover, they possess a high resistance to chemical action.

7) Laminate is a strong material manufactured from many layers of paper or textile impregnated with thermosetting resins. This sandwich is then pressed and subjected to heat. Laminate has been developed for both inside and outside use. It resists severe weather conditions for more than ten years without serious deformation. As a structural material it is recommended for exterior work. Being used for surfacing, laminate gives the tough surface.

8) Foamed glass is a high-porosity heat insulating material, available in block made of fine-ground glass and a frothing agent. Foamed glass is widely used in prefabricated house building, to ensure heat insulation of exterior wall panels, and in industrial construction.

1) What schools do Harvard College students come from?

2) What do you know about the history of rivalry with the Massachusetts Institute of Technology?

3) When was Harvard named the best university in the world?

ВАРИАНТ 5

1. Перепишите следующие предложения. Определите по грамматическим признакам, какой частью речи являются слова, оформленные окончанием **-s**, и какую функцию это окончание выполняет, т.е. служит ли оно:

а) показателем 3-го лица единственного числа в Present Indefinite;

б) признаком множественного числа имени существительного;

в) показателем притяжательного падежа имени существительного (см. образец выполнения 1).

Переведите предложения на русский язык.

1) In the 2008 Summer Olympics in Beijing, Stanford athletes won 25 medals, including eight gold medals.

2) A well-known scientist works at this University.

3) The students' hostel is within 20 minutes' walk from the University.

2. Перепишите следующие предложения и переведите их, обращая внимание на особенности перевода на русский язык определений, выраженных именами существительными (см. образец выполнения 2).

1) The Leland Stanford Junior University is a private research university located near Palo Alto.

2) We have a large University library in our city.

3) Leland Stanford, a Californian railroad magnate and politician, founded the university in 1891.

3. Перепишите следующие предложения, содержание разные формы сравнения, и переведите их на русский язык

1) It is one of the most prestigious universities in the world.

2) The more often you visit this small old town, the more you like it.

3) The situation was much better than I had expected.

4. Перепишите и письменно переведите на русский язык следующие предложения, обращая внимание на перевод неопределенных и отрицательных местоимений.

1) I don't see any difference and I think there is no difference at all.

2) Almost any building of the capital is attractive.

3) There are some educational institutions in our city.

5. Перепишите следующие предложения, определите в них видовременные формы глаголов и укажите их инфинитив; переведите предложения на русский язык (см. образец выполнения 3).

1) He will join the Students Scientific Society next term.

6. Прочитайте и переведите устно на русский язык с 1-го по 6-й абзацы текста. Перепишите и письменно переведите 1, 2 и 3-й абзацы.

Пояснения к тексту

Ivy League – "Лига плюща" (объединение 8 старейших привилегированных учебных заведений на северо-востоке США)
crimson – малиновый, тёмно-красный
donor – даритель; жертвователь
clergyman – священник
bequeath – завещать
in his will – по своему завещанию

HARVARD UNIVERSITY

1) Harvard University is a private Ivy League university located in Cambridge, Massachusetts, United States, established in 1636. Harvard is the oldest institution of higher learning in the United States. The institution was named Harvard College on March 13, 1639, after its first principal donor, a young clergyman named John Harvard. A graduate of Emmanuel College, Cambridge, John Harvard bequeathed a few hundred books in his will to form the basis of the college library collection, along with several hundred pounds.

2) The earliest known official reference to Harvard as a "university" rather than a "college" occurred in the new Massachusetts Constitution of 1780. In his 1869–1909 tenure as Harvard President, Charles W. Eliot radically transformed Harvard into the pattern of the modern research university. Eliot's reforms included elective courses, small classes and entrance examinations.

3) A faculty of about 2,410 professors, lecturers, and instructors serve as of school year 2009–10, with 7,180 undergraduate and 13,830 graduate students. The school color is crimson, which is also the name of the Harvard sports teams and the daily newspaper, *The Harvard Crimson*.

4) Harvard College has traditionally drawn many of its students from private schools, though today the majority of undergraduates come from public schools across the United States and around the globe.

5) Harvard has a friendly rivalry with the Massachusetts Institute of Technology, which dates back to 1900 when a merger of the two schools was frequently discussed and at one point officially agreed upon (ultimately canceled by Massachusetts courts). Today, the two schools cooperate as much as they compete, with many joint conferences and programmes.

6) In 2010, according to University Ranking by Academic Performance (URAP), Harvard is the best overall university in the world.

7. Прочитайте 4, 5 и 6-й абзацы текста и письменно ответьте на вопросы:

1) What groups is timber divided into?
2) Where is timber mostly used?
3) What is brick made of?
4) What properties has aluminum?
5) Where does steel find its application?

ВАРИАНТ 2

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный инфинитивные оборотьі соответствуют придаточным предложениям (см. образец выполнения 1).

1) All building materials to be used for structural purposes are divided into 3 main groups.

2) We believe this new building material to have great future in the field of housing construction.

3) Wood and bricks are proved to be the most ancient building materials.

2. Перепишите и письменно переведите на русский язык следующие предложения, обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) A new type of reinforced concrete having been tested, the builders began to use it widely.

2) Having invented reinforced concrete our designers have got one of the strongest building materials.

3) The new material finding its way in construction now is called chemically resistant concrete.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения. Обратите внимание на то, как переводятся условные предложения (см. образец выполнения 3).

1) It would be impossible to carry out any intensive programme in construction without new building materials.

2) If a man builds a house of stone and wood, the construction is called a non-fireproof one.

3) If plastics had not been developed the builders would have been deprived of one of the most attractive finishing materials.

4. Прочитайте и устно переведите с 1-го по 6-й абзацы текста. Перепишите и письменно переведите 1, 2 и 3-й абзацы.

5. Прочитайте 1, 2, 3, 4 и 5-й абзацы текста и ответьте письменно на следующие вопросы:

1) What groups is timber divided into?
2) Where is timber mostly used?
3) What is brick made of?
4) What properties has aluminum?
5) Where does steel find its application?

ВАРИАНТ 2

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) All building materials to be used for structural purposes are divided into 3 main groups.

2) We believe this new building material to have great future in the field of housing construction.

3) Wood and bricks are proved to be the most ancient building materials.

2. Перепишите и письменно переведите на русский язык следующие предложения, обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

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2) If a man builds a house of stone and wood, the construction is called a non-fireproof one.

3) If plastics had not been developed the builders would have been deprived of one of the most attractive finishing materials.

4. Прочитайте и устно переведите с 1-го по 6-й абзацы текста. Перепишите и письменно переведите 1, 2 и 3-й абзацы.

5. Прочитайте 5-й и 6-й абзацы текста и ответьте письменно на следующие вопросы:

1) What is field emission?

2) How is secondary emission obtained?

КОНТРОЛЬНОЕ ЗАДАНИЕ 4
для студентов направления «Промышленное и гражданское строительство»

Чтобы правильно выполнить задание 4, необходимо усвоить следующие разделы курса английского языка по рекомендованному учебнику:

1) сложные формы инфинитива (Passive Infinitive, Perfect Infinitive). Обороты, равнозначные придаточным предложениям: объектный инфинитивный оборот, субъектный инфинитивный оборот;

2) причастия (Participle I, II); независимый (самостоятельный) причастный оборот;

3) условные предложения.

Используйте образцы выполнения упражнений.

Образец выполнения 1 (к упр. 1)

1. Various types of buildings are reported to have been constructed during the last decades.	Из отчета следует, что за последние десятилетия построены здания различных типов.
2. We want the new bridge to be constructed by December.	Мы хотим, чтобы новый мост был построен к декабрю.
3. The monument to be build here will add beauty to the place.	Памятник, который будет здесь установлен, украсит это место.

Образец выполнения 2 (к упр. 2)

1. An architect designing a building should be careful in calculations.	Архитектор, проектирующий здание, должен быть точным в расчетах.
2. Having built a new prefabrication plant, we increased the output of prefabricated structures and units.	Построив сборочный цех, мы увеличили выпуск сборных конструкций и блоков.
3. A new type of reinforced concrete having been tested, the builders began to use it widely.	После того как новый образец железобетона прошел испытания, строители начали широко его использовать.

4) The university is organized into seven schools including academic schools of Humanities and Sciences and Earth Sciences as well as professional schools of Business, Education, Engineering, Law, and Medicine.

5) Stanford competes in 34 varsity sports. In the 2008 Summer Olympics in Beijing, Stanford athletes won 25 medals, including eight gold medals, more than any other university in the United States.

6) The Academic Ranking of World Universities (ARWU) ranked Stanford 2nd in the world in 2011.

7. Прочитайте 1-й и 2-й абзацы текста и письменно ответьте на вопросы:

1) Where is Stanford University situated?

2) Who was the University founded by?

3) What does Stanford University have a reputation for?

КОНТРОЛЬНОЕ ЗАДАНИЕ 2

Для того чтобы правильно выполнить задание 2, необходимо усвоить следующие разделы курса английского языка по рекомендованному учебнику:

1) видовременные формы глагола:

а) активный залог – формы Indefinite (Present, Past, Future); формы Continuous (Present, Past, Future); формы Perfect (Present, Past, Future);

б) пассивный залог – формы Indefinite (Present, Past, Future), особенности перевода пассивных конструкций на русский язык;

2) модальные глаголы:

а) выражающие возможность: can (could), may и эквивалент глагола can – to be able;

б) выражающие долженствование: must, его эквиваленты to have to и to be to; should;

3) простые неличные формы глагола: Participle I (Present Participle), Participle II (Past Participle) в функциях определения и обстоятельства. Gerund-герундий, простые формы;

4) определительные и дополнительные придаточные предложения (союзные); придаточные обстоятельственные предложения времени и условия;

5) интернациональные слова.

Используйте следующие образцы выполнения упражнений

Образец выполнения 1 (к упр. 1)

1. Russian President **has taken** steps to promote the development of renewable energy.	Российский президент предпринял шаги по поддержке развития регенеративной энергии.

has taken – Present Perfect Active от глагола **to take**.

4) Renewable energy in Russia is largely undeveloped although there is considerable potential for renewable energy use. Geothermal energy, which is used for heating and electricity production in some regions of the Northern Caucasus and the Far East, is the most developed renewable energy source in Russia.

5) Renewable energy in Russia mainly consists of hydroelectric energy. The country is the fifth largest producer of renewable energy in the world, although it is 56th when hydroelectric energy is not taken into account.

6) Only 179 TWh of Russia's energy production comes from renewable energy sources, out of a total economically feasible potential of 1823 TWh. Only 16% of Russia's electricity is generated from hydropower, and less than 1% is generated from all other renewable energy sources combined. The abundance of fossil fuels in the Soviet Union and the Russian Federation has resulted in little development of the renewable energy sector.

7) There are currently plans to expand the share of renewable energy in Russia's energy output. Russian President Dmitry Medvedev has called for renewable energy to have a larger share of Russia's energy output, and has taken steps to promote the development of renewable energy.

5. Прочитайте 6-й и 7-й абзацы текста и письменно ответьте на вопрос:

1) How much energy does Russia produce from renewable energy sources?

2) Why is the renewable energy sector in Russia undeveloped?

3) What has the Russian President called for?

ВАРИАНТ 2

1. Перепишите следующие предложения, подчеркните в каждом из них глагол-сказуемое и определите его видовременную форму и залог. Переведите предложения на русский язык. В части **б** обратите внимание на перевод пассивных конструкций (см. образец 1).

а) Today scientists are still looking for the substance as a source of energy.

Russia is one of the world's largest producers of energy, most of which it obtains from oil, natural gas and coal.

б) In 2009, the Russian energy industry generated a total 992 TWh of electricity, 176 TWh of which was produced by hydroelectric power stations.

Russia t is also second in the world for hydro potential, yet only 20% of this potential is developed.

2. Перепишите следующие предложения; подчеркните Participle I и Participle II и установите функции каждого из них, т.е. укажите, является ли оно определением, обстоятельством или частью глагола-сказуемого. Переведите предложения на русский язык (см. образец 2).

2) If the service life of the instrument had been prolonged, the economic effect would have been increased many times.

3) It would be impossible to ensure the full supply of energy without atomic power stations.

4. Прочитайте и устно переведите с 1-го по 5-й абзацы текста. Перепишите и письменно переведите 1, 2 и 3-й абзацы.

Пояснения к тексту

heating effect – тепловое действие
familiar – известный
filament – нить
as a matter of fact – на самом деле, фактически
on the contrary – наоборот, напротив
needless to say – не приходится и говорить..., не говоря уже о...
waste of energy – потери энергии

HEATING EFFECT OF AN ELECTRIC CURRENT

1) The production of heat is perhaps the most familiar among the principal effects of an electric current, either because of its development in the filaments of the electric lamps or, may be, because of the possible danger from overloaded wires.

2) As you know, of course, a metal wire carrying a current will almost always be at a higher temperature than the temperature of that very wire unless it carries any current. It means that an electric current passing along a wire will heat that wire and may even cause it to become red-hot. Thus, the current can be detected by the heat developed provided it flows along the wire.

3) The reader is certain to remember that the heat produced per second depends both upon the resistance of the conductor and upon the amount of current carried through it. As a matter of fact, if some current flown along a thin wire and then the same amount of current were sent through a thicker one, a different amount of heat would be developed in both wires. When the current is sent through the wire which is too thin to carry it freely, then more electric energy will be converted into heat than in the case of a thick wire conducting a small current.

4) Let us suppose now that a small current is following along a thick metal conductor. Under such conditions the only way to discover whether heat has been developed is to make use of a sensitive thermometer because the heating is too negligible to be detected by other means. If, however, our conductor were very thin while the current were large, the amount of generated heat would be much greater than that produced in the thick wire. In fact, one could easily

2. Geothermal energy **is used** for heating and electricity production in some regions of the Northern Caucasus and the Far East.	Геотермальная энергия используется для отопления и выработки электроэнергии на некоторых территориях Северного Кавказа и Дальнего Востока.

is used – Present Indefinite Passive от глагола **to use**

Образец выполнения 2 (к упр. 2)

1. The electric current **passing** through a wire will heat it.	Электрический ток, проходящий по проводу, будет его нагревать.

Passing – Participle I, определение.

2. **When heated** to the boiling point water evaporates	*Когда* воду *нагревают* до точки кипения, она испаряется. (или: *При нагревании* до точки кипения вода испаряется.)

(When) **heated** – Participle II, обстоятельство.

3. Heat is **radiated** by the Sun to the Earth.	Тепло *излучается* Солнцем на Землю.

Radiated – Participle II, составная часть видовременной формы Present Indefinite Passive от глагола **to radiate.**

ВАРИАНТ 1

1. Перепишите следующие предложения; подчеркните в каждом из них глагол-сказуемое и определите его видовременную форму и залог. Переведите предложения на русский язык. В части **б** обратите внимание на перевод пассивных конструкций (см. образец 1).

а) Renewable energy in Russia mainly consists of hydroelectric energy.

The abundance of fossil fuels in the Soviet Union and the Russian Federation has resulted in little development of the renewable energy sector.

б) Roughly 68% of Russia's electricity is generated from thermal power and 16% from nuclear power.

In 2003 the new Russian energy strategy was confirmed by the government.

2. Перепишите следующие предложения; подчеркните Participle I и Participle II и установите функции каждого из них, т.е. укажите, является ли оно определением, обстоятельством или частью глагола-сказуемого. Переведите предложения на русский язык (см. образец 2).

4. Прочитайте и устно переведите с 1-го по 6-й абзацы текста. Перепишите и письменно переведите 1, 2, 3 и 4-й абзацы.

Пояснения к тексту

electron emission – электронная эмиссия
electron tube – электронная лампа
carrier of current – носитель тока
to tend –стремиться
photoelectric emission –фотоэлектронная эмиссия, внешний фотоэффект
field emission – автоэлектронная (холодная) эмиссия
secondary emission – вторичная эмиссия
to knock out – выбивать

ELECTRON EMISSION

1) The electron tube depends for its action on a stream of electrons that act as current carriers. To produce this stream of electrons, a special metal electrode (cathode) is present in every tube. But at ordinary room temperatures the free electrons in the cathode cannot leave its surface because of certain restraining forces that act as a barrier.

2) To escape from the surface of the material, the electrons must perform a certain amount of work to overcome the restraining surface forces. To do this work, the electrons must have sufficient energy imparted to them from some external source of energy, since their own kinetic energy is inadequate. There are four principal methods of obtaining electron emission from the surface of the material: thermionic emission, photoelectric emission, field emission, and secondary emission.

3) Thermionic emission. It is the most important and one most commonly used in electron tubes. In this method the metal is heated, 'resulting in increased thermal or kinetic energy of the unbound electrons. Thus, a greater number of electrons will attain sufficient speed and energy to escape from the surface of the emitter. The thermionic emission is obtained by heating the cathode electrically.

4) Photoelectric emission. In this process the energy of the light radiation falling upon the metal surface is transferred to the free electrons within the metal and speeds them up sufficiently to enable them to leave the surface.

5) Field or cold-cathode emission. The application of a strong electric field (i.e. a high positive voltage outside the cathode surface) will literally pull the electrons out of the material surface, because of the attraction of the positive field.

6) Secondary emission. When high-speed electrons suddenly strike a metallic surface, they give up their kinetic energy to the electrons and atoms which they strike. Some of the bombarding electrons collide directly with free electrons on the metal surface and may knock them out from the surface. The electrons freed in this way are known as secondary emission electrons.

feel it. Thus, we see that the thinner the wire, the greater the developed heat. On the contrary, the larger the wire, the more negligible is the heat produced.

5) Needless to say, such heat is greatly desirable at times but at other times we must remove or, at least, decrease it as it represents a waste of useful energy. In case heat is developed in a transmission line, a generator, or a motor, it is but a waste of electric energy and overheating is most undesirable and even dangerous.

5. Прочитайте 4-й и 5-й абзацы текста и ответьте письменно на следующие вопросы:

1) How can heat be detected under the conditions when a small current is following along a thick metal conductor?

2) Why is heat developed in a transmission line undesirable?

ВАРИАНТ 5

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) Now we know neutrino to have a rest mass (масса покоя) of about 30 electron-volts.

2) Yablochkov was the first to realize the advantages of the alternating current.

3) Conduction is known to be a process by which heat is transmitted through a substance by molecular activity.

2. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) Having been carefully tested the device was put into operation.

2) The stream of electrons moving along the conductor is called electric current.

3) The text did not seem difficult, many words having been learned before.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения, Обратите внимание на то, как переводятся условные предложения (см. образец выполнения 3).

1) If you had translated the article, you could have used valuable data in your work.

2) If the quality of the equipment were higher, the results of the experiment would be more accurate.

3) It would be impossible to explain chemical phenomena without using the laws of physics.

1) A person beginning some experiment should be very careful and attentive.

2) The importance of the scientific researches and discoveries is growing with every year.

3) Speaking about the new method of work the engineer told us many interesting details.

4) Hydrogen is the lightest substance known.

3. Перепишите следующие предложения; подчеркните в каждом из них модальный глагол или его эквивалент. Переведите предложения на русский язык.

1) Due to the energy of the atom man can produce electric energy at atomic power stations.

2) In scientific work we must measure in units of the metric system.

3) Man-made satellites had to use solar cells as a source of power.

4) This power station was to supply us with all necessary energy.

4. Прочитайте и устно переведите 1-го по 6-й абзацы текста. Перепишите и письменно переведите 1, 2, 4 и 5-й абзацы.

Пояснения к тексту

energy efficiency – эффективность использования энергии
sustainable development – устойчивое развитие
renewable energy – возобновляемая или регенеративная энергия
geothermal energy – геотермальная энергия
thermal power – тепловая мощность (энергосистемы)
fossil fuel – ископаемое топливо

THE ENERGY POLICY OF RUSSIA

1) The Energy policy of Russia is contained in the Energy Strategy document, which sets out policy for the period up to 2020. This document outlines several main priorities: an increase in energy efficiency, reducing impact on the environment, sustainable development, energy development and technological development, as well as improved effectiveness and competitiveness.

2) Russia, one of the world's two energy superpowers, is rich in natural energy resources. It has the largest known natural gas reserves of any state on earth, along with the second largest coal reserves, and the eighth largest oil reserves. Russia is the world's fourth largest electricity producer after the USA, China, and Japan.

3) Russia exports 70% of oil produced, about 7 million barrels a day (2010), the largest net oil export of any country, as well as a major supply to the European Union. The entire Middle East, in comparison, exports 20 million barrels daily.

5) As mentioned above, there is a great difference in the conducting ability of various substances. For example, almost all metals are good electric current conductors. Nevertheless, copper carries the current more freely than iron; and silver, in its turn, is a better conductor than copper.

6) A material like string which resists the flow of the electric current is called insulator. There are many kinds of insulation used to cover the wires. The kind used depends upon the purposes the wire or a cord is meant for. The insulating materials we generally use to cover the wires are rubber, asbestos, glass, plastics and others. Glass is the insulator to be often seen on the poles that carry the telephone wires in city streets. Glass insulator strings are usually suspended from the towers of high voltage transmission lines. One of the most important insulators of all, however, is air. That is why power transmission line wires are bare wires depending on air to keep the current from leaking off.

5. Прочитайте 5-й и 6-й абзацы текста и ответьте письменно на следующие вопросы:

1) What materials are good conductors of electricity?
2) What is insulator?
3) What insulators do you know?

ВАРИАНТ 4

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) We know silver to be the best of conducting materials.
2) Electrons were shown to be particles of negative electricity.
3) I believe him to have changed his plans.

2. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) A neutron is a particle having the same mass as a proton, but carrying no electrical charge.
2) About 100 years ago, a French scientist Pierre Curie subjecting certain crystalline materials to pressure, observed that they produced an electric charge.
3) Chemistry and physics are interrelated sciences, any chemical change involving a physical change.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения. Обратите внимание на то, как переводятся условные предложения (см. образец выполнения 3).

1) If our conductor were very thin while the current were large, the amount of generated heat would be much greater than that produced in the thick wire.

1) The intensity of this process is influenced by many factors.
2) A body moving with a certain velocity carries within itself the kinetic energy of motion.
3) While absorbing the energy of cosmic rays the upper atmosphere becomes radioactive.
4) The Russian government will strongly consider purchasing electricity generated from renewable energy sources.

3. Перепишите следующие предложения; подчеркните в каждом из них модальный глагол или его эквивалент. Переведите предложения на русский язык.

1) Energy can exist in many forms and each form can be transformed into the other.
2) Using radioactive isotopes the scientists will be able to carry out many experiments.
3) He had to work hard before he was able to submit his paper to a scientific journal.
4) The chemists may use the reactor to analyze various substances for their exact composition.

4. Прочитайте и устно переведите с 1-го по 5-й абзацы текста. Перепишите и письменно переведите 1, 2 и 3-й абзацы.

Пояснения к тексту

renewable energy – возобновляемая или регенеративная энергия
energy-efficient – энергосберегающий, с низким энергопотреблением
recycling – 1) переработка отходов (для повторного использования); 2) сбор вторичного сырья
hybrid car – легковой автомобиль с гибридным приводом
ОАО «РусГидро» – российская энергетическая компания, владелец большинства гидроэлектростанций страны. Зарегистрирована в Красноярске, штабквартира находится в Москве.
Yangtze – Янцзы (самая большая река в Китае и на материке Евразия)

THE RUSSIAN ENERGY INDUSTRY

1) Russia is one of the world's largest producers of energy, most of which it obtains from oil, natural gas and coal. The country's focus on those resources for production and export, which constitute 80 % of foreign trade earnings, means it has paid little attention to renewable energy. Out of the 203 GW of electric generation capacity that Russia has, 44 GW comes from hydroelectricity, 307 MW from geothermal, 15 MW from wind and negligible amounts from other renewable sources.

2) President Dmitry Medvedev announced in May 2010 that the Russian government would strongly consider purchasing electricity generated from re-

though Russia used to interchange the latter status with Saudi Arabia until 2008. On 1 January 2011, Russia said it had begun scheduled oil shipments to China, with the plan to increase the rate up to 300,000 barrels per day in 2011.

2) Russia is the 3rd largest electricity producer in the world and the 5th largest renewable energy producer, the latter due to the well-developed hydroelectricity production in the country. Large cascades of hydropower plants are built in European Russia along big rivers like Volga. The Asian part of Russia also features a number of major hydropower stations, however the gigantic hydroelectric potential of Siberia and the Russian Far East largely remains unexploited.

3) Russia was the first country to develop civilian nuclear power and to construct the world's first nuclear power plant. Obninsk Nuclear Power Station, was built in the "Science City" of Obninsk, about 110 km southwest of Moscow.

4) Currently the country is the 4th largest nuclear energy producer, with all nuclear power in Russia being managed by *Rosatom* State Corporation. The sector is rapidly developing, with an aim of increasing the total share of nuclear energy from current 16.9 % to 23 % by 2020. The Russian government plans to allocate 127 billion rubles ($5.42 billion) to a federal program dedicated to the next generation of nuclear energy technology. About 1 trillion rubles ($42.7 billion) is to be allocated from the federal budget to nuclear power and industry development before 2015.

5) Russia is moving steadily forward with plans for much expanded role of nuclear energy, nearly doubling output by 2020. Exports of nuclear goods and services are a major Russian policy and economic objective. Russia is a world leader in fast neutron reactor technology.

5. Прочитайте 4-й и 5-й абзацы текста и письменно ответьте на вопросы:

1) What are the objectives of nuclear power development in Russia?
2) What are the plans of Russia in the field of nuclear energy production?
3) What place does Russia take as nuclear energy producer?

ВАРИАНТ 4

1. Перепишите следующие предложения; подчеркните в каждом из них глагол-сказуемое и определите его видовременную форму и залог. Переведите предложения на русский язык. В части **6** обратите внимание на перевод пассивных конструкций (см. образец 1).

a) The manufacturing of solar cells and photovoltaic arrays has advanced considerably in recent years.

Russia and India are currently discussing the possibility of a joint venture to produce silicon wafers for the creation of photovoltaic cells.

1) For the experiment we need several electrical devices to be connected in series.
2) The new methods were found to have many disadvantages.
3) The electric circuit is the subject to be dealt with in the present article.

2. Перепишите и письменно переведите на русский язык следующие предложения, обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) The atom is made up of a positive nucleus surrounded by negative charges of electricity, called electrons.
2) The problem having been settled, he could go on with his work.
3) The electric current passing through a wire will heat that wire.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения. Обратите внимание на то, как переводятся условные предложения (см. образец выполнения 3).

1) Without up-to-date crystallographic equipment it would be impossible to study the atomic structure of materials.
2) If the circuit is broken, the current is known to stop everywhere.
3) If we had used solar energy on a wide scale we should have found a solution to our energy problems.

4. Прочитайте и устно переведите с 1-го по 5-й абзацы текста. Перепишите и письменно переведите 1, 2 и 3-й абзацы.

Пояснения к тексту

circuit – цепь
source – источник
supply – подача, питание; электропитание; электроснабжение
load – (электрическая) нагрузка (крупный) потребитель
otherwise – иначе, в противном случае
conductor – проводник
series – последовательная
path – путь

ELECTRIC CIRCUIT

1) The electric circuit is the subject to be dealt with in the present article. We know the circuit to be a complete path, which carries the current from the source of supply to the load and then carries it again from the load back to the source. The purpose of the electrical source is to produce the necessary electromotive force required for the flow of current through the circuit.

2) The path along which the electrons travel must be complete otherwise no electric power can be supplied from the source to the load. Thus we close the circuit when we switch on our electric lamp.

3) If the circuit is broken or, as we generally say, “opened” anywhere, the current is known to stop everywhere. Hence, we break the circuit when we switch off our electrical devices. Generally speaking, the current may pass through solid conductors, liquids, gases, vacuum, or any combination of these. It may flow in turn over transmission lines from the power-stations through transformers, cables and switches, through lamps, heaters, motors and so on. There are various kinds of electric circuits such as open circuits, closed circuits, series circuits, parallel circuits and short circuits.

4) To understand the difference between the following circuit connections is not difficult at all. When electrical devices are connected so that the current flows from one device to another, they are said to be connected in series. Under such conditions the current flow is the same in all parts of the circuit, as there is only a single path along which it may flow. The electrical bell circuit is considered to be a typical example of a series circuit.

5) The parallel circuit provides two or more paths for the passage of current. The lamps in your room and your house are generally connected in parallel. The short circuit is produced when the current is allowed to return to the source of supply without control and without doing the work that we want it to do.

5. Прочитайте 4-й и 5-й абзацы текста и ответьте письменно на следующие вопросы:

1) What may the current pass through?
2) What kinds of circuit do you know?
3) What is a parallel circuit? Give an example.

ВАРИАНТ 3

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) Scientists today believe all substances to be made of one or more different kinds of atoms.

2) Any material that strongly resists the electric current flow is known to be an insulator.

3) Lasers are known to have found application in medicine.

2. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) The energy being released during the fission of one gramme of uranium is equal to the energy produced by two and a half tons of coal.

2) Electric current is capable of carrying power over a great distance, the conversion of power being effected with almost 100 per cent efficiently.

б) Heat was transformed into work.

Large cascades of hydropower plants are built in European Russia along big rivers like Volga.

2. Перепишите следующие предложения; подчеркните Participle I и Participle II и установите функции каждого из них, т.е. укажите, является ли оно определением, обстоятельством или частью глагола-сказуемого. Переведите предложения на русский язык (см. образец 2).

1) These reactions convert hydrogen into helium, giving off a great amount of light and heat.

2) In recent years, Russia has frequently been described in the media as an energy superpower.

3) The sector is rapidly developing, with an aim of increasing the total share of nuclear energy from current 16.9% to 23% by 2020.

4) If heated molecules of the material move faster.

3. Перепишите следующие предложения; подчеркните в каждом из них модальный глагол или его эквиваленты. Переведите предложения на русский язык.

1) He could not complete his research in time as he worked very slowly.

2) Heat is a form of energy and may be measured in the units in which energy is measured.

3) In spite of all the hardships he had to overcome, Yablochkov continued working in the field of electricity to the day of his death.

4) About 1 trillion rubles ($42.7 billion) is to be allocated from the federal budget to nuclear power and industry development before 2015.

4. Прочитайте и устно переведите с 1-го по 5-й абзацы текста. Перепишите и письменно переведите 1, 2 и 3-й абзацы.

Пояснения к тексту

natural gas reserves – запасы нефтяного газа
Rosatom State Corporation – Государственная корпорация по атомной энергии «Росатом» управляет всеми ядерными активами Российской Федерации, включая как гражданскую часть атомной отрасли, так и ядерный оружейный комплекс.
fast neutron reactor – реактор на быстрых нейтронах

PRIMARY ENERGY SOURCES

1) Russia is rich in energy resources. In recent years, Russia has frequently been described in the media as an energy superpower. The country has the world's largest natural gas reserves, the 8th largest oil reserves, and the second largest coal reserves. Russia is the world's leading natural gas exporter and leading natural gas producer, while also the largest oil exporter and producer,

newable energy sources in an attempt to encourage development of renewable energy. The government has plans for 4.5 % of Russia's energy output to come from non-hydroelectric renewable energy sources. Additionally, in November 2010, the government approved a US$300 billion program to make factories and buildings more energy efficient; it also announced plans to construct eight energy-efficient lamp production plants, promote recycling and support the construction of a hybrid car plant.

3) At the moment, renewable energy development is slowed by low investment, economic instability, low public demand and low tariffs on heat and electricity.

4) Hydropower is the most used form of renewable energy in Russia, and there is large potential in Russia for more use of hydropower. Russia has 102 hydropower plants with capacities of over 100 MW, making it fifth in the world for hydropower production. Russia is home to 9 % of the world's hydro resources, mostly in Siberia and the country's Far East.

5) *RusHydro* is the largest hydroelectric company in Russia and the second largest hydroelectric producer in the world. In October 2010, China Yangtze Power, the largest hydropower corporation in China, and *Euro-SibEnergo*, a Russian energy company, signed a cooperation agreement to expand hydroelectric energy production in Russia and export energy to China's northern territories. The *West Siberian Generating Company* has plans to start construction of eight mini-hydroelectric power plants in the Altai region before 2015.

5. Прочитайте 4-й и 5-й абзацы текста и письменно ответьте на вопросы:

1) What is the main form of renewable energy in Russia?
2) How many hydropower plants are there in Russia and what is their capacity?
3) What energy companies are mentioned in the text?
4) How do the Russian energy companies contribute to energy production?

ВАРИАНТ 3

1. Перепишите следующие предложения; подчеркните в каждом из них глагол-сказуемое и определите его видовременную форму и залог. Переведите предложения на русский язык, в части **б** обратите внимание на перевод пассивных конструкций (см. образец 1).

a) The reactor is fast becoming a major source of heat and electricity.

The Russian government plans to allocate 127 billion rubles ($5.42 billion) to a federal program dedicated to the next generation of nuclear energy technology.

3) The atom is made up of a positive nucleus surrounded by negative charges of electricity, called electrons.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения. Обратите внимание на то, как переводятся условные предложения (см. образец выполнения 3).

1) If the gathered data had been presented in time, the results of the experiments would have been different.

2) If we use a piece of string instead of metal wire, we shall find that current stops flowing.

3) It would be impossible to carry on a careful study of the process without the new device.

4. Прочитайте и устно переведите с 1-го по 6-й абзацы текста. Перепишите и письменно переведите 1, 2, 3 и 4-й абзацы.

Пояснения к тексту

substance – вещество, материя
to resist – сопротивляться
to carry – проводить, носить
path – путь
string – веревка
to cover – покрывать
bare – голый
to leak off – течь, пропускать

CONDUCTORS AND INSULATORS

1) Substances have some ability of conducting the electric current; however, they differ greatly in the ease with which the current can pass through them. Metals, for example, conduct electricity with ease while rubber does not allow it to flow freely. Thus, we have conductors and insulators. Substances through which electricity is easily transmitted are called conductors. Any material that strongly resists the electric current flow is known as an insulator.

2) The four factors, conductivity depends on, are: the size of the wire used, its length and temperature as well as the kind of material to be employed.

3) It is not difficult to understand that a large water pipe can pass more water than a small one. In the same manner, a large conductor will carry the current more readily than a thinner one.

4) It is quite understandable, too, that to flow through a short conductor is certainly easier for the current than through a long one in spite of their being made of similar material. Hence, the longer the wire, the greater is its opposition, that is resistance, to the passage of current.

NATURE OF ELECTRIC CURRENT

1) In the modern conception of the constitution of matter it is composed of atoms. The atom is made up of a positive nucleus surrounded by negative charges of electricity, called electrons, which revolve about the nucleus at tremendous speed. The nucleus consists of a number of protons, each with a single positive charge, and, except for hydrogen, one or more neutrons, which have no charge. The atom is neutral when it contains equal numbers of electrons and protons. A negatively charged body contains more electrons than protons. A positively charged body is one which contains fewer electrons than its normal number.

2) When the two ends of a conductor are connected to two points at different potentials, such as the terminals of a battery, we say that there is an electric current in the conductor. What actually happens?

3) The conductor has equal numbers of positive and negative charges in its atoms, and we want to know how the charges can be made to produce a current. The atoms in metals are packed so closely that overlap to some extent, so that it is comparatively easy for the outer electrons to pass from one atom to another if a small force is applied to them.

4) The battery causes a potential difference between the ends of the wire, and thus provides forces that make the negative electrons in the wire move toward the point of higher potential electrons. This electron flow toward the positive electrode is the electric current. The current will not flow unless there is an electric circuit.

5) When the electrons flow in one direction only, the current is known to be d.c, that is, direct current. The simplest source of power for the direct current is a battery, as a battery pushes the electrons in the same direction all the time (i.e., from the negatively charged terminal to the positively charged terminal). The letters a.c. stand for alternating current. The current under consideration flows first in one direction and then in the opposite one.

5. Прочитайте 4-й и 5-й абзацы текста и ответьте письменно на следующие вопросы:

1) What does the battery cause and provide?

2) What is an electric current?

3) What are d.c and a.c.?

ВАРИАНТ 2

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

б) The first Russian solar plant was opened in Belgorod Oblast in November 2010.

Construction is expected to finish in early 2011 and the plant will have an annual manufacturing capacity of 30 MW.

2. Перепишите следующие предложения; подчеркните Participle I и Participle II и установите функции каждого из них, т.е. укажите, является ли оно определением, обстоятельством или частью глагола-сказуемого. Переведите предложения на русский язык (см. образец 2).

1) Photovoltaic power generation employs solar panels composed of a number of solar cells containing a photovoltaic material.

2) Approximately 30% of incoming solar radiation (*insolation*) is reflected back to space while the rest is absorbed by clouds, oceans and land masses.

3) The *latent heat* of water condensation amplifies convection, producing atmospheric phenomena such as wind, cyclones and anti-cyclones.

4) While bombarding the upper layers of the atmosphere, cosmic rays reach the surface of the earth.

3. Перепишите следующие предложения; подчеркните в каждом из них модальный глагол или его эквивалент. Переведите предложения на русский язык.

1) Heat can be divided into three different types.

2) A great number of plastics should find their applications in the electrical industry.

3) He had to work hard before he was able to submit his paper to a scientific journal.

4) Solar *photovoltaics* installations may be ground-mounted or built into the roof or walls of a building.

4. Прочитайте и устно переведите с 1-го по 5-й абзацы текста. Перепишите и письменно переведите 1, 2-й и 3-й абзацы.

Пояснения к тексту

silicon wafer – кремниевая пластина
photovoltaic cell – фотогальванический элемент, вентильный элемент, фотоэлемент с запирающим слоем
wave power – энергия волн океана, возобновляемый источник энергии
photovoltaics – 1) фотоэлектричество; 2) фотоэлектрическая энергетика
solar panel – солнечная батарея, батарея солнечных элементов; солнечная панель
photovoltaic effect – вентильный фотоэффект, фотогальванический эффект
photovoltaic array – фотоэлектрическая батарея
Rusnano – ОАО «РОСНАНО» – российская компания, созданная для развития нанотехнологий. Штаб-квартира расположена в Москве
«Ренова» – российская частная бизнес-группа. Штаб-квартира находится в Москве.

Пояснения к тексту

wind energy – ветроэнергетика
the Kola Bay – Кольский залив
the Kislaya Guba Tidal Power Station – Кислогубская экспериментальная приливная электростанция (ПЭС), расположенная в губе Кислая Баренцева моря
Penzhin Tidal Power Plant – Пенжинская приливная электростанция, проектируемая в Пенжинской губе, располагающейся в северо-восточной части залива Шелихова (Shelikhov Bay) Охотского моря.
TWh – тераватт-час

WIND ENERGY AND TIDAL ENERGY

1) Russia has a long history of small-scale wind energy use but has never developed large-scale commercial wind energy production. Most of its current wind production is located in agricultural areas with low population densities where connection to the main energy grid is difficult.

2) In 2006, Russia had a total installed wind capacity of 15 MW. Current Russian wind energy projects have a combined capacity of over 1,700 MW. The Russian Wind Energy Association predicts that if Russia achieves its goal of having 4.5% of its energy come from renewable sources by 2020, the country will have a total wind capacity of 7 GW.

3) In 2010, plans for the construction of a wind power plant in Yeisk, on the Sea of Azov, were announced. It is expected to initially have a capacity of 50 MW, which will become 100 MW a year later. German engineering company Siemens announced in July 2010, following a visit to Russia by Chancellor Angela Merkel, that it would build wind power plants in Russia. By 2015, the company hopes to install 1,250 MW of capacity in Russia.

4) Russia has many tidal energy resources at its disposal, although they are currently underdeveloped as well. *The Kola Bay* and Sea of Okhotsk alone could produce 100 GW with tidal power stations, and the national energy potential from tidal energy can compete with current total energy production. The currently active *Kislaya Guba Tidal Power Station* is the largest tidal power facility in Russia and has the fourth largest capacity (1.7 MW) among the world's tidal power plants.

5) Plans for constructing an 800 MW tidal power plant in the Barents Sea were announced in 2008. The *Penzhin Tidal Power Plant Project* is a set of proposals for construction of tidal power plant in the Penzhin Bay, which is an upper right arm of *Shelikhov Bay* in the north-east corner of the Sea of Okhotsk. Because the tides in the Penzhin Bay are the highest ones for Pacific Ocean reaching the height 13.4 metres (44 ft), several projects of power station were suggested. One of proposed variants presumes installed capacity 87 GW and annual production 200 TWh of electricity.

processors and compact computers has extended the sophistication of the control available, so that the term "computer numerical control" (CNC) is used. In practice, movements in all three dimensions are controlled. The actual movement and monitoring of the controlled axes are carried out by motors and position transducers.

3) On the above basis numerical control machine-tools have been used for many years prior to the development of the microelectronics. The application of microcomputers allows for more sophisticated control. When metal is machined, its cutting properties can vary throughout the workpiece, particularly if it is a forging or casting. Microcomputers can add a further aspect of adaptive control by reacting to the current power consumption, torque, etc. of the driving motors.

4) Due to the nature of microcomputer systems a distributed processing approach can be adopted for the control of the various functions of a machine tool. This also allows a modular approach to the development of the hardware and software. In addition, greater operator interaction for unexpected situations is possible due to the work cycle not being restricted to preprogrammed punched paper tape.

5) Instead of being a substantial part of the cost of a machine tool, the use of microcomputers makes the numerical control cost less and adds relatively little to the cost of the machine tool. Some control systems are too complex for a single microprocessor.

5. Прочитайте 4-й и 5-й абзацы текста и ответьте письменно на следующие вопросы:

1) What approach can be adopted for the control of the various functions of a machine tool?

2) Why greater operator interaction for unexpected situations is possible?

3) What are the advantages of using the microcomputers?

КОНТРОЛЬНОЕ ЗАДАНИЕ 4
ДЛЯ СТУДЕНТОВ НАПРАВЛЕНИЯ «ЭЛЕКТРОПРИВОД И АВТОМАТИКА»

Чтобы правильно выполнить задание 4, необходимо усвоить следующие разделы курса английского языка по рекомендованному учебнику:

1) сложные формы инфинитива (Passive Infinitive, Perfect Infinitive); обороты, равнозначные придаточным предложениям: объектный инфинитивный оборот, субъектный инфинитивный оборот;

2) причастия (Participle I, II); независимый (самостоятельный) причастный оборот;

3) условные предложения.

Используйте образцы выполнения упражнений.

Образец выполнения 1 (к упр. 1)

1. Thomson's discovery is considered to have paved the way for many exciting new discoveries, for example, the discovery of the atomic nucleus and the proton by Ernest Rutherford.	Полагают, что открытие Томсона проложило путь для многих новых удивительных открытий, таких, например, как открытие атомного ядра и протона Эрнестом Резерфордом.
2. The electrical device to be bought must be checked beforehand.	Электрическое устройство, которое нужно купить, следует предварительно проверить.

Образец выполнения 2 (к упр. 2)

1. The student reading this article is certainly familiar with the important part which the electric current plays in everyday life.	Студенту, читающему эту статью, конечно же, известно, что электрический ток играет важную роль в повседневной жизни.
2. Having invented a lamp with a tungsten filament, Lodygin made another important improvement in the incandescent lamp.	Создав лампу с вольфрамовой нитью накала, Лодыгин внес еще одно усовершенствование в лампу дневного накаливания.
3. New technological processes having been developed, new types of equipment have been installed in the shop.	Когда были разработаны новые технологические процессы, в цехе было установлено новое оборудование.

Образец выполнения 3 (к упр. 3)

1. If the installation is put into operation in time, the economic effect will be greater.	Если установка будет пущена вовремя, экономический эффект возрастет.
2. If the system had been perfected, we should have applied it for new calculations.	Если бы система была усовершенствована, мы бы применили ее для новых расчетов.
3. It would be impossible to imagine our modern life without electricity.	Было бы невозможно представить нашу современную жизнь без электричества.

ВАРИАНТ 5

1. Перепишите следующие предложения; подчеркните в каждом из них глагол-сказуемое и определите его видовременную форму и залог. Переведите предложения на русский язык. В части **б** обратите внимание на перевод пассивных конструкций (см. образец 1).

а) German engineering company Siemens announced in July 2010, following a visit to Russia by Chancellor Angela Merkel, that it would build wind power plants in Russia.

The Russian Wind Energy Association predicts that if Russia achieves its goal of having 4.5% of its energy come from renewable sources by 2020, the country will have a total wind capacity of 7 GW.

б) Two projects are developed for tidal power stations.

Because Penzhin Bay has one of the strongest tides, several projects of power station were suggested.

2. Перепишите следующие предложения; подчеркните Participle I и Participle II и установите функции каждого из них, т.е. укажите, является ли оно определением, обстоятельством или частью глагола-сказуемого. Переведите предложения на русский язык (см. образец 2).

1) The tides in the Penzhin Bay of the Sea of Okhotsk are the highest ones for Pacific Ocean reaching the height 13.4 metres (44 ft).

2) One of proposed variants of power station presumes installed capacity 87 GW and annual production 200 TWh of electricity.

3) One can use several modern devices while detecting and measuring radioactivity.

4) As a rule one great discovery is generally followed by numerous others.

3. Перепишите следующие предложения; подчеркните в каждом из них модальный глагол или его эквивалент; предложения переведите.

1) We can think of heat as a special form of kinetic energy.

2) *The Kola Bay* and Sea of Okhotsk alone could produce 100 GW with tidal power stations, and the national energy potential from tidal energy can compete with current total energy production

3) New types of plastics had to be obtained for space technology.

4) The second project suggests smaller scale plant, which must use northern part of basin with higher tides.

4. Прочитайте и устно переведите с 1-го по 5-й абзацы текста, перепишите и письменно переведите 3, 4 и 5-й абзацы.

1) Solar energy, radiant light and heat from the sun, has been harnessed by humans since ancient times using a range of ever-evolving technologies. Solar radiation, along with secondary solar-powered resources such as wind and wave power, hydroelectricity and biomass, account for most of the available renewable energy on earth. Only a minuscule fraction of the available solar energy is used.

2) Solar powered electrical generation relies on heat engines and *photovoltaics*. Photovoltaics (PV) is a method of generating electrical power by converting solar radiation into direct current electricity using semiconductors that exhibit the photovoltaic effect. Photovoltaic power generation employs solar panels composed of a number of solar cells containing a photovoltaic material. Materials presently used for photovoltaics include monocrystalline silicon, polycrystalline silicon, amorphous silicon and others. Due to the growing demand for renewable energy sources, the manufacturing of solar cells and photovoltaic arrays has advanced considerably in recent years.

3) A partial list of solar applications includes space heating and cooling through solar architecture, potable water via distillation and disinfection, daylighting, solar hot water, solar cooking, and high temperature process heat for industrial purposes. To harvest the solar energy, the most common way is to use solar panels.

4) The first Russian solar plant was opened in Belgorod Oblast in November 2010. The southern parts of Russia, especially the North Caucasus, have the greatest potential for solar energy. Russia plans to set up an overall solar capacity of 150 MW by 2020.

5) Plans for the construction of a new solar plant on the Black Sea have been announced and the plant is expected to begin operations by 2012. This plant, which will have a capacity of 12.3 MW, is being built by *Rusnano* and *Renova*. Solar Wind LLC and Rusnano are building a plant that will produce double-sided solar panels, which will be able to collect solar energy from both sides. Construction is expected to finish in early 2011 and the plant will have an annual manufacturing capacity of 30 MW.

5. Прочитайте 4-й и 5-й абзацы текста и письменно ответьте на вопросы:

1) When and where was the first Russian solar plant opened?
2) When will a new solar plant on the Black Sea be put into operation?
3) What is the advantage of double-sided solar panels?
4) What companies take part in the development of solar energy sector in Russia?

ВАРИАНТ 1

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) The a.c. used for power and lighting purposes is assumed to go through 50 cycles in one second.

2) Scientific discoveries to be practically applied in industry are paid special attention to.

3) Conduction is known to be a process by which heat is transmitted through a substance by molecular activity.

2. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) All electrical conductors dissipate heat when carrying current.

2) Having been studied carefully, the new method was finally adopted.

3) The experiment was a success, our group achieving the necessary results.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения, Обратите внимание на перевод условных предложений (см. образец выполнения 3).

1) If these scientists had made the experiment in time, they would have got more information about this process.

2) It would be impossible to solve many problems without using computers.

3) If the voltage increased electrons would acquire energy high enough to ionize neutral molecules which they collide with.

4. Прочитайте и устно переведите с 1-го по 5-й абзацы текста. Перепишите и письменно переведите 1, 2 и 3-й абзацы.

Дополнения к тексту

constitution – состав
matter – материал, вещество, материя
to be made up of – состоять
current – ток
they overlap to some extent – они взаимно проникают в какой-то мере
circuit – схема, сеть, цепь
rate – норма, скорость
d.c. (direct current) – постоянный ток
a.c. (alternating current) – переменный ток
terminal (battery terminal) – полюс (аккумуляторной) батареи
to assume – принимать, полагать

2. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) Working with machines, sharp tools and motors one must always be careful.

2) The preparations being completed, we started the experiment.

3) Having been tested, the new equipment was installed in the laboratory.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения, Обратите внимание на то, как переводятся условные предложения (см. образец выполнения 3).

1) If we placed this material in vacuum, its mechanical properties would be changed.

2) If the quality of the equipment were higher, the results of the experiment would be more accurate.

3) It would be impossible to explain these phenomena without using the laws of physics.

4. Прочитайте и устно переведите с 1-го по 5-й абзацы текста. Перепишите и письменно переведите 1, 2 и 3-й абзацы.

Пояснения к тексту

machine-tool – металлорежущий станок
in a precise orientation and by a precise amount – в определенном положении и в точно заданных пределах
punched paper tape – бумажная перфолента
computer numerical control (CNC) – числовое программное управление (ЧПУ)
monitoring of the controlled axes – отслеживание (положения) контролируемых (координатных) осей
position transducer – датчик положения
torque – вращающий момент
distributed processing approach – принцип распределения обработки (данных)
modular approach – модульный принцип
bit slice... system – система, секционированная по двоичным разрядам; система с разрядной организацией

MACHINE-TOOLS

1) Machine-tools are a class of metal removing machines such as lathes, millers and drillers. The basis of the cutting process is the movement of the cutting tool in relation to the material in a precise orientation and by a precise amount.

2) Traditional numerical control (NC) is based upon the movement being controlled via a pre-prepared punched paper tape. The development of micro-

5. Прочитайте 1-й и 2-й абзацы текста и письменно ответьте на вопросы:

1) Has Russia ever developed large-scale commercial wind energy production?

2) What are the areas of wind energy production located and what are they characterized by?

3) How much wind energy had Russia in 2006?

4) What are the renewable energy prospects in Russia?

КОНТРОЛЬНОЕ ЗАДАНИЕ 3

Чтобы правильно выполнить задание 3, необходимо усвоить следующие разделы курса английского языка по рекомендованному учебнику:

1) грамматические функции и значения слов **that**, **one**, **it**;

2) пассивный залог (The Passive Voice) видовременных форм Indefinite, Continuous, Perfect;

3) функции глаголов **to be, to have, to do**;

4) простые неличные формы глагола; инфинитив в функции: а) подлежащего, б) составной части сказуемого, в) определения, г) обстоятельства цели;

5) бессоюзное подчинение в определительных и дополнительных придаточных предложениях.

Используйте образцы выполнения упражнений.

Образец выполнения 1 (к упр. 1)

Past Perfect Passive

1. Alfred is the only English king to whom the title “Great” had been given.	Альфред – единственный английский король, которому был присвоен титул «Великий».

Present Indefinite Passive

2. Hyde Park is much spoken about.	О Гайд-парке много говорят.

Образец выполнения 2 (к упр. 2)

1. It is necessary to use the latest information about Great Britain in our report.	Необходимо использовать в нашем докладе новейшие сведения о Великобритании.
2. One can see a lot of famous places of interest in London.	В Лондоне можно увидеть много известных достопримечательностей.

5) Christopher Wren started once more with a magnificent vision of St Paul’s and the rest of the City. All this, in spite of the fact, that he was more of scientist and hadn’t actually built or designed anything until he was 30 years old. He laid the foundation stone for the cathedral in 1675. 35 years later he set the final stone in place. When he died he was buried in his own magnificent building.

7. Прочитайте 1-й и 2-й абзацы текста и письменно ответьте на вопросы:

1) What was located on the site of St Paul’s Cathedral in the past?

2) Who was the first Christian church built by?

3) Why was the church destroyed at the time of the Saxon King?

4) Why was market place set up inside old St Paul’s during the reign of King Henry VIII?

ВАРИАНТ 2

1. Перепишите следующие предложения, определите в каждом из них видовременную форму и залог глагола-сказуемого (см. образец 1). Переведите предложения на русский язык.

1) When much had been done in the study of ecology by our University it became an important scientific centre.

2) The Crown Jewels are shown in the Jewel House.

3) A very important question will be discussed at the conference.

4) The Tower of London was used as a royal palace, a fortress and a prison.

2. Перепишите следующие предложения и переведите их на русский язык, обращая внимание на разные значения слов **it, that, one** (см. образец 2).

1) In the 16th century it was more profitable in England to breed sheep than to grow grain.

2) It is said that all experiments are going on successfully.

3) This metro station was opened last year, and that one will be put into operation in two years.

4) One must always observe the traffic rules.

5) The question that was discussed at the conference is of great significance.

3. Перепишите предложения и переведите их на русский язык, обращая внимание на разные значения глаголов **to be, to have, to do**.

1) There are always at least 6 ravens at the Tower.

2) These factors had to be taken into account.

3) Tourists did not visit this museum.

4) The students are to study customs and traditions of the UK.

Пояснения к тексту

minute porous cavities – крошечные поритые пустоты
self-lubrication characteristic – свойство, обеспечивающее самосмазывание деталей
self-lubricating bearing – самосмазывающийся подшипник
powder metallurgy – порошковая металлургия

POWDER METALLURGY LOOKS TOWARDS THE FUTURE

1) Developments and advances in powder metallurgy, a technology created some 50 years ago, can save manufacturing industry great amounts of valuable materials. Powder metallurgy is a cheap alternative to many conventional manufacturing processes.

2) When components, simple or complex, require precision and high quality at a comparatively low lost — powder metallurgy can provide the solution of the problem. An important feature of powder metallurgy is that it can provide the industry with such material compositions whirl, are not achievable by any other means.

3) Components produced by the powder metallurgy process can go straight into the manufacturing cycle or, if required, undergo further processing, including heat treatment. Powder metallurgy is finding new applications in various industries — in electronics, aviation, machine-building, etc.

4) The unique physical properties of powder metallurgy parts enable oil to be retained in minute porous cavities within the part. This sell lubricating characteristic is long lasting and can eliminate other lubrication systems.

5) The research and production association for powder metallurgy has developed a number of processes for powder metallurgy components production. The source material there is metal powder which is subjected to high pressure to acquire a required shape and is then put to thermo-electric furnaces. The resultant parts are more durable and require no additional machining.

6) Future processes to be introduced by the association will produce self-lubricating bearings, metal and nonmetal alloys and other match also with preset properties based on combinations of various powders. Metal powder with its unusual characteristic features and properties is listed in the category of new materials.

5. Прочитайте 5-й и 6-й абзацы текста и ответьте письменно на следующие вопросы:

1) What is the source material for powder metallurgy components production?

2) What will future processes introduced by the association produce?

3) What kind of material is metal powder?

ВАРИАНТ 4

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) The crew is reported to have carried out a great deal of scientific experiments.

2) We want the article to be translated right now.

3) The lifetime of the equipment is assumed to be 30 years.

2. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) A curve showing the behaviour of metal is given in Fig.21.

2) The journal was brought yesterday, his article being published on the first page.

3) Having subjected crystals to X-radiation the scientists could obtain materials with special properties.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения. Обратите внимание на то, как переводятся условные предложения (см. образец выполнения 3).

1) If the quality of the equipment were higher the results of the experiment would be more accurate and complete.

2) If the service life of the instrument had been prolonged, the economic effect would have been increased many times.

3) It would be impossible to simplify the production of aluminum without using the electrothermal method.

4. Прочитайте и устно переведите с 1-го по 5-й абзацы текста. Перепишите и письменно переведите 1, 2 и 3-й абзацы.

Пояснения к тексту

simultaneously – синхронно
utilize – использовать, утилизировать
desire – желание
multiple – многочисленный
laundry machine – стиральная машина

AUTOMATED PRODUCTION LINES

1) An automated production line consists of a series of workstations connected by a transfer system to move parts between the stations. This is an example of fixed automation, since these lines are set up for long production runs, making large number of product units and running for several years between

changeovers. Each station is designed to perform a specific processing operation, so that the part or product is constructed stepwise as it progresses along the line.

2) A raw work part enters at one end of the line, proceeds through each workstation and appears at the other end as a completed product. In the normal operation of the line, there is a work part being processed at each station, so that many parts are being processed simultaneously and a finished part is produced with each cycle of the line. The various operations, part transfers, and other activities taking place on an automated transfer line must all be sequenced and coordinated properly for the line to operate efficiently.

3) Modern automated lines are controlled by programmable logic controllers, which are special computers that can perform timing and sequencing functions required to operate such equipment. Automated production lines are utilized in many industries, mostly automobile, where they are used for processes such as machining and pressworking.

4) Machining is a manufacturing process in which metal is removed by a cutting or shaping tool, so that the remaining work part is the desired shape. Machinery and motor components are usually made by this process. In many cases, multiple operations are required to completely shape the part. If the part is mass-produced, an automated transfer line is often the most economical method of production. Many separate operations are divided among the workstations.

5) Pressworking operations involve the cutting and forming of parts from sheet metal. Examples of such parts include automobile body panels, outer shells of laundry machines and metal furniture.

5. Прочитайте 4-й и 5-й абзацы текста и ответьте письменно на следующие вопросы:

1) What is machining?
2) What is necessary in case of mass-produced work part?
3) What do pressworking operations comprise? Give some examples.

ВАРИАНТ 5

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) The metal to be poured into a mold for casting may contract or expand on solidifying.

2) The properties of the new material are known to be determined next month.

3) All the changes of temperature and changes of state to be discussed are shown by a graph in Fig. 2.

3. It is Christopher Wren that was the final architect of St Paul's Cathedral.

Именно Кристофер Рен был последним архитектором Собора Святого Павла.

Образец выполнения 3 (к упр. 4)

1. What is the name of the book you are reading?

Как называется книга, которую ты читаешь?

2. The church we want to visit is one of the oldest in the world.

Церковь, которую мы хотим осмотреть, одна из самых древнейших в мире.

ВАРИАНТ 1

1. Перепишите следующие предложения, определяйте в каждом из них видовременную форму и залог глагола-сказуемого (см. образец 1). Переведите предложения на русский язык.

1) When much material had been looked through and some problems had been solved, the article was published.

2) St Paul's Cathedral was built in the time of William the Conquerer.

3) St. Isaak Cathedral was being built for 40 years: from 1818 to 1858.

4) This guide is listened to with great interest.

2. Перепишите следующие предложения и переведите их на русский язык, обращая внимание на разные значения слов **it**, **that, one** (см. образец 2).

1) It is easy to answer this question.

2) One can see many banks, offices and the Stock Exchange in the City.

3) St Paul' Cathedral is one of the most famous buildings in the world.

4) One should take into consideration that this problem is very difficult.

5) It is the Parliament that passes new laws.

3. Перепишите предложения и переведите их на русский язык, обращая внимание на разные значения глаголов **to be**, **to have, to do.**

1) You have to come to the language laboratory of the University to work at your pronunciation.

2) This book does not simply discuss what you must to do, but gives you effective tools for how to do it.

3) To be able to trade with distant countries merchants had to know the way of life and the character of the people there.

4) The exam was to start in the morning.

4. Перепишите следующие предложения и переведите их на русский язык, обращая внимание на бессоюзное подчинение (см. образец 3).

1) We did not know he was responsible for this work.

2) I think we will complete our research in time.

3) The new facts he mentioned were interesting and important.

5. Перепишите следующие предложения и переведите их на русский язык, обращая внимание на функцию инфинитива.

1) To restore the ruined sculpture was impossible.

2) His first action was to visit memorial places.

3) The monument to be built here will add beauty to the place.

4) The question is too complicated to be solved at once.

6. Прочитайте и устно переведите с 1-го по 5-й абзацы текста. Перепишите и письменно переведите 3, 4 и 5-й абзацы.

Пояснения к тексту

William the Conqueror – Вильгельм Завоеватель (прозвище герцога Нормандского, под предводительством которого в 1066 г. норманны завоевали Англию; стал английским королём Вильгельмом I (1028-1087)
Great Fire – Великий лондонский пожар (1666 г.; уничтожил половину города, старое здание собора Павла)
Inigo Jones – Иниго Джоунз (1573-1652), выдающийся английский архитектор

ST. PAUL'S CATHEDRAL

1) St Paul's Cathedral is one of the most famous buildings in the world, and it is also one of the greatest survivors! There was once a Roman temple on the site, dedicated to the goddess Diana. Since then there have been four different Christian buildings. The first Christian church was built by the Saxon King, Ethelbert of Kent. Being made of wood it didn't work either as it was destroyed in a Viking invasion. When the Saxon used wood again on the third church, it was doomed to be destroyed by fire again!

2) When old St Paul's was built in the time of William the Conqueror, stone from Northern France was used and it was much taller and wider than it is today. During the reign of King Henry VIII, financial problems meant there wasn't enough money for the cathedral's upkeep. Parts of it were destroyed and market place was set up inside selling, bread, meat, fish, and beer!

3) The first public lottery was held at St Paul's by the west Door. But instead of the profits going to the cathedral they went to the country's harbors. Elizabeth I granted money to the cathedral for repairs and an architect was appointed. Inigo Jones cleared out the shops and market place ready for repairs. However it fell in to decay again when soldiers used it as barracks during the Civil War.

4) Christopher Wren, the cathedral final architect, was asked to restore it. Before he could make much progress, parts of it were destroyed by the Great Fire of London, which started in a baker's shop in Pudding Lane and raged for five days, destroying many of the buildings in the City.

harder than the original iron. This metal was called steel. Steel is not really an alloy, it is rather like one. We know the name of steel to be used now for any iron which contains from 0.1 to 1.7% of carbon. After more study and experiment men discovered many effects of alloying different metals with steel. The results are called the alloy steels.

5. Прочитайте 5-й абзац текста и ответьте письменно на следующие вопросы:

1) When did metal become much harder than the original iron?

2) What is steel?

ВАРИАНТ 3

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) Further experiments proved the assumption to be wrong.

2) For the experiment we need several electrical devices to be connected in series.

3) Lasers are known to have found application in medicine.

2. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) These machines will be sent to the plant being constructed in this region.

2) Having built a new automobile plant, we increased the output of cars and buses.

3) The pressure removed, the body returns to its original volume.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения. Обратите внимание на то, как переводятся условные предложения (см. образец выполнения 3).

1) If the gathered data had been presented in time, the results of the experiments would have been different.

2) If you started the work tomorrow, you would be able to finish it in time.

3) It would be impossible to carry on a careful study of the process without the new device.

4. Прочитайте и устно переведите с 1-го по 6-й абзацы текста. Перепишите и письменно переведите 1, 2, 3 и 4-й абзацы.

4. Перепишите следующие предложения и переведите их на русский язык, обращая внимание на бессоюзное подчинение (см. образец 3).

1) The methods we have just described are very effective.

2) We are sure it is possible to change the conditions.

3) The University I go to is one of the biggest educational institutions in our city.

5. Перепишите следующие предложения и переведите их на русский язык, обращая внимание на функцию инфинитива.

1) The teacher told her students to learn the poem by heart.

2) He is lucky to have travelled all over the world and to have seen so much of it.

3) To translate a sentence is to discover its meaning.

4) The United Kingdom was the first country in the world to become highly industrialized.

6. Прочитайте и устно переведите с 1-го по 6-й абзацы текста. Перепишите и письменно переведите 1, 2 и 3-й абзацы.

Пояснения к тексту

William the Conqueror – Вильгельм Завоеватель (прозвище герцога Нормандского, под предводительством которого в 1066 г. норманны завоевали Англию; стал английским королём Вильгельмом I (1028-1087)
the White Tower – Белая башня (самая старая часть Тауэра)
Yeomen Warders – лейб-гвардейцы, стражи лондонского Тауэра
Beefeaters – бифитеры, "мясоеды" (прозвище дворцовой стражи или стражников лондонского Тауэра
Crown Jewels – драгоценности из королевской казны
Jewel House – сокровищница британской короны

THE TOWER OF LONDON

1) The Tower on the north bank of the Thames is one of the most ancient buildings of London. It was founded in the 11th century by William the Conqueror. But each monarch left some kind of personal mark on it. For many centuries the Tower has been a fortress, a palace, a prison, a place of execution, a Zoo and a royal treasury. Today, it is best known as a historical museum and as one of the strongest fortress in Britain, it has the Crown Jewels.

2) The grey stones of the Tower could tell terrible stories of violence and injustice. Many sad and cruel events took place within the walls of the Tower. It was here that Thomas More, the great humanist, was falsely accused and executed. Among famous prisoners executed at the Tower were Henry's VIII wives Ann Boleyn and Catherine Howard.

skill of modeling anatomical subjects in wax. Soon Marie and her mother with the doctor Curtius moved to Paris. Dr. Curtius acted as a teacher to Marie, schooling her in the techniques of wax portraits. Thanks to him she used a scientific approach in wax portraiture.

3) At the time of the Revolution Marie and her mother were imprisoned for some time. Later Marie was asked to prepare the death masks of French aristocrats who had been executed – among them the King and the Queen. The time of terror came to an end. In 1794 the doctor died and Marie inherited the business which had grown under her influence.

4) In the following years she married a French engineer, François Tussaud and by 1800 had given birth to three children: a daughter who died and two sons. It was difficult for the exhibition to survive in France and in 1802 Marie Tussaud made a monument decision. She would leave her husband and baby son in Paris while she and her elder son would tour the exhibition round the British Isles.

5) She spent the next 33 years travelling in Great Britain. Later her other son joined her. Both of her sons were interested in the business. The travels ended in 1835 when Madame Tussaud's exhibition found a permanent home in London.

6) Madame Tussaud's wax museum has now grown to become a major tourist attraction in London; its current location is on Marylebone Road.

7. Прочитайте 4, 5 и 6-й абзацы текста и письменно ответьте на вопросы:

1) Why did Marie Tussaud leave her husband and a son in Paris?

2) How long was Marie's travelling in Great Britain?

3) When did Madame Tussaud's exhibition return to London?

4) Where is Madame Tussaud's wax museum located now?

ВАРИАНТ 4

1. Перепишите следующие предложения, определите в каждом из них видовременную форму и залог глагола-сказуемого (см. образец 1). Переведите предложения на русский язык.

1) Many green parks in London have been enjoyed by its citizens.

2) Kensington Gardens are separated from Hyde Park by a road.

3) The construction of this house will be completed in a month.

4) It's hard to believe that the roads were once infested by villains and popular with duelists.

2. Перепишите следующие предложения и переведите их на русский язык, обращая внимание на различные значения слов **it**, **that**, **one** (см. образец 2).

1) It is the function of Parliament to make and to adopt new laws.

2) Experience shows this strategy to have produced better results than more traditional algorithms.

3) The new methods were found to have many disadvantages.

2. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) Having completed all our preparations we started a new series of experiments.

2) This plant will produce the new types of machines being imported now from abroad.

3) New machine-tools were delivered to the plant, all of them being in good order.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения. Обратите внимание на перевод условных предложений (см. образец выполнения 3).

1) If the experiment is a success, it will confirm our theory.

2) If we had obtained the necessary data, we should have finished the work earlier.

3) It would be impossible to protect metal from corrosion without the films.

4. Прочитайте и устно переведите с 1-го по 6-й абзацы текста. Перепишите и письменно переведите 1, 2, 3 и 4-й абзацы.

Пояснения к тексту

decibel – децибел (db) = 0.1 b; b (бел) – логарифмическая единица измерения
damping – демпфирование, гашение (колебаний)
to sheet-metal shells – к нагружным частям, сделанным из листового железа
a high inherent damping capacity – способность сильного внутреннего демпфирования
yet – здесь но

SILENT METALS

1) A hundred years ago noise on the main streets of the world's biggest cities did not exceed 61 decibels. Today industrial noise is at very high level at many factories, and in some it reaches 90 to 110 decibels.

2) Noise is an ever growing inconvenience of modern life, and of it is generated by vibrations of metals. These vibrations not only cause noise but can also lead to "fatigue" and consequent failure of a structure.

3) Research into methods which can minimize vibrations in structures is therefore of considerable importance. There are two methods to reduce vibration in an engineering design; either we make the structure so stiff and heavy that it cannot vibrate significantly, or we introduce "damping" into the structure, that

is, we have to introduce some mechanism for the absorption of energy within the system.

4) To apply damping coating is standard practice today. The damping coatings are usually made of plastics and are applied to sheet-metal shells such as car bodies. This method is often cheap and the advantage is that the coating can be applied precisely where damping is required. But these damping coatings may be efficient for certain sound frequencies and temperatures.

5) So metallurgists were interested in the possibility of metals that are strong and tough enough to be used in structures. But they must also possess a high inherent damping capacity that is independent of frequency and less temperature-dependent that of plastics.

6) Scientists want to combine some of the properties, which characterize steel, with high damping capacity of lead and to produce a material that could be used to minimize noise and vibration. This can, in fact, be done with several materials, the most outstanding of which are alloys of manganese and copper. These alloys can be stronger than ordinary steel, with similar toughness and hardness, yet than that of steel. However, noise and vibration are problems to be faced by engineers.

5. Прочитайте 5-й и 6-й абзацы текста и ответьте письменно на следующие вопросы:

1) What properties of metals were metallurgists interested in?

2) What material do scientists want to produce?

3) What advantages will the alloys of manganese and copper possess in comparison with steel?

ВАРИАНТ 2

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) The working conditions appeared to be more difficult than it was supposed.

2) We know the scientist to study this proposal thoroughly.

3) Scientific discoveries to be practically applied in industry are paid special attention to.

2. Перепишите и письменно переведите на русский язык следующие предложения, обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) Having been tested, the new equipment was installed in the laboratory.

2) The metal was heated, its temperature reaching the melting point.

3) The engineer making an experiment must take all safety measures.

4) Madame Tussaud's exhibition of wax figures has been one of Britain's most popular attractions.

5) It is this article that I recommend you to read.

3. Перепишите предложения и переведите их на русский язык, обращая внимание на разные значения глаголов **to be, to have, to do**.

1) Mary didn't return to her family in Paris.

2) The story of Madame Tussaud is as impressive as her exhibition.

3) We were able to finish our work for 5 days.

4) A new project has been designed at the research Institute.

4. Перепишите следующие предложения и переведите их на русский язык, обращая внимание на бессоюзное подчинение (см. образец 3).

1) The hostel our students live in is situated not far from the metro station.

2) I think he has made a mistake in his calculations.

3) The text the student is reading is about some places of interest in London.

5. Перепишите следующие предложения и переведите их на русский язык, обращая внимание на функцию инфинитива в предложении.

1) She returned to her native town never to leave it again.

2) The purpose of this book is to describe certain traditions and customs of the UK.

3) Here is the list of books to be published this year.

4) The next move of the rebels was to surround the Tower.

6. Прочитайте и устно переведите с 1-го по 6-й абзацы текста. Перепишите и письменно переведите 1, 2 и 3-й абзацы.

Пояснения к тексту

wax figures – восковые фигуры
death mask – посмертная маска
scientific approach – научный подход
inherit – наследовать; унаследовать; быть, стать наследником
tourist attraction – место паломничества туристов

MADAME TUSSAUD

1) For over 200 years, Madame Tussaud's exhibition of wax figures has been one of Britain's most popular attractions. The exhibition has constantly developed and now visitors can see the world's public figures, including men and women who have made a lasting impact on our lives, Kings and Queens, great statesmen, religious leaders, superstars past and present who have become legends.

2) But the story of Madame Tussaud is as impressive as her exhibition. Madame Tussaud whose first name is Marie was born in France in 1761. Her father, a soldier, was killed in battle two month before her birth. She lived with the mother who worked as a housekeeper for the doctor who had a wonderful

3) The ravens whose forefathers used to find food in the Tower still live here as part of its history. There are always at least 6 ravens at the Tower. There is a story that they bring good luck to Britain, if they stay at the Tower. That's why they get "paid" meat and biscuits every day. But their wings are cut so that they can't fly away. They are not very friendly.

4) The White Tower was built by William the Conquerot to protect and control the City of London. It is the oldest and the most important building, surrounded by other towers, which all have different names.

5) The Tower is guarded by the Yeomen Warders, called Beefeaters. Today they work mostly as guides. They show people around and tell stories about all the terrible things that have happened here. They still wear the high ruffs and scarlet tunics assigned to them during the reign of Queen Elizabeth I.

6) The Crown Jewels are shown in the Jewel House. They are well looked after. Once Colonel Thomas Blood attempted to steal them. Blood and his accomplices bound and gagged the Jewel House keeper. Although they laid their hands on the Imperial State Crown, Sceptre and Orb, they were foiled when the keeper's son turned up unexpectedly and raised the alarm. The Crown Jewels are currently stored in the Waterloo Barracks at the Tower.

7. Прочитайте 4, 5 и 6-й абзацы текста и письменно ответьте на вопросы:

1) Who was the White Tower built by?

2) What kind of work do the Yeomen Warders do in the Tower?

3) What do the Beefeaters look like?

4) Did Colonel Thomas Blood steal the Crown Jewels? Why?

ВАРИАНТ 3

1. Перепишите следующие предложения, определите в каждом из них видовременную форму и залог глагола-сказуемого (см. образец 1). Переведите предложения на русский язык.

1) Mary's father, a soldier, was killed in battle two month before her birth.

2) These books were being published for a whole year.

3) The construction of this building has been completed this month.

4) All the students will have been examined by tomorrow.

2. Перепишите следующие предложения и переведите их на русский язык, обращая внимание на разные значения слов **it, that, one** (см. образец 2).

1) It was only with the establishing of Moscow University that legal science began to develop in Russia. It was a great progress.

2) The territory of Moscow is larger than that of London.

3) In London one must get used to the left-side traffic.

3. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на то, как переводятся условные предложения (см. образец выполнения 3).

1) If liquids expand upon freezing, an increase of pressure lowers the freezing point.

2) If the metal had been heated slowly, the first changes in its appearance would have occurred at a temperature of 1,000°K.

3) It would be impossible to determine the properties of these materials without intensive studies in our research laboratory.

4. Прочитайте и устно переведите с 1-го по 5-й абзацы текста. Перепишите и письменно переведите 1, 2, 3 и 4-й абзацы.

Пояснения к тексту

alloy – сплав
brass – латунь
molten – расплавленный
copper – медь
tin – олово

ALLOYS

1) The word alloy comes from a French word meaning "to combine". When metals in a molten state unite and make what seems to be a single substance, they are said to form an alloy. For example, brass is an alloy of copper and zinc. Most alloys are known to be made by melting the metals together but some are made by electrochemical methods and a few by compressing the powdered metals together.

2) Men first learned about the simple metals like copper and tin. Then, perhaps after, a fire, they found that a different substance was formed if copper and tin were melted together. This substance, called bronze, was found to be more useful than either of the metals by themselves, for when two or more metals form an alloy the result is a substance which has different properties from those of the original metals.

3) Metallurgists are known to have produced many kinds of alloys which can be used in several different ways.

4) In the homes of ancient people copper was used to make tools and weapons but it was too soft to be really suitable. It soon lost its sharp edge or bent if it struck something hard. The discovery of bronze gave a harder and more useful metal. Later iron was discovered and used instead of bronze.

5) When iron was obtained from the iron ore varying amounts of carbon were left in the metal produced. More recently in history it became possible to obtain iron with a definite amount of carbon in it. When this metal was made red-hot and cooled quickly by plunging it into cold water, it became very much

2. We want the new machine-tool to be produced by February.	Мы хотим, чтобы новый металлорежущий станок был выпущен к февралю.
3. Copper to have been alloyed with tin to form bronze was the most important metal of the Greeks and Romans.	Медь, которую сплавляли с оловом, чтобы получить бронзу, был самым важным металлом у греков и римлян.

Образец выполнения 2 (к упр. 2)

1. Alloys of copper including tin, aluminum, manganese, iron and beryllium are called bronze.	Сплавы меди, содержащие олово, алюминий, марганец, железо и бериллий, называют бронзой.
2. Having made this metal red-hot and cooled quickly by plunging it into cold water, we got a very much harder metal than the original iron.	Раскалив этот металл докрасна и охладив его, погрузив в холодную воду, мы получили гораздо более твердый металл, чем железо.
3. New technological processes having been developed, new types of equipment have been installed in the shop.	Когда были разработаны новые технологические процессы, в цехе было установлено новое оборудование.

Образец выполнения 3 (к упр. 3)

1. If the installation is put into operation in time, the economic effect will be greater.	Если установка будет пущена вовремя, экономический эффект возрастет.
2. If the system had been perfected, we should have applied it for new calculations.	Если бы система была усовершенствована, мы бы применили ее для новых расчетов.
3. It would be impossible to build spaceships without using new materials and alloys.	Было бы невозможно построить космические корабли без применения новых материалов и сплавов.

ВАРИАНТ 1

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) The scientists suppose these phenomena to be of great importance.

2) St. James's Park is one of the smallest, but with its charming lake and view of Westminster from the bridge, is easily the most attractive.

3) One should work regularly if one wants to master English.

4) The City is situated in the centre of London. It occupies about one square mile in area.

5) That happened the year he graduated from the University.

3. Перепишите следующие предложения и переведите их на русский язык, помня о разных значениях глаголов **to be, to have, to do**.

1) They had to cover the whole distance on foot.

2) The students are not at the laboratory. They are to be there at 6 o'clock.

3) Five of London's nine royal parks are in the very near of the capital.

4) Each London park has its own character.

5) He doesn't read English books in the original.

4. Перепишите следующие предложения и переведите их на русский язык, обращая внимание на бессоюзное подчинение (см. образец 3).

1) I think the drawing will be ready by tomorrow.

2) The method we objected to did not give good results.

3) The problem we are dealing with is very important for our research.

5. Перепишите следующие предложения и переведите их на русский язык, обращая внимание на функцию инфинитива в предложении.

1) To design new buildings is the work of an architect.

2) We decided to check the results of the experiment.

3) The pictures to be displayed at the international exhibition are taken from many world-famous museums.

4) The question is too complicated to be solved at once.

6. Перепишите и устно переведите на русский язык с 1-го по 5-й абзацы текста. Перепишите и письменно переведите 4-й и 5-й абзацы.

Пояснения к тексту

flower bed – клумба

Serpentine – Серпантин – узкое искусственное озеро в Гайд-Парке (*букв.* змееобразное)

Speaker's Corner – «Уголок оратора» (место в Гайд-парке, где по воскресеньям и субботам с импровизированной трибуны выступают ораторы на различные темы; в настоящее время превратился в одну из достопримечательностей Лондона).

Marble Arch – (*букв.* мраморная арка) Марбл-Арч (триумфальная арка сооружена в 1828 г. в качестве главного въезда в Букингемский дворец, в 1851 г. перенесена в северо-восточную часть Гайд-Парка; ныне находится вне его пределов)

6. Прочитайте и устно переведите на русский язык с 1-го по 5-й абзацы текста. Перепишите и письменно переведите 1-й и 2-й абзацы.

Пояснения к тексту

flag officer – адмирал, имеет право поднимать свой флаг на корабле; адмиральского

superb grasp – великолепная способность быстрого понимания

the Battle of Trafalgar – битва при мысе Трафальгар на Атлантическом побережье Испании в 1805 г.

monument's plinth – постамент памятника

mass rallies – массовые митинги

1) At the beginning of the 19th century the English fleet under Admiral Nelson's command defeated the French and Spaniards in the great sea battle at Trafalgar. Horatio Nelson was a flag officer famous for his service in the Royal Navy, particularly during the Napoleonic Wars. He was noted for his inspirational leadership and superb grasp of strategy and unconventional tactics, which resulted in a number of decisive naval victories. He was wounded several times in combat, losing one arm and the sight in one eye. Of his several victories, the best known and notable was the Battle of Trafalgar in 1805.

2) Napoleon had threatened to invade Britain several times. While the preparations to defend Britain were being made at home, Admiral Nelson swept the seas searching for the French navy and at last met it in Trafalgar Bay, off the coast of Spain. Nelson was killed in the Battle, but the victory was won. Napoleon's power on the sea was utterly destroyed. Britain was once more saved from all fear of invasion and the ribbon of water between Britain and the Continent was enough to keep her safe.

3) Trafalgar Square commemorates Nelson's victory at the Battle of Trafalgar. In the middle of the Square rises the Nelson Column, a monument to Admiral Nelson. The monument was constructed between 1840 and 1843 to a design by William Railton at a cost of £47,000. The sandstone statue of Nelson is by E. H. Baily and the four bronze lions on the base, added in 1867, were designed by Sir Edwin Landseer.

4) But Trafalgar Square is not used only for the commemoration of Admiral Nelson. It is also the meeting – place of the members and supporters of the British peace movement. In fact, mass rallies of many organizations take place here and the monument's plinth is often used as a platform by the speakers.

5) Sometimes there are hundreds of Londoners here, strolling up and down the Square, meeting friends and resting. Trafalgar Square is a public space and tourist attraction in central London.

the engine) These qualities are particularly in evidence in the Kamov Ka-50 "Black Shark" helicopter of the Russian Air Force developed by Kamov design bureau. It is a single-seat Russian attack helicopter with the distinctive coaxial rotor. The Ka-50 was designed in the 1980s, adopted for service in the Russian army in 1995 and is currently manufactured by the Progress company in Arsenyev.

2) During the late 1990s, Kamov and Israel Aerospace Industries developed a tandem-seat cockpit version, the Kamov Ka-50-2 "Erdogan", to compete in Turkey's attack helicopter competition. Kamov also designed another two-seat variant, the Kamov Ka-52 "Alligator".

3) The Ka-50 was designed to be small, fast and agile to improve survivability and lethality. For minimal weight and size (thus maximum speed and agility) it was–uniquely among gunships–to be operated by a single pilot only.

4) Kamov concluded after thorough research of helicopter combat in Afghanistan and other war zones that the typical attack mission phases of low-level approach, pop-up target acquisition and weapon launch do not simultaneously demand navigation, maneuvering and weapons operation of the pilot; and thus with well-designed support automation a single pilot can carry out the entire mission alone. During operational testing in the 1985–86, the workload on the pilot was similar to a fighter-bomber pilot, and the pilot could perform both flying and navigation duties.

5) Like other Kamov helicopters, it features Kamov's characteristic contra-rotating co-axial rotor system, which removes the need for the entire tail rotor assembly and improves the aircraft's aerobatics qualities—it can perform loops, rolls and "the funnel" (circle-strafing).

5. Прочитайте 4-й и 5-й абзацы текста и ответьте письменно на следующие вопросы:

1) What can the contra-rotating co-axial rotor system improve?

2) What did Kamov conclude after research of helicopter combats in some wars?

ВАРИАНТ 5

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) The early artificial satellites showed the Earth to be surrounded by intense radiation.

2) The properties of the new material are known to be determined next month.

3) All the changes of temperature and changes of state to be discussed are shown by a graph in Fig. 2.

PARKS AND GARDENS

1) The special feature that distinguishes London from other capital cities is its many green parks, which have been enjoyed by its citizens since Hyde Park became the first public garden in 1637.

2) Five of London's nine royal parks are in the very near of the capital. Among the most important parks that bring fresh life and colour to London are St. James's Park, Hyde Park and Kensington Gardens that stretch across the West End. Each has its own character.

3) St. James's Park is the oldest of the Royal Parks of London. The park has a small lake, St. James's Park Lake. The lake's collection of waterfowl includes a resident colony of pelicans, which has been a feature of the park since the first gift of the birds from a Russian ambassador in 1664. Laid out in the midst of government buildings and palaces, St. James's Park is one of the smallest, but with its charming lake enlivened by water birds, well– maintained flower beds and view of Westminster from the bridge, is easily the most attractive.

4) Hyde Park has an area of 361 acres and its outstanding feature is the 40 – acre Serpentine boating lake. One of the great urban parks of the world was once a deer – hunting park for Henry VIII and in 1851 it was the site for London's Great Exhibition. Londoners love to use this park and you'll find joggers – not to mention riding enthusiasts cantering around the horse track – taking advantage of its spaciousness. Another attraction of the park is Speaker's Corner, near the Marble Arch, where anyone can get up on a makeshift rostrum – often a cardboard box – and spout their opinions.

5) Kensington Gardens are separated from Hyde Park by a road, but the difference in character is at once apparent – it is more formal, more enclosed. The Gardens share the boating lake with the neighboring park, but at this section it is called the Long Water, where depending on the weather there is boating and ice – skating, or swimming. William III nipped 26 acres off the western and of Hyde Park in 1689 to make a garden for Kensington Palace. Expensive boats are still sailed in the Round Pond and magnificent kites are flown.

7. Прочитайте 1, 2 и 3-й абзацы текста и письменно ответьте на вопросы:

1) When was Hyde Park first opened to the public?
2) How many London's royal parks are not far from the capital?
3) What park is the oldest of the Royal Parks of London?
4) What is St. James's Park famous for?

3) With over 300 orders secured by early 2011, the Superjet 100 is widely regarded as the most important project of the Russian civilian aircraft industry and the project receives substantial support from the Russian government. The final assembly of the plane is done by Komsomolsk-on-Amur Aircraft Production Association, its SaM-146 turbofan engines, providing 13,500 to 17,500 pounds-force (60 to 78 kN) of thrust are designed and produced by the French-Russian Power Jet joint-venture and the plane is marketed internationally by SuperJet International. The noise and emissions levels satisfy the existing ICAO requirements.

4) The first test flight took place on 19 May 2008 at the Dzemgi airport at the Komsomolsk-on-Amur Aircraft Production Association. The first Superjet spent 1 hour, 5 minutes in the air, and reached an altitude of 1,200 meters.

5) At the Russian domestic market, the Sukhoi Superjet 100 (SSJ) is intended to replace the aging Tupolev Tu-134 and Yakovlev Yak-42 planes. The Superjet 100 is the first new civil aircraft developed in post-Soviet Russia.

5. Прочитайте 3-й и 4-й абзацы текста и ответьте письменно на следующие вопросы:

1) Where is the final assembly of the Superjet 100 done?
2) Where and when did the first test flight of the Sukhoi Superjet 100 take place?

КОНТРОЛЬНОЕ ЗАДАНИЕ 4
для студентов направления «Технология машиностроения»

Чтобы правильно выполнить задание 4, необходимо усвоить следующие разделы курса английского языка по рекомендованному учебнику:

1) сложные формы инфинитива (Passive Infinitive, Perfect Infinitive); обороты, равнозначные придаточным предложениям: объектный инфинитивный оборот, субъектный инфинитивный оборот;

2) причастия (Participle I, II), независимый (самостоятельный) причастный оборот;

3) условные предложения.

Используйте образцы выполнения упражнений.

Образец выполнения 1 (к упр. 1)

1. Copper is known to have been used in prehistoric times for making weapons and tools	Известно, что медь в древности использовали для изготовления оружия и орудий труда.

2. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) When discussing high-speed aerodynamics, we constantly refer to the speed of sound.

2) In preceding chapters of this book we have discussed the development and construction of turbo-jet engines.

3) With the rocket travelling at around 4,500 mph, at an angle of 45 deg. to the Earth's surface, the first-stage motor stopped and fell away.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения, Обратите внимание на то, как переводятся условные предложения (см. образец выполнения 3).

1) If you had translated the article about this aircraft, you could have used valuable data in your work.

2) If the quality of the equipment were higher, the results of the experiment would be more accurate.

3) It would be impossible to explain these phenomena without using the laws of physics.

4. Прочитайте и устно переведите с 1-го по 5-й абзацы текста. Перепишите и письменно переведите 1, 2 и 5-й абзацы.

Пояснения к тексту

fly-by-wire – aircraft control through systems operated by electronic circuits rather than mechanical rods – электродистанционная система управления самолетом
maiden flight – первый полёт (самолёта)
turbofan – турбовентиляторный двигатель

SUKHOI SUPERJET 100

1) The *Sukhoi Superjet 100* is a modern, fly-by-wire regional jet in the 75- to 95-seat category. With development starting in 2000, the plane was designed by the civil aircraft division of the Russian aerospace company Sukhoi in cooperation with Western partners. Its maiden flight was conducted on 19 May 2008 and the plane received its Interstate Aviation Committee certification in January 2011 with European Aviation Safety Agency certification expected in mid-2011. On 21 April 2011, the Superjet 100 performed its first commercial passenger flight, on the Armavia route from Yerevan to Moscow.

2) President of United Aircraft Corporation and General Director of Sukhoi Mikhail Pogosyan hailed the event as a key milestone for the Superjet 100 project, saying that it opened "a new stage of the program – the beginning of commercial operation and full-scale serial production."

ВАРИАНТ 5

1. Перепишите следующие предложения, определите в каждом из них видовременную форму и залог глагола-сказуемого (см. образец 1). Переведите предложения на русский язык.

1) Napoleon's power on the sea was utterly destroyed.

2) Trafalgar Square is not used only for the commemoration of Admiral Nelson.

3) Many houses have been built in our city lately.

4) At the publishing house I was told that the book would have been published by the end of the year.

2. Перепишите следующие предложения и переведите их на русский язык, обращая внимание на разные значения слов **it**, **that, one** (см. образец 2).

1) The British Constitutional system is one which has developed over the centuries.

2) One should take into consideration that this problem is very difficult.

3) The house of Commons plays the major role in law-making. It consists of Members of Parliament.

4) It was he who made so many discoveries.

5) I didn't agree with him and that made him angry.

3. Перепишите следующие предложения и переведите их на русский язык, обращая внимание на разные значения глаголов **to be, to have, to do.**

1) There are hundreds of Londoners here, strolling up and down the Square, meeting friends and resting.

2) When he came to London he was able to carry on talks without an interpreter.

3) We had to find new methods of investigation because the old ones were unsatisfactory.

4) The students didn't repeat the new grammar rules.

4. Перепишите следующие предложения и переведите их на русский язык, обращая внимание на бессоюзное подчинение (см. образец 3).

1) We know Trafalgar Square to commemorate Nelson's victory at the Battle of Trafalgar.

2) The book we have expected so much is being discussed hotly now.

3) The pictures we have expected to be displayed at the international exhibition are taken from many world-famous museums.

5. Перепишите следующие предложения и переведите их на русский язык, обращая внимание на функцию инфинитива в предложении.

1) It must be very nice to go to the country every week-end.

2) Our plan was to go sightseeing in London.

3) The question will be discussed at the meeting to be held tomorrow.

4) The book on History of England is too long to be read in a day.

ВАРИАНТ 4

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) The crew is reported to have carried out a great deal of scientific experiments.

2) The designer assumed the form of the tank to be spherical.

3) Propellant properties are the main two factors to be considered here.

2. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) Tests simulating overland flights at various speeds are of great importance.

2) Soon the aircraft exploded in the air and broke into several pieces, two of them falling in flames.

3) With this manoeuvre of the spacecraft completed, two of the three crewmen will transfer from one module to the other.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения. Обратите внимание на то, как переводятся условные предложения (см. образец выполнения 3).

1) If the air is rising from the earth, it is called a vertical current or thermal.

2) If lift were less than gravity, the aircraft would descend.

3) It would be impossible to ensure the full supply of energy without atomic power stations.

4. Прочитайте и устно переведите с 1-го по 5-й абзацы текста. Перепишите и письменно переведите 1, 3 и 4-й абзацы.

Пояснения к тексту

coaxial rotors – соосные, имеющие общую ось несущие винты
payload – полезная нагрузка
dispense with – обходиться без чего-л.
tail rotor – хвостовой винт
cockpit – кабина (в самолёте)

KAMOV HELICOPTERS

1) Long experience with helicopters with coaxial rotors has proved their main advantages – great maneuverability, small size, high payload and great effectiveness. The coaxial system has also enabled the designers to dispense with tail rotor (which usually consumes about 10 per cent of the power developed by

7. Прочитайте 3, 4 и 5-й абзацы текста и письменно ответьте на вопросы:

1) What monument is located in the middle of Trafalgar Square?
2) When was the Nelson Column constructed?
3) Who were the designers of the monument to Admiral Nelson?
4) What is Trafalgar Square used for?

КОНТРОЛЬНОЕ ЗАДАНИЕ 4
для студентов специальности «Самолето- и вертолетостроение»

Чтобы правильно выполнить задание 4, необходимо усвоить следующие разделы курса английского языка по рекомендованному учебнику:

1) сложные формы инфинитива (Passive Infinitive, Perfect Infinitive); обороты, равнозначные придаточным предложениям: объектный инфинитивный оборот, субъектный инфинитивный оборот;

2) причастия (Participle I, II), независимый (самостоятельный) причастный оборот;

3) условные предложения.

Используйте образцы выполнения упражнений.

Образец выполнения 1 (к упр. 1)

1. Some new types of aircrafts are recorded to have been produced in Russia.	Зарегистрировано, что в России выпущено несколько новых типов самолетов.
2. We want the new aircraft to be produced by February.	Мы хотим, чтобы новый самолет был выпущен к февралю.
3. Large airplanes to be used for overseas or transcontinental flights also require considerable crew space.	Большие самолеты, которые нужно использовать для рейсов за границу и трансконтинентальных полетов, также требуют достаточно места для размещения экипажа.

Образец выполнения 2 (к упр. 2)

1. There are two pairs of opposing forces acting on an aircraft in flight.	Существует две пары противоположных сил, действующих на самолет во время полета.
2. Having been completed, the airplane parts were transported to the assembly shop.	После того как изготовление деталей самолета было завершено, их перевезли в сборочный цех.

5) Further, to be satisfactory, the vehicle should display stable characteristics, so that if it is disturbed from an equilibrium condition, forces and moments are created which return it to its original condition without necessitating corrective action on the part of the pilot. Efficient design will minimize the aerodynamic drag, thereby reducing the propulsive thrust required for a given flight condition, and will maximize the lifting capability per pound of airframe and engine weight, thereby increasing the useful, or transportable, load.

5. Прочитайте 5-й абзац текста и ответьте письменно на следующий вопрос:

1) What must an airplane consist of to achieve practical flight?
2) What will the efficient design of the vehicle minimize and maximize?

ВАРИАНТ 2

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) Astronautics is considered to be the science and technology of the design and operation of space vehicles.

2) On some occasions scientists may consider the acceleration of gravity to be constant.

3) Tests to determine properties of propellants are currently in preparation at the laboratory.

2. Перепишите и письменно переведите на русский язык следующие предложения, обратите внимание на первой зависимого и незавимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) The indicated airspeed of the airplane being controlled constantly, the pilot may determine the plane's true airspeed.

2) The first indication of icing the airplane is a loss of power, with the loss increasing at a rapid rate.

3) Air flowing around the cockpit makes a tremendous noise.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения. Обратите внимание на то, как переводятся условные предложения (см. образец выполнения 3).

1) At high speeds he would not be able to survive in his cockpit if special cooling devices were not used.

2) If outside forces disturb a stable aircraft from its normal flight, the aircraft tends to return eventually to its original position.

3) It would be impossible to determine the properties of these materials without intensive studies in our research laboratory.

4. Прочитайте и устно переведите с 1-го по 5-й абзацы текста. Перепишите и письменно переведите 1, 3 и 4-й абзацы,

Пояснения к тексту

spoiler aileron – интерцептор
trailing edge – задний край; задняя кромка
camber – изгиб крыла
airfoil – аэродинамическая поверхность; крыло; профиль крыла
(aerodynamic) chord – (аэродинамическая) хорда
fore-and-aft – продольный
torque – крутящий момент; вращающий момент; изгибающий момент

AILERON

1) Aileron is a hinged rear portion of an aircraft wing, moved differentially on each side of the aircraft to obtain lateral or roll control moments. The angular settings of the ailerons are controlled by the human or automatic pilot through the flight control system.

2) The operating principles of ailerons are the same as for all trailing-edge hinged control devices. Deflection of an aileron changes the effective camber, or airfoil curvature relative to the wing chord, of the entire wing forward of the aileron. With the trailing edge deflected upward, reduced local flow velocities are produced on the upper wing surface, and increased local flow velocities are produced on the lower wing surface.

3) By Bernoulli's law, this results in a reduction of lift over the portion of the wing forward of the aileron, and on the aileron itself. Conversely, trailing-edge down deflection of a flap-type aileron increases the lift in the same areas.

4) Ailerons are located as close as possible to the wing tips, to maximize rolling moment by increasing the moment arm of the force due to the change in wing lift. In the case of flap-type ailerons, when the trailing edge is raised on one wing, say the left, the trailing edge of the aileron on the opposite or right wing is lowered by about the same amount. The decrease in lift on the left wing is accompanied by a lift increase on the right wing. While the net wing lift remains about the same, a rolling moment or torque about the aircraft's fore-and-aft axis develops in a left, or counterclockwise, direction as seen by the pilot.

5) Flap-type ailerons are replaced or supplemented by spoiler-type ailerons for a variety of reasons. Spoiler ailerons are usually installed forward of the landing flaps on commercial jet transports, in order to supplement aileron effectiveness during landing approaches, when the landing flaps are extended. Greatly reduced takeoff and landing speeds can be obtained by devoting the trailing edge of the entire wing to high-lift flaps. This is made possible by substituting spoilers for flap-type ailerons.

5. Прочитайте 2-й и 5-й абзацы текста и ответьте письменно на следующие вопросы:

1) What are the operating principles of ailerons?

2) Why are flap-type ailerons replaced by spoiler-type ailerons?

ВАРИАНТ 3

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) The Sun and stars are proved to be able to produce great quantities of energy by means of certain nuclear reactions.

2) For the experiment we need several electrical devices to be connected in series.

3) No other forces are assumed to act on the fuel tank bottom.

2. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) The forces acting on a plane in flight are lift, weight, drag and the thrust.

2) Having built a new aircraft construction plant, we increased the output of airplanes.

3) The tracking of a space vehicle may be accomplished in three different ways, the most obvious being the complete measurement of position and velocity.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения. Обратите внимание на то, как переводятся условные предложения (см. образец выполнения 3).

1) If the gathered data had been presented in time, the results of the experiments would have been different.

2) If thrust were decreased, drag would cause the aircraft to decelerate.

3) It would be impossible to carry on a careful study of the process without the new device.

4. Прочитайте и устно переведите с 1-го по 5-й абзацы текста. Перепишите и письменно переведите 1, 2 и 3-й абзацы.

Пояснения к тексту

rudder – руль направления
tail plane – горизонтальное оперение, стабилизатор
landing gear – шасси
mid wing – среднерасположенное крыло
stall – сваливание (воздушного судна), потеря скорости
pod – гондола двигателя, подвеска под крылом, фюзеляжем

air drag – аэродинамическое сопротивление, сопротивление воздуха
directional stability – продольная (путевая, курсовая) устойчивость

PARTS OF AN AIRPLANE

1) The airplane has six main parts: fuselage, wings, stabilizer (or tail plane), rudder, one or more engines, and landing gear. The fuselage is the main body of the machine, customarily streamlined in form. It usually contains control equipment, and space for passengers and cargo.

2) The wings are the main supporting surfaces. Modern airplanes are monoplanes (airplanes with one wing) and may be high-wing, mid-wing, or low-wing (relative to the bottom of the fuselage). At the trailing edge of the wings are auxiliary hinged surfaces known as ailerons that are used to gain lateral control and to turn the airplane.

3) The lift of an airplane, or the force that supports it in flight, is basically the result of the direct action of the air against the surfaces of the wings, which causes air to be accelerated downward. The lift varies with the speed, there being a minimum speed at which flight can be maintained. This is known as the stall speed. Because speed is so important to maintain lift, objects such as fuel tanks and engines that are carried outside the fuselage are enclosed in structures called nacelles, or pods, to reduce air drag (the retarding force of the air as the airplane moves through it).

4) Directional stability is provided by the tail fin, a fixed vertical airfoil at the rear of the plane. The stabilizer, or tail plane, is a fixed horizontal airfoil at the rear of the airplane used to suppress undesired pitching motions. To the rear of the stabilizer are usually hinged the elevators, movable auxiliary surfaces that are used to produce controlled pitching.

5) The rudder, generally at the rear of the tail fin, is a movable auxiliary airfoil that gives the craft a yawing (turning about a vertical axis) movement in normal flight. The rear array of airfoils is called the empennage, or tail assembly. Some aircraft have additional flaps near the ailerons that can be lowered during takeoff and landing to augment lift at the cost of increased drag.

5. Прочитайте 4-й и 5-й абзацы текста и ответьте письменно на следующие вопросы:

1) What is directional stability provided by?

2) What is the stabilizer used for?

3) Where is the rudder located and what is its function?

3. New technological processes having been developed, new types of equipment have been installed in the shop.

Когда были разработаны новые технологические процессы, в цехе было установлено новое оборудование.

Образец выполнения 3 (к упр. 3)

1. If the installation is put into operation in time, the economic effect will be greater.

Если установка будет пущена вовремя, экономический эффект возрастет.

2. The airspeed indicator tells the pilot what his airspeed would be if he were flying at sea-level under standard atmospheric conditions.

Указатель воздушной скорости сообщает пилоту, какой могла бы быть скорость воздушного потока, если бы он летел над уровнем моря при нормальных атмосферных условиях.

3. It would be impossible to build spaceships without using new materials and alloys.

Было бы невозможно построить космические корабли без применения новых материалов и сплавов.

ВАРИАНТ 1

1. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям (см. образец выполнения 1).

1) The speed of the aircraft at the time of the explosion is estimated to have been about 300 knots.

2) We expect the new aircraft to fly this year.

3) The spacecraft appears to have encountered very few micrometeoroids in its travel.

2. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого (самостоятельного) причастных оборотов (см. образец выполнения 2).

1) Having done a number of calculations, our astronomers have shown that the basic mass of the galaxies is concentrated outside their visible part.

2) A simple laboratory experiment demonstrating this principle is shown in Fig. 29.

3) With the first phase of the test flight completed, attention now turns to modifications of the aircraft.

3. Перепишите и письменно переведите на русский язык следующие сложные предложения. Обратите внимание на перевод условных предложений (см. образец выполнения 3).

1) If a step-rocket of this kind had ever been fired it would have dropped into the Pacific Ocean.

2) If biological experiments are continued, the problem of developing the technology for growing plants in space conditions will be solved.

3) It would be impossible to protect metal from corrosion without the films.

4. Прочитайте и устно переведите с 1-го по 5-й абзацы текста. Перепишите и письменно переведите 1, 2 и 3-й абзацы.

Пояснения к тексту

fixed-wing aircraft – воздушное судно с неподвижным крылом
screw propeller – гребной винт
high-velocity – высокоскоростной
altitude control – высотное управление, высотный корректор; руль высоты
swept-back – стреловидный
aerofoil – аэродинамическая поверхность; профиль (крыла); крыло
short takeoff and landing – короткий взлет и посадка
aerodynamic drag – сила лобового сопротивления, аэродинамическое сопротивление

AIRPLANE PARTS

1) Fixed-wing aircraft that is heavier than air, propelled by a screw propeller or a high-velocity jet, and supported by the dynamic reaction of the air against its wings. An airplane's essential components are the body or fuselage, a flight-sustaining wing system, stabilizing tail surfaces, altitude-control devices such as rudders, a thrust-providing power source, and a landing support system.

2) Beginning in the 1840s, several British and French inventors produced designs for engine-powered aircraft, but the first powered, sustained, and controlled flight was only achieved by Wilbur and Orville Wright in 1903.

3) Later airplane design was affected by the development of the jet engine; most airplanes today have a long nose section, swept-back wings with jet engines placed behind the plane's midsection, and a tail stabilizing section. Most airplanes are designed to operate from land; seaplanes are adapted to touch down on water, and carrier-based planes are modified for high-speed short takeoff and landing.

4) A heavier-than-air vehicle designed to use the pressures created by its motion through the air to lift and transport useful loads. To achieve practical, controllable flight, an airplane must consist of a source of thrust for propulsion, a geometric arrangement to produce lift, and a control system capable of maneuvering the vehicle within prescribed limits.